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The augmented house: Crafting tangible interaction in house museums

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The Augmented House:
Crafting tangible interaction in House Museums

Caroline Claisse

A thesis submitted in partial fulfilment of the requirements

of Sheffield Hallam University for the degree of Doctor of Philosophy

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Abstract

With my practice-based PhD, I intended to broaden current practice in exhibition design by means of designing for tangible interaction in house museums. The main goals were (1) to identify the challenges and opportunities for designing interactive experiences in historic houses, (2) to show how to include underrepresented actors such as museum volunteers in the creative process, and (3) to use design as a means to demonstrate the potential of tangible interaction in house museums. I was motivated by my experience as an exhibition designer where I identified a space for experimenting with a new approach to exhibition design, one that was more inclusive, multisensory and design-led. To achieve this, I blended Research Through Design (RtD) with co-creation to magnify the voices and roles of museum volunteers in the context of one historic house: the Bishops' House museum (Sheffield, UK). I designed for tangible interaction where embedded technology enabled me to augment the visiting experience in ways that were magical, embodied and highly evocative.

The thesis reports the four phases of my investigation in which I reflect on my process alongside presenting findings from co-creating and implementing novel experiences of heritage at the museum. I contribute to the field of exhibition and interaction design at different levels: firstly, by providing practitioners with guidance on how to design for sensitive places like the Bishops' House; then, by developing my own tools to nurture co-creation during the RtD process; finally, by addressing issues with current practice through design and showing how tangible interaction can enhance the visiting experience in the particular context of house museums. With my work, I believe that I have opened a new area of exploration for exhibition design where challenges and concerns can be addressed through an inclusive approach with craftmanship at its centre.

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1 Introduction

1.1 Research context and approach

In my doctoral study, I used Research through Design (RtD) to explore the potential of tangible interaction to augment the visiting experience not in traditional museums, but within house museums – a particular type of heritage site where artefacts are displayed in a domestic setting, often in their original context and out of their protective case with limited interpretation attached to them. I present the findings from my practice-based PhD where the following research question was investigated through design: *how can tangible interaction be used to augment the place and increase engagement with heritage in the specific context of house museums?* "Tangible interaction" (Hornecker & Buur, 2006) is used in my thesis as an umbrella term with a particular focus on material aspects of experience where embedded technology enabled me to augment an artefact or a space with new readings and multiple interpretations. Here, I first introduce the research context and the motivations behind using tangible interaction for exhibition design in house museums. I then outline the research questions, aims and contributions of my practice-based investigation. In section 1.2, I describe my background as a designer and summarise the structure of my thesis in section 1.3.

My research is interdisciplinary and sits within the field of user experience design – a field where "theory and practice are continually evolving, fusing borrowed principles and processes from graphic design, product design, human-computer interaction (HCI) and cognitive psychology with new ones of its own" (Steane & Yee, 2018, p. 6). It was motivated by my experience as an exhibition designer where I noticed an increasing interest in using technology to create interactive experiences in museums (see details in 1.2). However, I also noticed museums' concerns linked to technology and the need for sensitive design, careful integration and planning. With regard to innovative interpretation, house museums have recognised the potential of using digital technology

to breathe life into the house (Bugler, 2015) but very little experimentations have been conducted so far. Digital technology is conspicuously absent, apart from occasional interventions relying on mobile devices (Ciolfi, 2015; Lombardo & Damiano, 2012; Szymanski et al., 2008). In my research, I addressed a new area of exploration for exhibition making by designing for tangible interaction where embedded technology allowed me to focus the visitor experience on the material aspects of *being there* rather than on the device used to augment the visit (e.g. mobile phone). I demonstrated this by designing interactive experiences where digital technology is embedded within physical artefacts to encourage multisensory and embodied experience of heritage. Embedded technologies allowed me to hide technology in such a way that it did not override the visiting experience, but rather, enhanced it by creating magical encounters with heritage. With my thesis, I argue that house museums offer a unique opportunity for practice-based research and I intended to show ways for tangible interaction to augment the visiting experience in meaningful and sensitive ways.

House museums are popular and well-established types of heritage sites in the UK and in other countries such as Australia and the USA (Young, 2007). They are experiential places where meaning and place making are formed through physical and haptic experiences, and where visitors engage with the past in embodied and sensory ways by the simple act of walking through the house and leaning on its walls (Naumova, 2015). However, recent critics (Vagnone & Ryan, 2016) have challenged historic houses to adopt a more inclusive approach and to reconsider the way they interpret and present heritage to the public (see details in 2.1). Current practice in exhibition design is criticised for its tendency to freeze the place by limiting interpretation to a single period of history and presenting heritage as one linear narrative often focused on a leading character (Smith, 2006; Vagnone & Ryan, 2016). In line with Smith (2006), I believe that exhibition designers should think of heritage as an active process – something actively used by people, rather than a static and unchanging mon-

ument of the past. In this case, I argue for the potential of tangible interaction to broaden existing practice in exhibition design by means of augmenting stories and artefacts in ways that are meaningful for people visiting or involved in looking after these sites.



Figure 1–1 The Bishops' House museum, Sheffield (UK).
Photo © Ken Dash

This was explored by adopting a RtD approach with co-creation as a "mindset" (Stappers & Sanders, 2012) to engage a community of museum volunteers involved in looking after the Bishops' House[1] museum (figure 1-1) in Sheffield (UK). Together, we explored new opportunities for exhibition design and re-imagined heritage through co-creation. Two interactive experiences were evaluated in the context of two exhibitions: "Containers of Stories" and the "Interactive Tableaux" displayed at the 2016 and 2017 *Curious House* exhibitions[2]. The resulting designs served as a means of exploration through which volunteers were able to access experience of technology whilst collectively exploring the potential of tangible interaction for exhibition design in their museum. Prior to outlining my

1 See the Bishops' House museum website: https://www.bishopshouse.org.uk/

2 *Curious House* exhibitions blog: https://curioushouse.wordpress.com/

researh questions, aims and contributions, I describe the Bishops' House to set the scene for my practice-based investigation.

1.1.1 The Bishops' House

Located in the grounds of Meersbrook Park in Sheffield, the Bishops' House is described as a treasure of Sheffield's architecture heritage and is one of the best surviving example of timber frame buildings in the city[3]. Inhabited until the 1970s, the House was then restored back to its 17th century structure and turned into a museum. Once opened to the public, the house operated as a museum of local history with many temporary exhibitions about the many and varied facets of local life and history in the city[4] (figure 1-2).



Figure 1–2 Temporary exhibition at the Bishops' House before the Friends took over.
Photo from the archive © Museums Sheffield.

In 2011, Museums Sheffield relocated staff to their city centre museums and it was only through the efforts of a group of local volunteers, forming "The Friends of Bishops' House" charity, that the House was saved from closure. The

3 Bishops' House website: www.bishopshouse.org.uk

4 Document from the archive © Museums Sheffield

Friends have since managed the House on behalf of Sheffield City Council on a voluntary and non-profit making basis, maintaining weekend opening. Inside, visitors find period room displays, dressing up activities and hands-on exhibits about Tudor history (figure 1-3). The bulk of artefacts on display in the house continue to be curated by Museums Sheffield who meet periodically with the Friends. There is no temporary exhibition, but the Friends host regular events, school visits and occasional weddings. The Friends have developed a range of educational materials for visitors to enjoy: a guidebook, leaflets, and activities for young children (e.g. knitted mice to find), and visual trails of places and objects to spot around the house for older children.



Figure 1–3 Example of a period room display at the Bishops' House.
Photo © Caroline Claisse.

After visiting the museum, I felt inspired by the sensory qualities of the place and its vernacular architecture. I also identified an opportunity for involving the community of volunteers who were looking after the site. This is described in more details in the first phase of my research (see Immersion, chapter 4).

1.1.2 Research Questions

My research questions (RQs) were answered through the design of two interactive experiences that were instrumental to the generation of new knowledge (figure 1-4). My contribution is three-fold and organised below in relation to three main RQs. Here, it is important to clarify that both interventions were not designed to solve a particular problem but instead, they were used as a means of exploration, to refine my enquiry through design (see details in methodology chapter). This section is followed by Foundation work (see 1.2) to show how my experience as a design practitioner informed my practice-based enquiry.



Figure 1–4 Two interactive experiences “Containers of Stories” (left) and The Interactive Tableaux (right). Design © Caroline Claisse.

RQ1: *What are the challenges and opportunities for designing interactive experiences in house museums?* Via a comprehensive understanding of house museums, I believe that technology can be seamlessly integrated and used to enhance visitors’ experience. By immersing myself in the research context, I aimed to identify the particularities of historic houses so interaction designers can build on the sensory properties of the house and use these to design interactive experiences that are sensitive to the environment of house museums. One output of my PhD is a set of design principles (DPs, see 4.1) that I used to guide

my process and to turn challenges into opportunities for design. With the DPs, I contributed to current practice in interaction and exhibition design where to the best of my knowledge, there is currently no research that offers guidance on how to deploy technology in house museums.

RQ2: *How may volunteers be included in the process of designing exhibitions for house museums?* By using a participatory approach with museum volunteers, I demonstrated a new approach for exhibition design, one that is more inclusive. I developed bespoke methods to place museum volunteers at the heart of my design process and showed different ways to harvest their creativity. I also found my own ways to make sense of participants' contributions and placed my efforts on making sure that the resulting designs embodied their ideas and aspirations for the museum. In doing so, I aimed to demonstrate ways to nurture collective forms of creativity in longitudinal design research. I also contributed to ongoing dialogue in RtD and participatory design where there is a lack of transparency and documentation of the design process (see details in 3.1).

RQ3: *How can tangible interaction engage visitors with heritage at one house museum?* With my thesis, I argue for the potential of tangible interaction to provide interaction and exhibition designers with new means for audience engagement in house museums. Not only can tangible interaction afford new experiences of heritage but also, I believe, it can help house museums to address their spatial and aesthetic constraints. This is demonstrated in my research through the design of sensitive, bespoke and multisensory installations, which were carefully developed and implemented. Both the process of co-creation and the resulting designs aimed to broaden current exhibition practice while addressing museums' concerns about technology. This was achieved in practice, by focusing on material aspects of experience and using digital technologies for the volunteers to augment the place in ways that were meaningful to them, thus transforming their perception and role at the museum, and more at large, the community's experience of the local heritage site.

1.2 Foundation work

The aim of this section is two-fold: first, to identify what I mean by practice as the way that I understand and "do" design differs from other practitioners. Second, to emphasise key characteristics of previous work to show the motivations behind my doctoral investigation.

In my experience, design practice has a progressive and evolving nature. By studying in different universities across France, USA and the UK, my practice was informed by different cultures. Also, by progressing from undergraduate to postgraduate studies, I gained maturity in my work. I first trained as a graphic designer in Paris where the scope of the project and the deliverables were clearly outlined in a brief. During a student exchange in New York, I learned about corporate branding and developed my visual communication skills to design identities and campaign materials for cultural institutions such as the Museum of Modern Art. Back then, I was concerned with using design as a means to communicate information; for example, designing maps or posters to inform an audience about an exhibition or creating a logo that represented the values of a particular institution.

My understanding of design changed significantly with my postgraduate studies in London where I joined a new course entitled Information Experience Design at the Royal College of Art[5]. My practice shifted from communicating information to transforming information into experiences. By "experience", I mean using design to generate new perspectives and ways to engage with the world. During my MA, I developed my research skills and used design as a method of enquiry; to question and explore across the fields of art, design and technology. When unsure or confused, I was pushed to start making things as a means to clarify ideas. In this process, my work turned to be more sculptural, crafted and spatial. At the same time, my practice became more personal, self-directed and interdisciplinary. I now describe key aspects of my work to show how it informed three main strands of my current research: storytelling, participation and craft.

5 MA Information Experience Design website: https://www.rca.ac.uk/schools/school-of-communication/ied/

1.2.1 Exploring forms of storytelling in gallery settings

I drew inspiration from artistic practice and adopted tactics from the Surrealists to explore new formats for storytelling. I illustrate this here with two installations: “The Wheelbarrow Chair” and “The Exquisite Cabinet”. The Chair (figure 1-5, left) was designed in response to an open-ended brief, where students were asked to imagine a new platform for communicating and interpreting a story. I envisioned The Wheelbarrow Chair as a three-dimensional poem object. It embodied the story of Ferdinand Cheval, a French postman who committed his life to building his dream palace only with the help of a wheelbarrow. The hybrid object was exhibited in a gallery and later acquired by Ferdinand’s museum in France: The Ideal Palace[6].



Figure 1–5 The Wheelbarrow Chair (left). The Exquisite Cabinet (right).

The cabinet (figure 1-5, right) was created to explore participatory experience in gallery settings; by means of collecting and sharing stories in a new way. It was inspired by my MA dissertation where I observed innovative use of handling objects for creative thinking in museums (Claisse, 2013). The installa-

6 The Ideal Palace website: http://www.facteurcheval.com/en/index.html

tion was interactive and presented visitors with four drawers to pick objects from. Each drawer featured one hybrid object that acted as a prompt to record an imagined story (figure 1-6). The interactive system was inspired by the Surrealist game: *The Exquisite Corpse* – meaning that each visitor was invited to add a contribution by only seeing the last couple of words from the previous participant. Visitors' contributions were printed at the back of the cabinet as a long paper scroll that accumulated during the time of the exhibition. The cabinet provoked surprise and encouraged social interaction in the gallery. It was selected by the Design Council as Ones to Watch "Rethinking reality"[7] and described by Curator and Art Historian Tim Marlow as follows[8]: *This seems to be where surrealism enters the digital age – a kind of post-modern cabinet of curiosities with narrative twists. Commendably ambitious and experiential.*



Figure 1–6 The Exquisite Cabinet (detail). Hybrid object placed on top of the cabinet and contributions from visitors.

7 Design Council 70 Ones to Watch: https://www.designcouncil.org.uk/70-ones-watch

8 The Noise Festival: http://www.noisefestival.com/user/carolineclaisse/work/exquisite-cabinet

With my PhD, I continued to experiment with forms of storytelling and making, which were sculptural, participatory and evocative. This led me to the design of interactive experiences for a house museum that challenged traditional formats of interpretation and encouraged people to access heritage from their own perspective.

1.2.2 Facilitating participatory experience in the gallery

As a practitioner, my work developed towards designing participatory and engaging experience in gallery settings. I worked as a facilitator during a residency at The Pump House Gallery[9] in London where I invited visitors to contribute to a participatory artwork: “Unknown Territory” (figure 1-7). The collaborative intervention grew alongside The First Humans – a two-month exhibition that featured contemporary artworks inspired by the theme of prehistory.

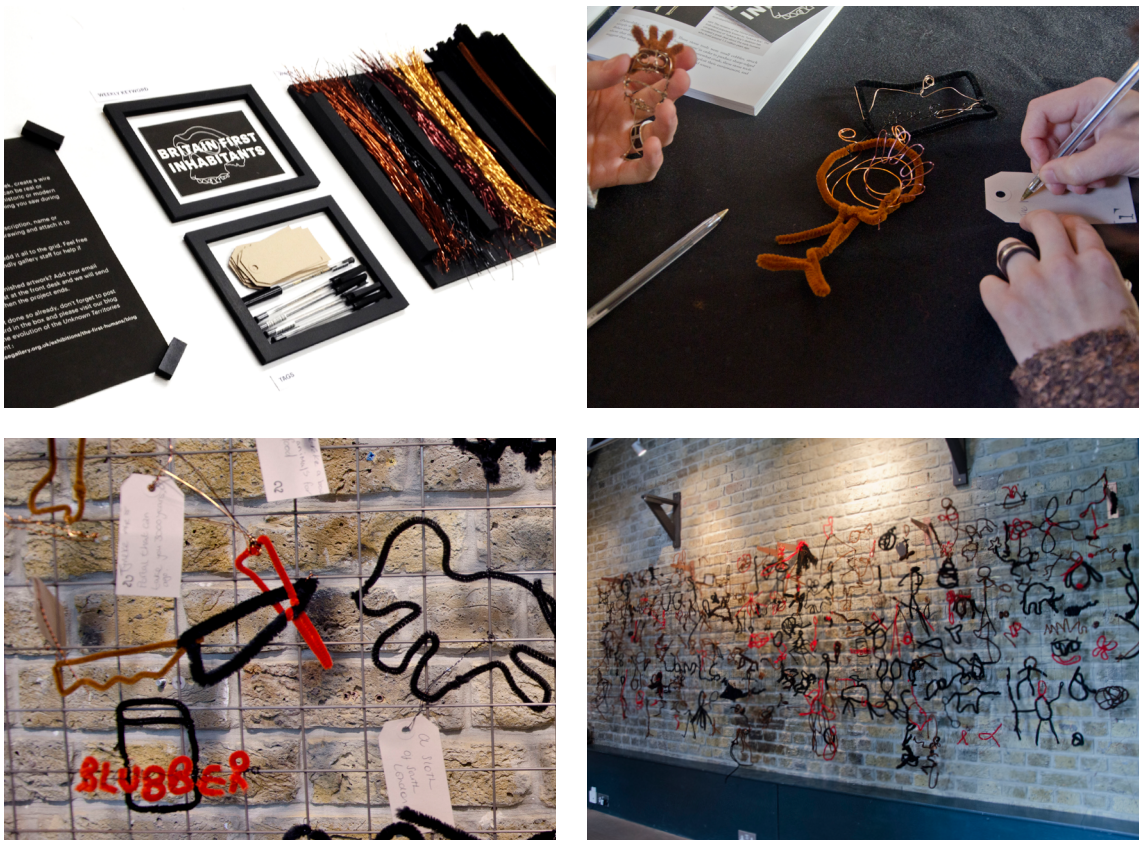

Figure 1–7 Detail of Unknown Territory, participatory artwork at the Pump House Gallery.

9 The Pump House Gallery: https://pumphousegallery.org.uk

The main purpose behind my intervention was to prompt visitors' personal and critical engagement with the exhibition. This was achieved through weekly activities where visitors responded to prompts by creating "cave drawings" – little sculptures made of wires and pipe cleaners (figure 1-7). Those were then hung together to form an imaginary snapshot that generated insights into visitors' experience of the exhibition. This informed weekly blog posts where together with the gallery, I discussed and expanded on themes and ideas that emerged from visitors' contributions. Overall, the participatory artwork facilitated thinking through making and served as a means to actively engage visitors during the exhibition.

Thinking through making and participation were important aspects of my doctoral investigation. I built on this experience to include a community of museum volunteers in my design process. I placed a lot of efforts on facilitating engagement all the way through my PhD. Design-based methods were essential to this process and an important part of my thesis was to reflect on the benefits of using design practice and making to facilitate participation, dialogue and creativity (see details in 4.3).

1.2.3 The craft of exhibition design

I came to the PhD with 4 years of experience working as an exhibition designer at Acme Studios[10]. Their creative and craft-based approach inspired me as a designer and laid the ground for my doctoral exploration. Collaboration with makers and artists allows the studio to produce highly evocative and detailed designs that encourages engaging and inclusive experience of heritage. An example of this was The Enchanted Palace at Kensington Palace in London (figure 1-8), an exhibition the studio was working on when I first joined in 2011. This project showed the value of artistic collaboration and a different approach to exhibition design in historic houses, one that was more poetic and theatrical.

10 Acme Studios website: www.acme-studios.co.uk

However, other projects contrasted with The Enchanted Palace exhibition as in many cases, the timeline of the design process was compressed, and important stages of creation were omitted in favour of production stages. Because of budget constraints, there was not enough time for experimentation and exploration of alternative scenarios. The scope of the projects was defined in advance so the briefs did not encourage dialogue and experimentation, nor did it allow us to ask questions and imagine “what if”. Moreover, technological aspects were the least collaborative as these were usually developed separately from the main design process, by external partners with no time for experimentation onsite before implementation.



Figure 1–8 The Enchanted Palace exhibition at Kensington Palace (London, UK).
Photograph by Richard Lea-Hair © Kensington Palace, 2011.

As a practitioner, I felt the need to undertake a practice-based PhD to explore another approach to exhibition design, one where design would take central stage by leading the process. I was also inspired by my experience at Acme Studios, particularly by their aspiration to diversify the ways an audience can both interpret and understand a story, and their desire to reconcile craft and technology, which are often thought of as polar opposite.

1.3 Introduction summary

To summarise, my research sits between the fields of cultural heritage and user experience design, particularly interaction and exhibition design. It unfolded through participatory practice; by means of co-creating a series of interactive experiences where design practice, embedded technology and evocative content were woven together to create novel experiences of heritage at one house museum: the Bishops' House in Sheffield (UK). The research context and questions were introduced in section 1.1. Then, I defined what practice meant to me and described earlier works to provide a foundation for my current research (see 1.2). I emphasised my interests in exploring innovative forms of storytelling and facilitating participatory experiences in gallery settings, which I continued to explore in my PhD. Inspired by my experience as an exhibition designer, I was determined to address the limitations of current practice. This was achieved by adopting RtD, an approach that fostered my ambition as a designer. With this thesis, I intended to share my discoveries with other practitioners to challenge existing practice and to broaden the overall space for exhibition design. I aimed to show an alternative use of technology, one that was not limitted to a screen-based interface, which tends to distract visitors from the actual place. With their unusual constraints, house museums and more specially the Bishops' House presented an interesting setting for rethinking the potential of technology for creating magical and surprising encounters with heritage. This was achieved through designing for material and embodied experiences of heritage.

For the purpose of my thesis, I have organised my practice-based enquiry into four process chapters: Immersion, Insights, Development and Implementation (see details about each phase in 3.2). Before unpacking my process, I review the Literature (chapter 2) and present my personal take on Research through Design in the Methodology chapter (3). The four process chapters follow respectively as 4, 5, 6 and 7. In chapter 8, I summarise and reflect on my research contributions.

2 Literature Review

For the purpose of my research, I have selected literature and existing works to address my three research questions outlined in the Introduction. Therefore, I do not claim to review every strand of work that is linked to the topics of this thesis, but rather, I focus on the three following sub-sets: *Designing exhibition for historic houses* (2.1), *Including museum volunteers in the design of interactive experiences* (2.2), and *The potential of tangible interaction for house museums* (2.3). The aim is to ground my argument and research contributions within the scope of designing interactive experiences in house museums.

In section 2.1, I first review examples of exhibition practice that are relevant to the particular setting of house museums. Here, I intended to gain an initial understanding of the research context and identify opportunities and challenges for designing interactive experiences in historic houses. In section 2.2, I discuss examples of participatory approach to show the potential of involving museum volunteers in the design of interactive experiences. For a long time, museums have been experimenting with the newest technology; from displaying computers on the exhibition floor (Serrell & Raphling, 1992) to augmenting a whole gallery with screen-based technology (Alexander, 2014). Given this broad range and timescale, in section 2.3, I focus on reviewing projects in museums that fit within the framework for tangible interaction (Hornecker & Buur, 2006). Finally, I reflect on how my work aims to contribute to the state of the art in section 2.4.

2.1 Designing exhibition for historic houses

House museums bring the past to the attention of the public in the form of domestic and personal life: they are domestic dwellings, which everyone is familiar with (Donnelly, 2002). They are turned into museums to celebrate particular stories, which are different depending on the house specimens (Young, 2012). One type relevant to my research is the social history house with the pur-

pose of presenting themes of daily life and in which the house structure is presented as the most important artefact (Young, 2012). These are described as living museums where heritage is staged and performed as if life in the building still goes on (Naumova, 2015). However, by focusing on the physical building, there is a risk for historic houses to no longer reflect the intimate real-life use and to lose their poetic or emotional dimension once they are turned into a museum (Vagnone & Ryan, 2016). Indeed, historic houses sometimes look more like a museum than a house or home; “these Houses move from being woolly, sloppy and impressionistic, to being places that are systematic, objective, and professional” (p. 35). Instead, exhibition in house museums should build on the sensory property of home and explore the communicative, cognitive and emotional connotations of the house (Pavoni, 2001). This is investigated in my research where the dimension of home was brought back through multisensory design and evocative content.

With their physical fabric and domestic settings, house museums are loaded with human associations in which visitors find personal resonances (Young, 2007). Bachelard (1994) talks about the poetics and depth of the house and its personal connotations: when entering a house, people experience it from memories of previous homes that are updated through a process of recollection and imagination in which memories are entwined with present experiences. Research in museum studies shows that meaning is constructed rather than simply absorbed by visitors (Hein, 1998). Indeed, meaning lies in “the eyes, head and heart of the particular beholder” (Silverman, 1995, p. 161). Falk (2009, p. 135) also talks about personalized “experiential filters” and describes memories of museum visits as “personal constructs” where things are created even invented, reconstructed and recombined over time. In my research, I consider volunteering as a form of visiting where volunteers are both hosts and guests in the museum (Holmes & Edwards, 2008). Informed by visitor studies (Falk, 2009; Hein, 1998; Silverman, 1995), I pay attention to the way volunteers

construct meaning, the ways this process is shaped by their personal experience, expertise and interest in the House.

While historic houses are turned into museums to celebrate particular ideas, they have more than one story to tell as many people lived in them across time, often across centuries. However, spatial and aesthetic constraints mean that curators have to choose which part of the story of the house is presented to the public. Thus, house museums tend to concentrate on a single moment in their history where both the building and its interiors are restored or reconstructed to match a particular era or episode in time. For example, period rooms are often used to showcase an everyday that is “museumized” as if frozen in time (Pavoni, 2001). This approach to exhibition has been criticised (Smith, 2006) and most recently, house museums were challenged to present heritage in less static and strict linear manners (Vagnone & Ryan, 2016).

One way to overcome this stiffness is to work with artists to present alternative readings of the place, which invite visitors to re-enter the house in new and critical ways (Mårdh, 2015). Examples feature the curation of contempo-



Figure 2–1 Endgrain by Raw Edges. Part of “Make yourself comfortable” at Chatsworth House, 2015.
Image via craftscouncil.org.uk © Chatsworth House Trust.

rary artefacts in dialogue with the historic space to provoke new connections (Bugler, 2015) and the display of site-specific interventions where artists are invited to create artworks in response to a particular space or collection (Robins, 2016). Figure 2-1 shows how contemporary chair designs have been displayed in the historic rooms of Chatsworth House for visitors to experience new perspectives on the interiors.

In recent years, there is an increasing interest in living history with visitors becoming more interested in the social history embodied in the house (Mårdh, 2015). For example, Bugler (2015) reports how visitors at Down House (Darwin's house, English Heritage) want to know about Darwin's personal and everyday life: his favourite place, the things he wore in bed and things he could see from his windows. This influences exhibition practice where rooms are reorganised to tell more intimate and one-to-one stories by exhibiting personal belongings, placing a particular chair to contrast with the scale of the building or installing a viewing platform for visitors to stand on to imagine what it was like (Bugler, 2015). In some cases, visitors are invited to step in the shoes of previous inhabitants or



Figure 2–2 World War Stamford Hospital at Dunham Massey, National Trust.
Image via messengernewspapers.co.uk © David Jones.

to follow imagined characters to actively explore and become part of a story. This highlights a shift toward immersive interpretation where lighting, sound, set and costume design become part of the visiting experience. Indeed, it reflects a wider trend across the field of heritage where museums have shifted from object-centred to experience-centred (Parry, 2007). This was introduced as the immersive turn in museums, which is defined by Kidd (2018, p. 1) as "story-led, audience and participation centered, multimodal, multisensory and attuned to its environment".

In house museums, an example is the Georgian house Dunham Massey[1] (figure 2-2), which was temporarily reconverted back into a hospital where costumed actors performed as doctors and wounded soldiers to show visitors how life was like when the building was used as a military hospital during the First World War (Bugler, 2015). Theatrical interventions like this one allow historic houses to bring, for a limited time, other parts of their history to life, which were not visible before.



Figure 2–3 "Suspend all expectations of a traditional experience", major restoration was carried out at Kensington Palace in 2011, a restoration that instigated The Enchanted Palace exhibition. Photograph © Hedvig Mårdh.

1 Details on the National Trust: www.nationaltrust.org.uk/dunham-massey

Another example is The Enchanted Palace – a temporary exhibition organised as a way for Kensington Palace to remain opened to the public during renovation (figure 2-3). The museum took the renovation as an opportunity to experiment with new formats for storytelling such as performance and scenography. The exhibition manifested as an "interface between history and imagination"[2] with a desire to tell contrasted and multiple stories at once (Marschner & Mees, 2013). The immersive exhibition was a complete redesign of previous experience and while it attracted a new crowd to the palace, it disappointed some of the more traditional visitors who did not want to engage in the multisensory and theatrical performance (Mårdh, 2015). Exploring more creative and immersive interpretation raises the challenge to design for different audiences, as exhibition design can never be a case of "one size fits all" approach (Bugler, 2015).

2.2 Including museum volunteers in the design of interactive experiences

In the context of design research, the role of the designer has changed dramatically (Yee, Jefferies & Tan, 2013) and collective forms of creativity are now common practice for many practice-based research projects (Stappers & Sanders, 2012). However, real world practice and particularly traditional exhibition design process rarely encourages participation or collective forms of making with non-designers. In a recent book (Steane & Yee, 2018), interaction designers reflect on their process and highlight the following concerns: museums commission designers to solve issues and address deliverables that are identified in advance by the institution; thus, they limit opportunities for collective exploration and refinement. Also, innovative ideas are dropped in favour of working with the existing, to not take risks and to comply with time and budget constraints. Developing technological solutions are still challenging as the process does not allow time for onsite experimentations; instead, technology is conceived by external partners or brought in too late in the process.

2 Article via https://www.theguardian.com/stage/2010/apr/13/enchanted-palace-review

Traditional design disciplines have long been concerned with the design of products but emerging design practices (e.g. interaction design, service design) have increasingly focused on designing for a purpose (e.g. for social interaction, sustainability) shifting attention from designing products to future experiences of people, communities and cultures (Sanders & Stappers, 2008; Yee, Jefferies & Tan 2013). Exemplar of this is the Milanese approach in early 2000s where locally rooted and action-oriented research projects aspired at changing local communities rather than creating new products (Koskinen, Zimmerman, Binder, Redstrom & Wensveen, 2011). In this case, researchers worked with the local community to understand their hopes, needs and worries. Many have used Participatory Design (PD) to design alternatives and improve the quality of life (Halskov & Hansen, 2015). Simonsen and Robertson (2013, p. 2) define PD as “a process of investigating, understanding, reflecting upon, establishing, developing, and supporting mutual learning between multiple participants in collective reflection-in-action”, and where the designer is committed to ensure that participants play a critical role in the design process. In those cases, people gain from direct involvement in collaborative design processes where through participation they “[participants] become capable of engaging with, and making their voices heard in interdisciplinary networked design efforts, thus shaping technological developments” (Bossen, Dindler & Iversen, 2010, p. 149). A core aspect of PD is to use design to show participants what is possible (Simonsen & Robertson, 2013). Developing design methods are essential to this process for participants to make sense of the future, to bring insights to the surface and to collectively explore, express and test future scenarios (Sanders & Stappers, 2014).

PD finds its origins 40 years ago in a Scandinavian approach to design, which initially, was motivated by workplace democracy and worker empowerment (Simonsen and Robertson, 2013). Since then, it has diversified beyond the workplace (Halskov & Hansen, 2015) and in the last two decades, participatory methods were deployed in gallery settings to increase audience engagement

with the aim to shift power structure and encourage a two-way dialogue between museums and their visitors (Simon, 2010). Inspired by the fact that visitors construct their own meaning from museum experiences (Hein, 1998) and have different motivations for their visit (Falk, 2009), practical examples were reported to challenge museum authority toward a more audience-centred institution (Simon, 2010). For example, by presenting multiple stories and voices, exhibitions increased active engagement and helped visitors to find relevance within the context of their own lives (Simon, 2016).

When introducing technology in museums, work as early as Taxén (2004) demonstrates the potential of a participatory approach to design interactive experiences. Other examples include involving visitors and curators in the design of digitally-augmented exhibits. In the “Digital Natives” exhibition (Smith & Iversen, 2014), the team involved teenagers in the design process to collaboratively inquire about the young people’s use of technology. The team enabled the teenagers to become active participants by allowing them to directly contribute to the creation of content and experiences for the exhibition. In another project (Halloran et al., 2006), researchers used co-design at a historic manor house where the team intended to develop engaging visitor experiences by tapping into the curators’ knowledge and expertise. Findings emphasise the value of including curators in the design process for their unique perspective; for example, the way they “live the House”, and the multiple layers of history that can be told in different ways and from the perspective of the many people who lived or worked there. More recently, co-design strategies in museums were unpacked (Ciolfi et al., 2016) and one study (Maye, Bouchard, Avram & Ciolfi, 2017) shows the successful application of action research to empower staff and volunteers at a small museum using digital technologies to support the museum in engaging visitors with the collection on display.

Volunteers have become an essential resource for museums as without them many cultural institutions would have difficulties to function or could even

cease to operate (Holmes, 2003; Orr, 2006). Recent reports (Groom, 2017; Museum Association, 2017, 2014) show how volunteers' roles have expanded beyond the museum's front desk toward administration, preservation, exhibition development and more recently, digital services. Studies have shown that despite their significant role, volunteers tend to be neglected in the heritage sector (Holmes, 2003). Instead, volunteers should be recognised and acknowledged as a distinct group of museum audience; "a definitive visitor who has ready access to their area of interest and is concerned with supporting and communicating that interest" (Holmes & Edwards, 2008, p. 6). Museums need to understand volunteering as a committed form of visiting with intrinsic and extrinsic motivations that change through time. The challenge is not necessarily in recruiting volunteers but in finding ways to keep them and sustain their engagement over time (Pearce, 1993). Initially, people start volunteering because of a particular subject of interest and their motivation increases when social opportunities are encouraged (Holmes, 2002). To respond to the needs and interests of volunteers, museums need to develop creative and social opportunities to encourage valuable and enjoyable experiences where volunteers can immerse themselves in the culture of the museum (Holmes & Edwards, 2008).

2.3 The potential of tangible interaction for house museums

Tangible interaction where people use their full body to interact with digital technology (Dourish, 2001; Hornecker, 2005; Hornecker & Buur, 2006) whether by manipulating smart objects or by moving in smart environments to trigger reactions from a computational system, is not yet a common practice in exhibition design. Indeed, tangible interaction in heritage is still developing and when deployed in museums, it is often for a short period of time or as part of research projects (e.g. *the Lost Palace* at Historic Royal Palaces, London, 2016). I believe that there is a need for more practice-based and longer-term experimentations for interactive designers to better understand how visitors react to such novel ways of consuming digital content while visiting museums. Moreover, I argue for tangible interaction to offer

an opportunity for exhibition designers to implement technology in sensitive and meaningful ways in places like historic houses. In this section, I review examples at different heritage sites and show how tangible interaction can be used to enhance the visiting experience in the context of house museums. I organise this section according to the 4 themes featured in the framework for tangible interaction (Hornecker & Buur, 2006): tangible manipulation (2.3.1), expressive representation (2.3.2), spatial interaction (2.3.3) and embodied facilitation (2.3.4). I then outline in section 2.4 how my work builds on the reviewed examples whilst extending some aspects of the framework by focusing on a craft-based approach.

2.3.1 Tangible manipulation

Research in critical heritage studies shows that material engagement with museum objects provides visitors with powerful experiences as it enables them to understand and empathize with stories in ways that textual interpretations used on their own don't (Dudley, 2010). Material engagement is facilitated by tangible interaction, which involves the design of a physical-digital "interface" that can be touched and manipulated in a visible and interesting manner (Bannon, Benford, Bowers & Heath, 2005). Thus, tangible manipulation is a valuable means for engagement in house museums where the design of hybrid objects could enable visitors to control and personalise their museum experience.

Case studies at other types of museum show how tangible tokens or smart museum replicas acted as a key to access interactive component in an exhibition. Examples include "Reminisce" (Ciolfi & McLoughlin, 2011) at an open-air museum where bespoke tokens were collected along the way by visitors to support them going from one station to the next. The tokens acted as clues, which directed visitors around the site while allowing them to access additional content. At an exhibition about the Second World War, visitors selected smart replicas prior starting their visit and used them to trigger audio-visual content at different points of interest while walking through the exhibition (Marshall et al., 2016).

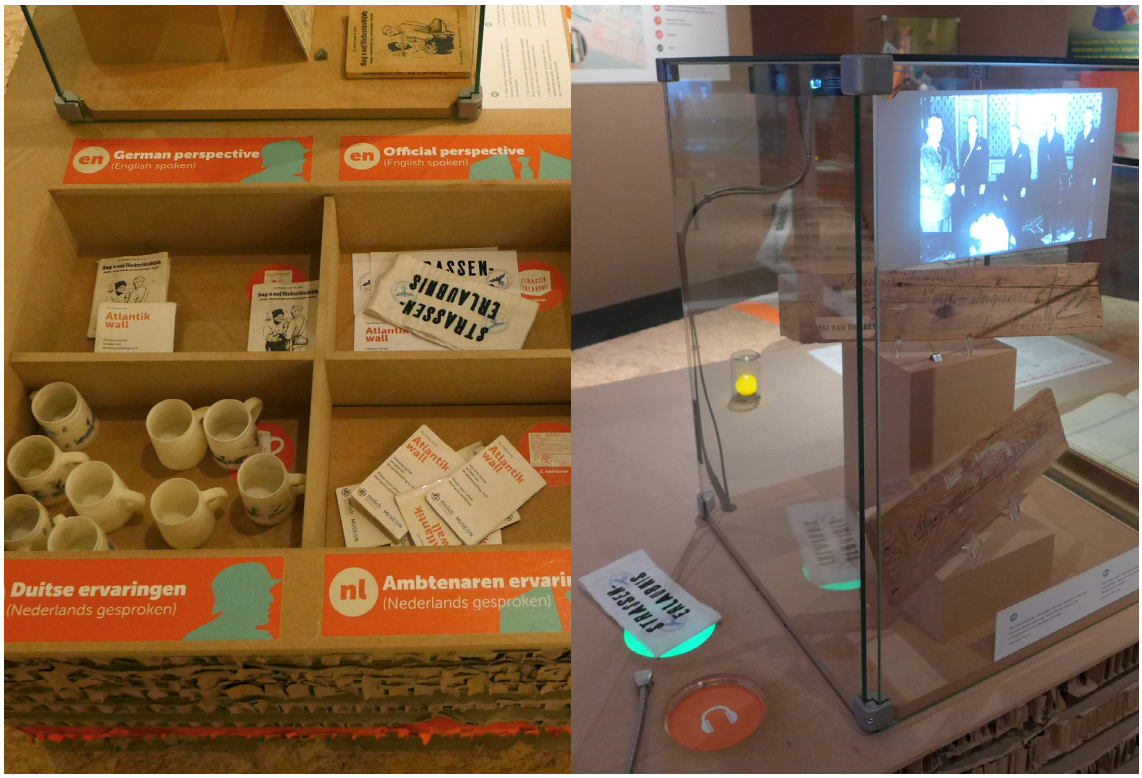

Figure 2–4 Smart replicas selected by visitors at the start of the visit (left). One replica used in the exhibition to trigger audio-visual content (right). Photographs © Caroline Claisse.

Each replica matched a particular theme and narrative; for example, the perspective of a civil servant was symbolised by an armband (in English) and a travel pass (in Dutch) while a dictionary (in English) and a drinking mug (in Dutch) represented the perspective of a German soldier (figure 2-4, left). Depending on which objects visitors picked, different languages and threads of content were released (figure 2-4, right). Research showed how tangible manipulation in these cases encouraged emplaced and collocated interactions (Ciolfi & McLoughlin, 2017) while deepening engagement with the artefacts on display (Petrelli & O'Brien, 2018). Tangible manipulation is particularly relevant for house museums where visitors have an embodied experience: they sense first and think about it second (Naumova, 2015).

2.3.2 Expressive representation

Materiality is not the only means for designing meaningful physical-digital interaction. Expressive representation of digital content is required to facilitate in-

terpretation and meaningful interaction. Designing hybrid objects is a successful strategy only when both physical and digital components are linked with the overall storyline (Ciolfi & McLoughlin, 2011). Projects such as *ec(h)o* (Wakkary & Hatala, 2007) highlighted the limitations of creating a coherent story when designing across both physical-digital interaction. *Ec(h)o* was a tangible and adaptive museum guide that coupled a wooden cube with digital navigation and information. Because of the level of abstraction, visitors were sometimes confused or found it difficult to relate their experience of the guide with what they encountered during their visit. Further exploration showed the importance for digital-physical representation to connect through narrative and materiality (Wakkary et al., 2009).

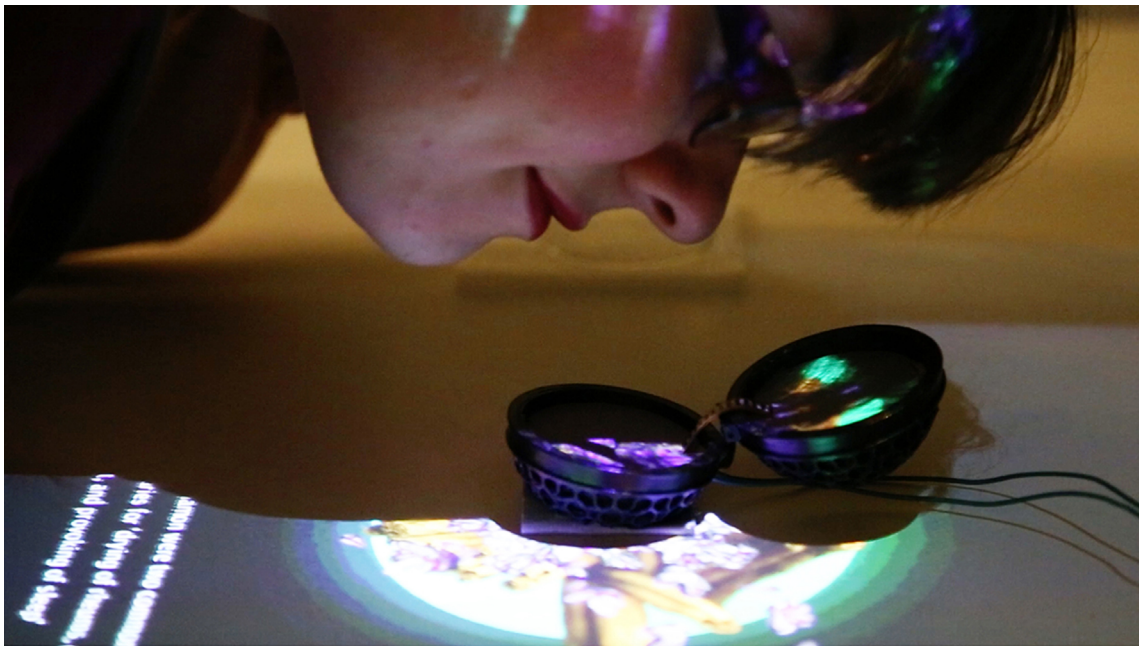

Figure 2–5 Research participant interacting with “Scents of Power” (2015). Prototype for the prayer-nuts tangible experience. Image via jeanhochu.com.

A recent exploration in this direction is the prayer-nuts tangible experience in which narrative design and sensory interactions (e.g. smell) were used to enhance the presentation of delicate museum artefacts (Chu, Harley, Kwan, McBride & Mazalek, 2016). The sensory prototype combined physical and multisensory design together with digital layers of experience. Those were activated when people manipulated the replica of a prayer-nuts, which was designed to convey a tactile sense of scale and texture. Participants were invited to carry

out actions that were historically inspired and to experience the artefact from a first-person perspective. The narrative design approach showed promising results in contextualising and personalising people's experience of the prayer-nuts as well as encouraging embodied meaning making. However, this exploratory project was limited to an evaluation in a laboratory-environment.

Overall, these projects show the importance of designing for the interrelation of physical and digital representations, and for the interaction to be a salient part of the overall use process rather than being designed as a peripheral action (Hornecker & Buur, 2006). Also, projects like the tangible prayer-nuts show the potential to incorporate sensory elements such as smell into the narrative to make storytelling in museum more engaging. This shows that expressive representation of digital content needs to be considered beyond physical representation, also in terms of interaction and multisensory features. However, careful design is needed to balance and orchestrate the different sensory modes (Chu et al., 2016) and to not overload visitors or divert their attention from the actual place (Ciolfi, 2015).

2.3.3 Spatial interaction

Tangible interaction goes beyond touching or moving objects towards supporting spatial interaction that is emplaced and embodied (Hornecker & Buur, 2006). Designing for tangible interaction means creating experiences that are situated in a real place with the potential to employ users' full-body movement. This is relevant for house museums as they are places where visitors tend to engage through multisensory means and bodily movement (Naumova, 2015). In fact, we experience, understand and interact in the world through our physical bodies (Klemmer, Hartmann & Takayama, 2006): "the body is the ultimate instrument of all our external knowledge (…) experience [is] always in terms of the world to which we are attending from our body" (Polanyi in Klemmer et al., 2006, p. 140). As our movement and perception are tightly coupled (Hornecker & Buur, 2006),

meaning is constructed in interaction through moving one's body (Dourish, 2001); thus, embodied experiences allow for deeper meaning that are subliminally registered in one's muscles and bones (Tuan, 1977).



Figure 2–6 Going to the trenches with meSch technology. A soldier belt-like device and bespoke cards to trigger audio at different points of insterest. Images via meSch-project.eu © meSch.

Experiments with mobile audio guides (Fosh, Benford, Reeves, Koleva & Brundell, 2013) demonstrate ways to use the body in expressive and meaningful ways where visitors responded to sculptures on display through performing physical actions such as touching artefacts or posing next to them. By prompting full-body interaction, the audio guide encouraged evocative experience and fostered visitors' personal interpretation. Other projects discarded app- and screen-based devices to prioritise situated and emotional engagement with a place. Examples of bespoke designs are a digitally-augmented time radio (Poole, 2017), which delivered different audio content depending on visitors' trajectories, and a soldier belt-like device (Petrelli et al., 2016), which triggered audio to play when visitors approached particular points of interest (figure 2-6). In both cases, the use of embedded computing and sensor-based approach minimised the presence of technology and avoided distraction, which encouraged visitors to experience narrative in place.

Another project showed successful integration of physical-digital installations by considering early on how the interactives would co-exist and sit within the exhibition space (Taylor et al., 2015). In this process, crafting visitors' trajectories became an important aspect of the exhibition where the multiple interactive stations were carefully placed to maximize engagement throughout, particularly with children.

2.3.4 Embodied facilitation

Embodied facilitation relates to intuitiveness of experience and what methods of facilitation are used when designing for tangible interaction. For example, how the size, form and location of physical-digital objects inform visitors behaviour by easing or limiting their activities (Hornecker & Buur, 2006). Interactive installations should be intuitive with minimum instructions and visitors should learn how to operate them within 10 seconds to avoid frustration and conflict (Serrell & Raphling, 1992). However, ambiguity can be used as a resource for design to encourage close and personal engagement with interactive systems (Gaver, Beaver, & Benford, 2003). Dalsgaard (2008) talks about designing for inquisitive use where stable elements are used as a scaffold to explore the unfamiliar. In this case, designers choose between a range of transparent and enigmatic strategies; for example, what is revealed and what is kept hidden to arouse curiosity and reward extended engagement. An example is the Magic Mirrors and Cauldron (Taylor et al., 2015), three interactive installations designed to be experienced as part of a more traditional exhibition about magic. The interactive pieces promoted open-ended exploration and rewarded long term engagement by uncovering additional audio-visual feedback or by allowing visitors to appropriate the pieces to produce pleasing visual effects. Visitors were not aware of the rewards at first, which manifested only during extended investment with the exhibits. This contributed to design for open interactions that encouraged different forms of participation while accommodating both short- and long-term engagement.



Figure 2–7 “Jurascope” (2007) at the Museum of Natural History, Berlin, Germany.
Images via artcom.de © ART + COM Studios.

Projects such as the “Jurascopes” (Hornecker, 2010) demonstrates how to design for different forms of participation by providing multiple access points to experience dinosaurs coming to life through digital augmentation (figure 2-7). While one visitor experienced the exhibit through a single telescope-like device, others experienced it through a large screen display, which enabled everyone to see what was going on and engage with the central objects of interest (the dinosaur skeletons coming to life). Accessibility is achieved by designing for visibility, which in turn affords peripheral participation (Klemmer et al., 2006). In this process, the qualities and functionality of objects are discovered through shared interactions in which the actions of others act as a vehicle for the discovery and experience of an installation (Heath, Luff, Lehn, Hindmarsh, & Cleverly, 2002). This is not always enough as interactives sometimes require a facilitator for visitors to get the most out of their experience (e.g. Taylor et al., 2015).

2.4 Summary

Designing exhibition for historic houses

By reviewing the literature on house museums, I gained an understanding of my research context and identified opportunities for deploying tangible interac-

tion to address current issues with exhibition practice. I believe that despite their spatial and aesthetic constraints, house museums provide designers with a unique setting for experimenting with new formats of storytelling. However, this needs to be done in inclusive and sensitive manners; by designing for personal relevance whilst building on the sensory and evocative connotations of the house. My work is informed by research on immersive heritage (Kidd, 2018) and builds on existing examples reviewed in section 2.1: I use theatrical techniques and place people rather than objects at the centre of interpretation to provide visitors with a more intimate experience of the social history embodied in the house. I take artistic and theatrical experimentations further; firstly, by using site-specific interventions as a method for opening up the design space (see details in the methodology, section 3.3), and secondly, by exploring innovative use of digital storytelling through tangible interaction – an area that I believe is overlooked, particularly in this research context. With my thesis, I argue for the potential of tangible interaction to overcome the stiffness and linear exhibition strategies of house museums, which dominate current practice as described by Vagnone and Ryan (2016).

I am also inspired by art practice in house museums where artists personally respond to a site through the creation of site-specific interventions. However, interventions by contemporary artists can compete with the place and lead to confusing and disengaging experiences (Mårdh, 2015). I believe that this is due to the nature of artistic practice, which are often temporary and where the main intention is to present the artist's individual statement in favour of designing for visitors' understanding of the work. By adopting a design-led approach, I argue that museums can create experiences that are more inclusive and with the potential to be implemented in the longer term, as part of the main interpretation and exhibition design strategy. This is achieved in my thesis with the participation of museum volunteers, an underrepresented group which I detailed in section 2.2.

My research builds on the literature and expands current practice by using multisensory design to explore the poetic, domestic and emotional dimensions

of historic houses. With my work, I aimed to show the value of adopting a craft-based approach to create interactive experiences that are bespoke and sensitive to a particular place. This was investigated through practice with the following research question (RQ1): *What are the challenges and opportunities for designing interactive experiences in house museums?* My approach informed the choice to focus on one historic house for my practice-based enquiry (see details about the Bishops' House in 4.2).

Including museum volunteers in the design of interactive experiences

The literature on Participatory Design (PD) helped me realise the gap between academia and industry. In my thesis, I address the limitation of exhibition design through collaborative design processes. I argue for the need to envision exhibitions beyond individual products, more as experiences that have the potential, through participatory process, to improve current situations into preferred ones. In the methodology chapter, I show how participation became one of four main aspects of my Research through Design (RtD) approach (see details in 3.2). By researching with people, I aimed to empower participants through co-creation. An important contribution is the development of bespoke methods to support "collective reflection-in-action" (Simonsen & Robertson, 2013, p. 9) and the documentation of design process (e.g. design synthesis see 5.1) over a long period of time to address the gap in PD (Halskov & Hansen, 2015) and in RtD (Dalsgaard & Halskov, 2012).

I built on participatory practice with visitors and cultural heritage professionals (e.g. Ciolfi et al., 2016) to show the value of co-creating with museum volunteers – a group that I argue is clearly underrepresented and needs more recognition in academic research and exhibition design. In fact, I realised that there was little research conducted with museum volunteers. I was inspired by one project in particular where the researcher became a volunteer and used existing prototypes to observe how the team formed understandings of interactive

tools at the museum (Maye, Bouchard, Avram & Ciolfi, 2017). While building on such examples, my research is unique in the sense that it uses co-creation to directly involve volunteers in the design of novel interactive experiences for their museum. Here, I see the potential for participatory approach to offer an avenue for engaging volunteers in valuable and enjoyable experiences whilst allowing them to actively contribute to the goals of the museum. In doing so, I aimed to foster a more sensitive and inclusive process where museum volunteers had their voice heard and magnified through design so they could take advantage of new technology to strengthen the resilience of the community. This was explored through my research question (RQ2): *How may volunteers be included in the process of designing exhibitions for house museums?*

Key to this investigation was to become a museum volunteer myself. In chapter 4, I report on insights from fieldwork to support my motivation of including museum volunteers in my design process and to shed light on the vital role they play for small sites like the Bishops' House.

The potential of tangible interaction for house museums

Initially, I was motivated to experiment with tangible interaction to show the possibilities to reconcile craft and technology in exhibition design. In fact, I was interested in using embedded computing in order to conceal the technology to create magical encounters with heritage. The Tangible Interaction Framework (see 2.3) provided me with practical guidelines on how to design digitally-augmented experiences where technology was invisible. While the framework allowed me to point out useful design directions for my work, using it in the context of house museums pushed me to extend some of the concepts associated with the four themes: *tangible manipulation*, *expressive representation*, *spatial interaction* and *embodied facilitation*. In fact, the particular context of house museums provided me with an interesting setting for developing innovative use of tangible interaction that relied on material qualities and embodied

aspects of experience. Here, I briefly summarise my take on the Tangible Interaction Framework in relation to the four themes and reflect on my contributions later in the conclusion (see chapter 8).

I built on the examples reviewed in 2.3 and used hybrid objects to materialise the perspectives of different people about a place. I explored *tangible manipulation* as a means to change visitor experience from passive to more active modes whilst observing how tangible aspect of experience could increase personal engagement with a place. Particular to my research is the way I experimented with tangible means to explore new forms of storytelling that connect people with a place. This is detailed in chapter 6 with the development of the Interactive Tableaux where the temporal aspect of the place was revealed by tangible manipulation of objects, and where the work focused on creating the illusion of a conversation in place with a family of imagined characters. Tangible encounters of heritage were explored beyond physical representations, to encompass multisensory means such as smell, noise and kinaesthetic. Including such sensory qualities in the design was informed by the particular experience of visiting house museums, which is described as highly multisensory and embodied (Naumova, 2015).

The theme of *expressive representation* informed my design where digital and physical representations were intertwined together, and both linked to the actual place (see details in Development, chapter 6). Indeed, an important part of the work was to design an experience where physical artefacts and digital content were carefully orchestrated in place. This is described in section 6.3 with the Interactive Tableaux where the content embedded in the tableaux was developed as an ensemble instead of thought in isolation.

By designing for tangible interaction, I considered the theme of *spatial interaction* and created interactive experiences where people used their whole body for engaging with heritage. The framework also allowed me to respond to the embodied quality of visiting a historic house (Naumova, 2015).

I developed installations that encouraged dynamic trajectories and emplaced experience at the house. This is discussed in chapter 7 where I show how, by designing for spatial interaction, I succeeded in promoting a voyage of discovery where visitors took on the role of explorers.

Finally, by considering *embodied facilitation,* I designed experiences that were intuitive and provided people with multiple access points for shared interaction. Also, I built on this last theme to go beyond designing for usability and experimented with more enigmatic strategies. Inspired by examples reviewed in section 2.3, I explored ambiguity as a resource for design (Gaver, Beaver, & Benford, 2003), to investigate opportunities for inquisitive use (Dalsgaard, 2008) and open-ended interactions that encouraged multiple forms of engagement (eg. long and short term engagement).

To conclude, the four themes: *tangible manipulation*, *expressive representation*, *spatial interaction* and *embodied facilitation* acted as a conceptual aid to design the two interactive experiences (Containers of Stories and The Interactive Tableaux, see figure 1-4) that are unpacked in my thesis. Prior to describing them in detail, the following chapter is an opportunity for me to contribute to design-led research by outlining my personal take on Research Through Design (RtD) – an approach that has yet to be formalised.

3 Methodology

In this chapter, I describe my personal take on Research Through Design (RtD). I first present a critical review of RtD and identify four main components that are key to my research: Setting, Artefacts, Documentation and Participation (see 3.1). In section 3.2, I discuss those in relation to my own practice to show how they manifest in the four phases of my research: Immersion, Insights, Development and Implementation. Section 3.3 focuses on the methods for researching in the field, generative design research and design synthesis. More specially, I show how the interdisciplinary and participatory nature of my practice has pushed me to adopt a bricolage approach to practice-based enquiry.

3.1 Critical review of Research Through Design

3.1.1 Multiple terminologies

Research through Design (RtD) is described as a practice-based enquiry used for over 20 years in design research (Durrant, Vines, Wallace & Yee, 2017). However, the design community still struggles to articulate a single methodological approach (Brown et al., 2017; Stappers & Giaccardi, 2017; Zimmerman, Stolterman & Forlizzi, 2010). In the past five years, the Research Through Design Conference (RTD) contributed to disseminate the latest experiments in design research. In doing so, the biannual event has shown the need for a methodological pluralism rather than a single approach to RtD, and has called practitioners to develop ways to communicate knowledge gained through design practice (Brown et al., 2017).

There is also an issue with terminology across Design Research, Human Computer Interaction and Interaction Design (Stappers & Giaccardi, 2017). For instance, Koskinen et al. (2011) clarify their approach by referring to “design research through practice” instead of RtD. They start afresh with “Constructive Design Research”, an approach that puts an emphasis on construction, where

something is built and put into use for people to interact with real things; “not only concepts, but materials. Not just bits, but atoms” (Koskinen et al., 2011, p. 7). Others in art and design have referred to practice-led and practice-based research (Candy & Edmonds, 2006; Mäkelä, 2007; Nimkulrat, 2007), practice-based design research (Vaughan, 2017), generative design research (Sanders & Stappers, 2012) or design-led research (Frayling, 2015). Below, I explain more in detail the different terminologies to show the variations.

Candy and Edmonds (2006) describes a basic principle of practice-based research: “not only is practice embedded in the research process but research questions arise from the process of practice, the answers to which are directed toward enlightening and enhancing practice” (2006, p. 63). They make a distinction between practice-based and practice-led research: whilst in the former knowledge is gained by means of practice and the outcomes of that practice, the latter does not depend upon the creation of artefacts. This contribution to knowledge in practice-led research manifests in the form of principles, frameworks or guidelines, and aims to generate new understandings about the nature of practice itself (Candy & Edmonds, 2006). Distinctions between different types of practice-related research are not always clear and different terms are used interchangeably (Candy 2006; Nimkulrat 2007). Also, such terms are not always seen as clearly excluding one another. For instance, Mäkelä (2007) defines her doctoral study as practice-led research where she contributes to knowledge by generating new understandings about creative practice. However, her contribution to knowledge depends upon the creation of artefacts and she describes her process as “knowing through making” where artefacts take a central position and become inseparable from the process itself. For Nimkulrat (2007), there is one important distinction in the role we take: in practice-based research, the emphasis is on practice; thus, the practitioner’s role is more dominant while in practice-led research, both practitioner and researcher’s roles are equally important.

In some cases, the roles we take are not as clear-cut as practitioner or researcher. For example, Yee (2017) talks about hybrid practice and shows how the skills she gained as a researcher and designer have mutually enhanced her practice. She sees both trainings as complementary rather than separate practices. Those are described in terms of two different lenses: the “researcherly designer”; a practising designer trained in research, and the “researcher”; a practising researcher trained in design. She identifies with both and describes her ability to oscillate between the two: first to understand how a research lens informed her design practice and then, how a design lens informed her research practice. Similarly, in relation to practice, Vaughan (2017) proposes the title of the designer-practitioner-researcher: “Like a molecule chain, this title can be read left-to-right or right-to-left, but at the centre of ‘designer’ and ‘researcher’ is in effect practice” (2017, p. 10). Overall, she prefers the term practice-based design research to emphasise the value of practice in her research.

In this section, I reviewed different terminologies that are used to describe design research. It is clear that there is no constant terminology among the design community, however, I see this as an opportunity to contribute to the ongoing debate. By presenting my personal take on RtD (see details in 3.2), I aimed to help define the formative stage of RtD. This is achieved here with my thesis where I unpack my process of gaining knowledge through design practice.

3.1.2 Design-led research

RtD was initially coined by Frayling (1993) as one of three ways of undertaking research in creative practice: “research into practice”; “research for the purpose of practice”; “research through practice” (Yee, 2010). First, research *into* practice to understand what has been done in the past or theoretically (Vaughan, 2017). It is also described as “hands-off” research on design, and while it allows designers to improve their practice, it plays an important role in legitimating and establishing design methods within the wider research community (Faste & Faste,

2012). Second, research *for* design or doing research as part of doing design is increasingly used with students and by practitioners who follow a user-centred design approach (Stappers & Giaccardi, 2017). In those cases, designers learn about potential users and their needs by means of conducting research activities like interviews and observation. The research is conducted for the purpose of learning specific information about the context for which the design is made. It is conducted prior the design or after, as a means to get feedback on new products or prototypes. Thirdly, research *through* practice where "art or design practice is the vehicle of the research, and a means to communicate the result" (Yee, 2010, p. 3). Sanders and Stappers (2012) have more recently introduced a variation of this approach to include participatory research practices. They refer to generative design research, which focuses on bringing the people we serve through design directly into the design process.

For Frayling (2015), RtD is different from just doing design; to summarise, in doing research *for* design, practitioners use research as a reference to enhance their practice where the primary goal is not to communicate knowledge but rather, to research for the purpose of creating an artefact (Frayling, 1993, 2015). Research *for* design is undertaken with the motivation to address a design brief where practical issues and problems need to be resolved (Yee 2017). It contrasts with doing research *through* design where the aim is to develop understandings about things that exist outside of design, and to do so by taking design as a particular approach to knowledge (Frayling 2015); for instance, by means of designing prototypes to generate new directions rather than a general or definitive solution for the field (Stappers 2007). In this case, the research goes beyond the creation of a product and is concerned with the articulation of knowledge gained through the act of designing (Frayling, 2015; Stappers & Giaccardi, 2017; Stappers, 2007). In doing so, design leads the research in all sorts of directions (Frayling, 2015) and practitioners are able to ask broader questions; beyond the limited scope of a particular design problem (Zimmerman in Stappers & Giaccardi, 2017). In line with this, Vaughan

(2017) describes design as not only a practice of problem solving but equally one of problem making. She emphasises the value of design-led research: “Design can open our known parameters, expose the intricacies of relationships, ask questions, posit answers and then explode them open again” (2017, p. 2).

Researching *into*, *for* and *through* design tend to be presented as separate. However, they are not mutually exclusive. When reviewing practice-based PhDs, Yee (2010) observes that more than one approach can be used to conduct design research. While Frayling (1993) provides us with a practical framework, the realities of design-based inquiries are much more complex (Yee, 2010). Although it is essential for doctoral students to understand the different models of design research, they should also construct their own approach to design research (Yee, 2010). Indeed, the different types of research identified by Frayling can be combined; as phases or aspects of a practice-based enquiry (Vaughan, 2017; Yee, 2010). Even Frayling (2015) recently clarified his original claims and preferred the term design-led research.

In line with Yee (2010), I can see how in my PhD I conducted different types of research. For instance, I researched *into* the way theatre makers use scenography as a means for designing immersive exhibition. I also conducted research activities like interviews *for* informing the design of interactive experiences in the particular context of house museums. As others in the field, I observed that the interplay between research and design is never completely separate: it is continuously evolving in ways that couple, interweave and decouple (Basballe & Halskov, 2012). Research and design both relied on each other and became intertwined throughout. To help clarify my process, I found it useful to identify key design phases, which are summarised in section 3.2 as Immersion, Insights, Development and Implementation.

3.1.3 Four characteristics of RtD

Doing a critical review of RtD helped me reflect on my process. I identified four characteristics that were fundamental to my investigation: (1) Setting, (2) Artefacts, (3) Documentation and (4) Participation. I first review them in relation

to the literature in design research before showing how my personal take on RtD brought them together in a unique way (see 3.2).

1. SETTING: RESEARCHING IN SITU

Traditionally, design practitioners operate in the design studio with a strong emphasis on the culture of doing to generate ideas and develop them into tangible products (Koskinen et al. 2011). Stappers (2007) talks about the value of the design studio for practitioners who surround themselves with inspiring materials that encourage play, communication and reflection. He argues that studio-like environment provides design researchers with a playground, which is an essential ingredient of RtD. Indeed, studios function as “knowledge environments” (Koskinen et al. 2011, p. 129) where hands-on methods and play foster understanding in a safe and shared environment (Wallace et al., 2015). It is now common practice for designers to take their work to the field, which expands the space for making beyond the studio where new players are involved in the design process (Sanders & Stappers, 2008). For instance, in the case of working with new technology, Koskinen et al. (2011, p. 137) observe that “the best way to follow these technologies and practices is to build them, hand them to people, and then study what happens”. This has transformed traditional approaches to design into more interdisciplinary practice, pushing design researchers to use mixed methods, and turning towards other disciplines to address new scope of research (Vaughan, 2017).

Based on different contexts, Koskinen et al. (2008) identify three approaches to design research: Lab, Field and Showroom. Whilst design practice is placed at the heart of the process, they show how each setting provides researchers with established tools and methods used in other fields such as experimental psychology (for “the lab”), social sciences (for “the field”) and art (for “the showroom”). However, the different approaches are not mutually exclusive and Zimmerman and Forlizzi (2014) invite design researchers to combine them. One approach

relevant to the context of my research is *the Field* where designers adopt ethnographic methods to research with people in a face-to-face manner (Frayling, 2015). Exemplars of such practice are the Helen Hamlyn Centre for Design[1] at the Royal College of Art and the Lab4Living[2] at Sheffield Hallam University. Both focus on inclusive and user-centered design to research ways to improve the lives of people. This approach to design impacts practice in two ways: first, the focus shifts from designing products to designing for people's purposes and societal needs (Sanders & Stappers, 2008; Yee, Jefferies, & Tan, 2013); second, they spend more time to observe "how people and communities understand things around designs, make sense of them, talk about them, and live with them" (Koskinen et al., 2011, p. 69). However, experience in the field is usually limited to a few months or days (Salvador & Anderson 1999, Koskinen et al. 2011). Moreover, ethnographic research tends to be applied as a single instance of research; often preceding design, instead of being deeply integrated into and throughout the design process (Simonsen & Robertson, 2013). In my case, it was essential to conduct fieldwork all the way through my research. This is discussed in more detail in sections 3.2.1 and 3.3.1 where I observe how my experience in the field became a core aspect of my design process.

The three approaches presented by Koskinen et al. (2011) do not exclude one another as practice does not just fit within one setting. This is observed by Stappers and Giaccardi (2017) who review RtD projects such as the Drift Table (Gaver et al. 2004) that encompass more than one approach. The environment can also be the start of an enquiry as with the Rooftop Project (Taylor, 2017) where the practice of transforming a building was entwined with the place and its community. Indeed, practice-based enquiry takes place across a broad range of settings: for example, the digital sphere (Harrison, Regan & Grayson 2017), the rural area and wild environment (Maxwell, Edwards & Odling 2017), and it even unfolds between

1 Helen Hamlyn Centre for Design webpage: https://www.rca.ac.uk/research-innovation/helen-hamlyn-centre/

2 Lab4Living website: https://www.lab4living.org.uk

places by means of walking through the city (Bueno de Mesquita & Hamers 2017). In line with such projects, the design community has recently emphasized the emplaced and situated characters of RtD: “Nothing is designed in isolation (…) Geographical place, history or community all define a locus that influences practice” (RTD Conference Companion, 2017[3]). In relation to situated practice, there is a novel area for investigation and reflection in RtD: the personal dimension, feelings and emotions associated with a place and more specially, “What does it mean to belong, and how can site specific making afford a sense of attachment to place?” (RTD Conference Companion, 2017). This is particularly relevant to my research as by volunteering at the museum, I developed a feeling of belonging and became attached to the place and its community. I discuss this further in section 3.2 and later in chapter 4 where I describe the Immersion phase of my research.

2. ARTEFACTS: RESEARCHING THROUGH MAKING

Some practice-based researchers have described artefacts as instrumental to the generation of new knowledge (Candy & Edmonds, 2006; Koskinen et al., 2011; Mäkelä, 2007). Candy and Edmonds (2006) argues that a full understanding of the research can only be obtained with a direct reference to the creative outcome. They review examples of practice-based PhDs to show that not only making artefacts is central to the research process but also experience of these is key for the generation of new knowledge. Recently, the RTD Conference has placed the artefacts at the centre of attention by exhibiting them in the Rooms of Interest. During the event, attendees and presenters can experience the design-in-use and observe its material qualities in a close encounter. Stappers and Giaccardi (2017) have reviewed RtD projects and showed the way artefacts provide practitioners with the means to conduct evaluations where insights are generated through interaction and experience: “[RtD] creates the possibility for people and products to

3 See RTD Conference Companion http://researchthroughdesign.org/2017/wp-content/uploads/2017/12/RTD2017-Companion.pdf

engage in interaction that were not possible before, and these can come into existence – indeed, become *observable* – through the design" (2017, 43.1.2). Therefore, not only the artefacts but interaction with them is necessary for observation, reflection and evaluation. Without artefacts, practice-based researchers would not be able to grasp implications or develop their understanding and position for contributing to knowledge (Candy & Edmonds, 2006). This is demonstrated in my work with two interactive experiences that were evaluated at the museum as a means to develop my understanding while assessing the potential of interactive experiences in house museums (see detail in chapters 5 and 7).

In design research, Stappers (2007) describes the designer's ability to absorb knowledge through realising products. In the context of RtD, Ingold (in Taylor, 2017) talks about the weightiness of material where engagement through making slows our imagination down; thus, helping us to keep up with it while taking control of it. Others have referred to *designerly* ways of knowing, thinking and acting (Cross, 2007; Cross, 1982) or knowing through making (Mäkelä, 2007). While artefacts are central to the research process, they cannot be seen as research outcomes until they are interpreted (Candy & Edmonds, 2006): they remain as mute objects until the practitioner has given them a voice (Mäkelä, 2007).

Artefacts can also be used "as a method of collecting and preserving information and understanding" (Mäkelä 2007, p. 158). Brix (2008) illustrates this point by using iconic designs such as the Diamond Chair by Bertoia to show how ideas are embedded within the final outcome as "silent knowledge". He develops his argument by using the notion of solidity in design to describe the density of information embedded in an artefact like the Diamond Chair. This contrast with Scrivener's view who argues that knowledge is not embedded in creative artefacts (2002). He illustrates his point with examples from art practice to show that artworks rely on knowing by experience rather than by means of communication. Thus, artworks do not intend to communicate new knowledge in the traditional sense but instead, they provide viewers with new ways of seeing and encourage them to construct their

own interpretation Scrivener (2002) further observes that if an art object is to function as a means of conveying new knowledge, justifications of those claims should be provided and traced back. I believe that this depends on the context and the ways artefacts are framed. My research was based on building, using and communicating knowledge (see details in 3.2). When exhibited at the museum, artefacts were encountered by means of experience and personal engagement. But for my thesis, they became a means to communicate new knowledge where efforts were placed on tracing back connections and providing justifications.

Artefacts inRtD are described as “ultimate particulars” (Stolterman, 2008, p. 59) – bespoke artefacts that are created for a specific purpose and concerned with addressing the situations at hand; for instance, people’s needs and desires. They are rich artefacts that indicate possibilities through exploring and speculating, particularising and diversifying (Gaver, 2012). In interaction design, Fallman (2008) talks about design exploration where products are brought into the world to ask “what if”; as a means to indicate what is possible and desirable or just as a way to reveal alternatives to current situations. In this case, the aesthetic of things – how it looks and feels – are essential as interaction design deals with the qualities of user experience. Those are embedded not only into the artefact but in the whole interaction, which includes “how something works, how elegantly something is done, how interaction flows, and how well the content fits in” (Fallman, 2008, p. 8). To envision interactive design and user experience, designers have shifted their attention toward prototyping experience (Buchenau & Suri, 2000) and considered more the role, look and feel of a prototype (Houde & Hill, 1997). But because prototypes are unfinished and in some cases compared to mass-produced products (Odom et al., 2016; Stappers & Giaccardi, 2017), others have preferred the term “research products” for their aesthetic qualities and potential to support richer investigations in interactive design; to engage people with “*what it is* as opposed to *what it might become*” (Odom et al., 2016, p. 2550).

In the context of RtD, Pierce (2014) identifies a broader range of artefacts where the primary users are the designers themselves. He refers to design research artefacts that are less technical, aesthetic and practical. Their ultimate function is to facilitate the process and help designers to externalize tacit knowledge that cannot be fully articulated verbally. Indeed, they can be used for different purposes; as a means for reflection on the process, to communicate abstract concepts, to legitimize a particular direction and demonstrate the credibility or commitment to an idea (Pierce, 2014). At the 2017 RTD Conference, the community has challenged the finished character and state of completion of bespoke artefacts. They encourage the presentation of design outcomes that are incomplete and question the “thingness” of creative outputs (RTD Conference Companion, 2017). They invite the community to reflect on the new roles those objects and materials perform in the creative process. In line with Pierce (2014), I identified a broader range of artefacts, which helped with the progression of my research. These are introduced as design artefacts in section 3.2.2 where I reflect on their role in externalising and synthesising insights in my design process.

3. DOCUMENTATION: RESEARCHING IN A RIGOROUS MANNER

Documentation is essential in the design process and should be used for artefacts to not remain mute (Mäkelä, 2007), and for designers to justify their claims to knowledge, making their process more explicit. However, the difficulty to capture and make sense of the design process has pushed some researchers to describe it as a “black box” (Yee, 2017, p. 156), a form of “black art” (Wolf et al. 2006) or as magically derived (Kolko, 2010), possibly because of a lack of documentation (Frayling, 1993) and transparency (Frayling, 2015), particularly in RtD (Bardzell, Bardzell, Dalsgaard, Gross, & Halskov, 2016). For Scrivener (2002), the lack of documentation means that research outcomes cannot be legitimised or recognised as contribution to knowledge: if an artefact is to function as a means of conveying new knowledge, justifications of these claims should be

provided and traced back. One way to improve this, is for practitioners to follow the criteria of good research, which are established in terms of originality, significance and rigor (Biggs & Büchler, 2007). However, this needs to be done in ways that embrace the values and qualities of design; thus, “RtD has to find its own ways of approaching traditional research qualities such as reliability, repeatability, and validity through ways that are trustworthy while true to the approach” (Zimmerman, Stolterman & Forlizzi 2010). In line with this, Biggs & Büchler (2007) re-define the criteria of rigor to fit the purpose of design research. For them, it is a necessary condition of any type of research, which they describe as the strength of the chain of reasoning. By documenting the in-between steps of RtD, practitionners can make their process more rigorous so decisions can be traced back. In order to achieve this, it is essential for documentation to be used not only in a supportive capacity (e.g. retrospectively), but also as an inherant property and an act of doing RtD (Bardzell et al., 2016). I contribute towards such a practice by re-thinking what documentation means in the context of my research. In section 5.1, I present design synthesis: an act of documenting sense making and a means to build a tangible chain of reasoning that allowed me to progress in more confident and consistent manners.

Stappers (2007) identifies a place in research where designers can be of special value and encourage them to make optimal use of their design skills and expertise. He describes the value of prototypes as carriers of knowledge; but questions designers’ efforts in reporting back and providing the justification of that knowledge. As a result, “the ‘product’ emerges but the decisions are kept silent” (Stappers, 2007, p. 84). According to Kolko (2010, p.16), “it is the lack of understandable documentation, or the decision to not share that documentation, that creates a sense of magic” around design. This is critical for doctoral students who are expected to provide a track record of their process so the knowledge gained through practice-based research can be shared, verified and challenged in some ways (Candy, 2006). This is usually achieved at the end of the PhD with the writ-

ten thesis, which stands by the creative artefacts providing justification and evidence of original contribution that are not just new to the student but to the wider community (Candy & Edmonds, 2006). However, written formats like the thesis can be challenging for practice-based researchers trained in design as it pushes them to describe a process that is often tacit and implicit (Schön, 1983). Because it takes efforts to look beneath the surface of explicit and observable knowledge, generative design research methods give designers the means to see what is going on at deeper level of what people know (Sanders & Stappers, 2012). In co-creation, probes, toolkits and prototypes have fostered participants' creativity and helped bring their insights to the surface by means of thinking through making (Sanders & Stappers, 2014). But as Wakkary (2004) observes, practitioners have placed their efforts on their participants or users rather than on themselves. Thus, he calls for further exploration in documenting, analysing and observing design practice. In professional practice, Schön (1983) refers to this as "knowing-in-action" and encourage practitioners to be more reflexive so they can make explicit their implicit knowledge.

An example in design practice is Yee (2017) who developed an ability to shine a light into the black box of her design process by combining methods from social sciences with design. She developed her reflective practice by thinking through writing – something she was not used to as a practitioner trained in design. Alongside this, she has also experimented with visual mapping to explore connections between ideas, concepts and theories (Yee, 2012). In RtD, documentation is often done in a supportive and retrospective capacity, at a post-design stage. Examples range from documents that are assembled together in annotated portfolios (Gaver, 2012), images that are organized alongside a line to reflect on the designer's journey (Taylor, 2017), research that is disseminated in the form of pictorials (e.g. at the DIS Conference), to experiential books composed by students as a communication tool for the general public (Eudes & Maire, 2017). While these are valuable means of commu-

nication, there is a need to develop methods for documenting the in-between steps of the RtD process. More specially, for encouraging self-reflection along the way to help practitioners address the challenges of longitudinal studies and collaborative processes such as “how to assemble, condense, and make sense of the streams of data that are generated during the process?” (Dalsgaard & Halskov, 2012, p. 429). This is investigated in my research where I explored different ways to synthesise materials generated from creative and participatory processes with volunteers (see examples in 5.1 and 6.2).

4. PARTICIPATION: RESEARCHING WITH PEOPLE

Design research always involves people in some way in the design process whether as consultant, research partners or spectators. In constructive design research (Koskinen et al., 2011), people participate in different ways depending on the approach (Zimmerman & Forlizzi, 2014): in the Lab, participants take part in controlled experiments to test research prototypes in laboratory-like conditions; in the Field, designers conduct research with people in real-world situations and are driven by a desire to improve the state of the world. In the Showroom, people encounter artefacts by means of experience which challenge them to reconsider their everyday through critical designs. For example, the HOSPITAbLe collection (Chamberlain & Craig, 2017) invite visitors to think with things in an exhibition that becomes a theatre for conversation and a method for data collection[4].

Practice in the field builds on the Scandinavian tradition of Participatory Design (Zimmerman & Forlizzi, 2014), described by Sanders and Stappers (2012, p. 19) as “an approach to design that attempts to actively involve the people who are being served through design in the process to ensure that the designed product/service meets their needs”. When using a participatory approach in RtD, Taylor (2017) refers to “research through co-design”. She describes her practice-based

4 Exhibition at Sheffield Institute of Arts (September 3th – September 16th 2018)
https://www4.shu.ac.uk/sia/events/event-listing.html?event=277

research in which she involves the local community in rethinking the potential of green and social space in the city. An important aspect of her research is for the resulting designs to reflect the aspirations of the community participating in the design process. She reflects on her process and emphasizes her responsibility as a designer in being inclusive and in conveying a sense of purpose for the community. Sanders and Stappers (2012) describe this as co-creation at a societal level where co-creators work closely together fuelled by aspirations for longer-term and more sustainable ways of living. In line with this, I focused on making sure that the resulting designs reflected participants' aspirations and ideas. In my research, this was facilitated by the documentation and the design research outcomes in which participants clearly saw how their contributions informed my process (see details in 3.2.2).

In participatory design, generative design methods are used to involve participants at different stages of the design process (Sanders & Stappers, 2014). For instance, probes and toolkits are used early on in the process while prototypes are used later on during evaluation. Those methods support collective forms of creativity (Sanders & Stappers, 2008; Sanders & Stappers, 2012) where meaning is constructed and transformed throughout the design process by all co-creators. This generates creative opportunities and dialogue where making, telling and enacting become intertwined together. An exemplar of this in health context is the used of design probes created for eliciting personal and rich insights on people's lived experience (Lindley & Wallace, 2015; Wallace, McCarthy, Wright & Olivier, 2013; Wallace et al., 2013). However, the term participation has become over used and poorly articulated in design research (Vines, Clarke, Wright, McCarthy, & Olivier, 2013). Participation occurs in multiple forms and participants are not always actively involved; "participation can be highly passive and even unwitting but still potentially satisfying for those involved" (Vines et al., 2013, p. 435). With my research questions, particularly "how may volunteers be included in the process of designing exhibition for

house museums?", I articulate the various facets of participation in my process and show the need to design for different levels of engagement.

From the literature, I have identified four interdependent characteristics that I found essential for RtD: Setting, Artefacts, Documentation and Participation. I believe that these need to be considered together during the design process – I used them as a means for reflection, clarity and transparency. In the next section, I discuss them in the context of my own research and show how they were fundamental to the process of building, using and communicating knowledge in RtD.

3.2 A personal approach to Research Through Design

3.2.1 Building, using and communicating knowledge

In section 3.1, I reviewed different ways of undertaking design research; e.g. researching *into*, *for* and *through* design and showed that they were not mutually exclusive. I emphasised the importance of practice where design and research both relied on each other and became intertwined. Section 3.1 also showed that RtD relied on multiple approaches rather than a clear set of procedures or a single methodology. Indeed, I argue that RtD should be particular to the individual practitioner and bespoke to the context of enquiry. In my case, critical to my RtD process was to draw from participatory design (PD) to conduct research with people. In the literature review (section 2.2), I emphasised the potential of using PD for including museum volunteers in the process of designing interactive experiences. Thus, my personal take on RtD can be described as highly participatory and inclusive, and summarised as follow: a design-led enquiry where I investigated my research questions through the practice of participation; by co-creating interactive experiences with museum volunteers and observing how both the act of co-creation and the design research outcomes transformed people's experience including my own. In this process, questions arose from practice and were re-assessed throughout, new ideas came into play and insights were reflected upon and shared along the way with participants.

For the purpose of this thesis, I have organised my design process into four phases (figure 3-1): (1) “Immersion phase: *discovering and getting inspired*”; (2) “Insights phase: *materialising my understanding through practice*”; (3) “Development phase: *revealing the temporality of place through co-creation and tangible interaction*”; (4) “Implementation phase: *engaging with tangible interaction*”. I discerned three facets of my process: Building, Using and Communicating knowledge. In the first two phases, I focused on building knowledge in and out of the field while in the remaining two, the aim was to use the knowledge I gained through practice to design bespoke experience at the museum. Overall, communicating knowledge is achieved here with my thesis.

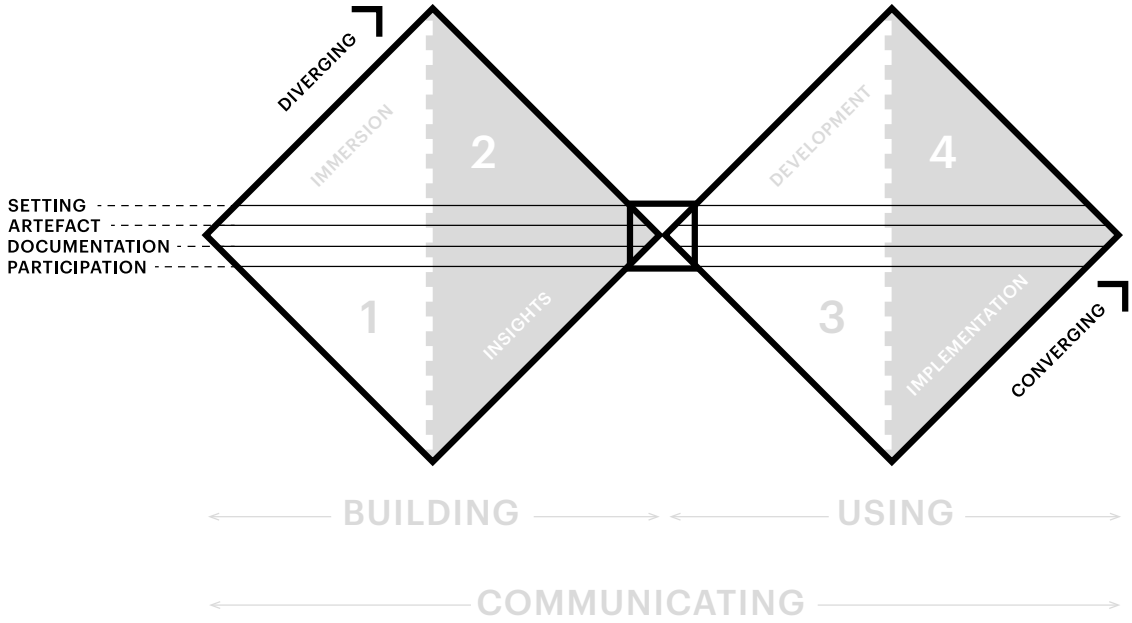

Figure 3–1 The process of researching through design in my practice-based PhD: the 4 phases, the diverging and converging dynamics and the 3 facets of RtD. The square represents the main point of convergence in my process where opportunities were refined and consolidated.

Figure 3-1 also presents my RtD process as a Double Diamond[5] with four interwoven threads running across. These symbolise four interdependent characteristics of my practice: Setting, Artefacts, Documentation and Participation

5 Double Diamond via the Design Council
https://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond

(see details in 3.2.2). My PhD was led by design meaning that design practice was instrumental in all four phases of my process. I illustrate this by adapting the Double Diamond to show the divergent and convergent dynamics of the creative process: opening up and narrowing down design possibilities. This applied in my research as follows: in the Immersion and Development phases, I was concerned with generating as many ideas and insights as possible. In contrast, the Insights and Implementation phases were defined by a process of synthesis and refinement. The main point of convergence in my process represents a time where the opportunities for design and the scope of research were refined and consolidated (see square in figure 3-1).

3.2.2 The four threads of my research

Part of my contribution was to help clarify the design process by identifying key components of RtD. In my research, I brought them together in a unique way, which helped me reflect and clarify my process. They are summarised in this section as follows: first, the setting where by *researching in situ*, the museum became my studio; second, artefacts where by *researching through making*, I designed artefacts for different purposes; third, documentation where by *researching in a rigorous manner*, I created a chain of thoughts, and finally, participation where by *researching with people*, I empowered volunteers through co-creation.

1. SETTING: THE MUSEUM BECAME MY STUDIO

My research took place between the studio and the field, the Bishops' House museum. In the studio, I developed and tested ideas through making and prototyping. The emphasis was placed on my creative process as a designer and my ability to develop ideas into tangible experiences. When in the field at the museum, I focused on developing my understanding of volunteers' practice. To do so, I used ethnographic methods and became a volunteer as a means to immerse myself in the community (see details in 3.3.1). Spending time at the mu-

seum was important: it contextualised my research whilst grounding my design practice in the aspirations and needs of the community.

In my research, the field became the site of practice through exhibition and co-creation workshops; almost like my studio, it functioned as a platform for experimentation. Not only the resulting designs were brought into the museum but also, participatory and design-based methods were used to involve the volunteers in the design process (see details in 3.3.2). My practice was inspired by the museum and relied on my ability to go back and forth between the studio and the museum. In this process, my fieldwork became an intertwined part of my design process. It was also important to reflect on my experience as a volunteer and the way I developed a sense of belonging and attachment to the place, which transformed my practice and role as a designer.

2. ARTEFACTS: DESIGNING FOR DIFFERENT PURPOSES

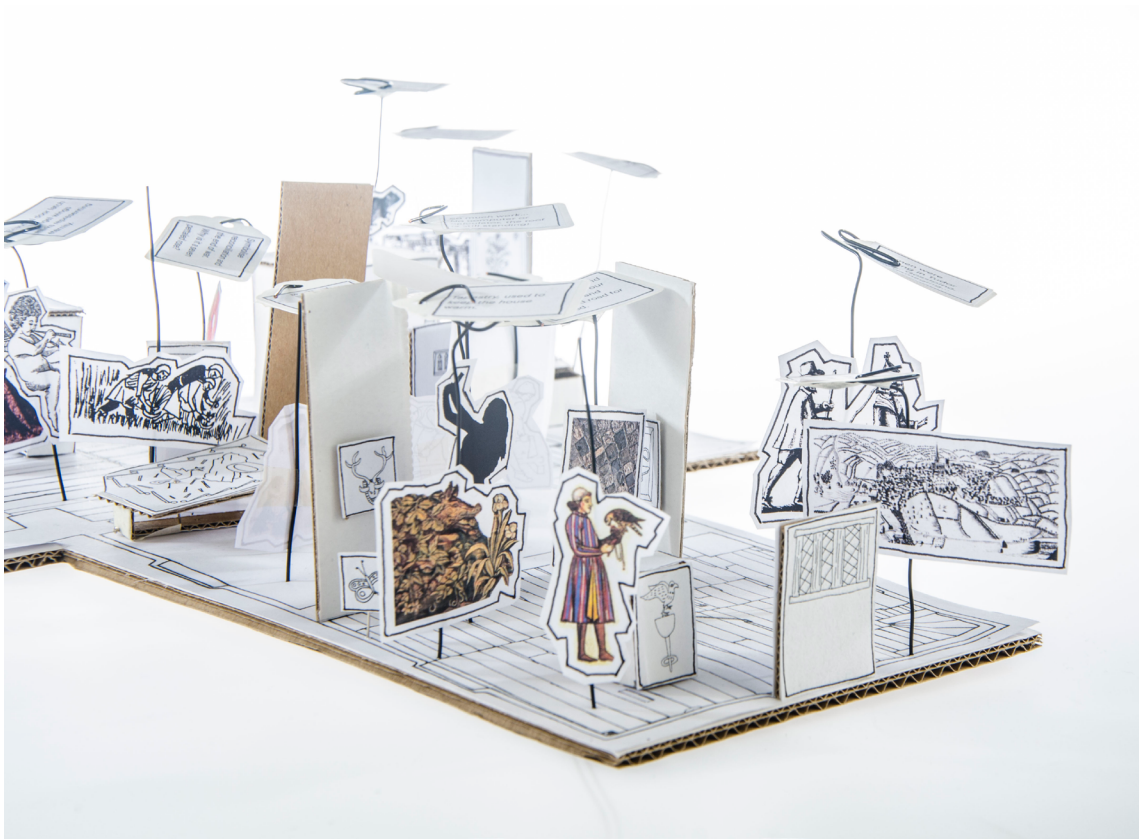

Figure 3–2 An example of one design research artefact: scale model (detail), see 4.1.

The process of creating artefacts were key means for addressing my research questions and generating new knowledge. The artefacts manifested in multiple forms with different resolutions and for specific purposes. I identify three types of artefacts: design research artefacts, design research prototypes and design research outcomes.

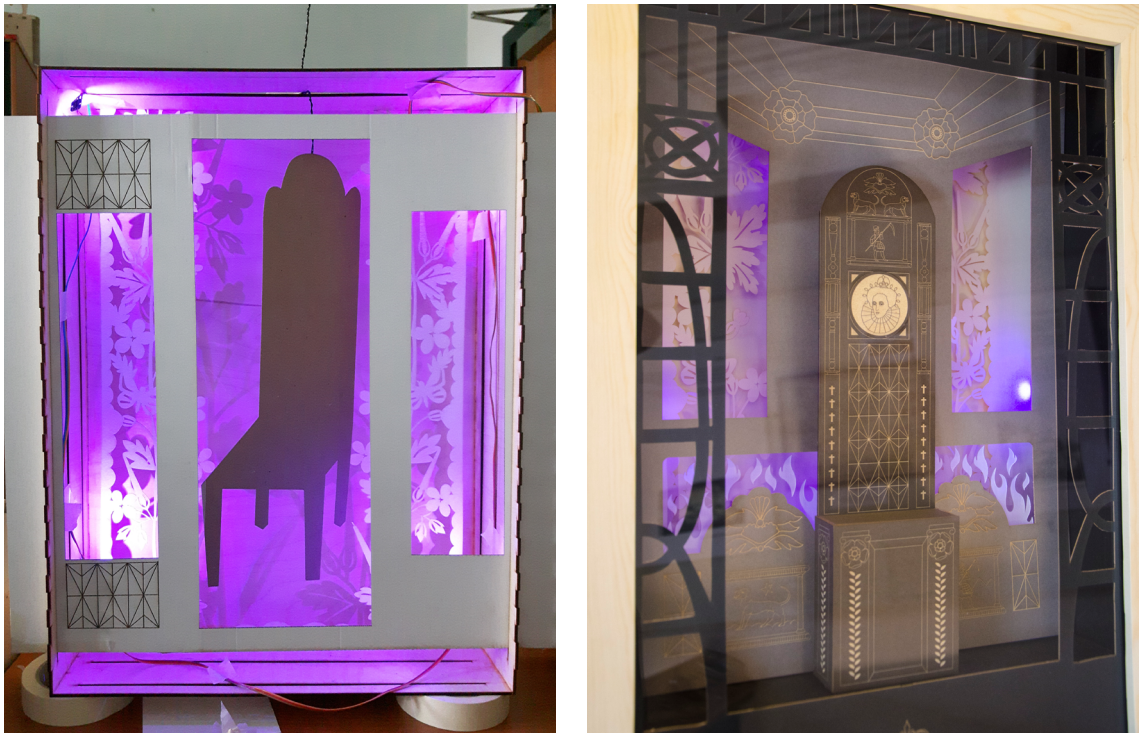

Figure 3–3 Design research prototype (left), design research outcome (right), for the Interactive Tableaux.

Firstly, design research artefacts were created for the purpose of reflection and progression of my process (figure 3-2). They differed from prototypes in the sense that they were not an intermediate of the final design. Instead, they composed a body of knowledge or a chain of thoughts, which helped build my understanding by crystallising information into tangible forms. The artefacts made sense to me as they were a means to preserve the density of information generated in and out of the field. In light of new understandings, I went back to them and used the knowledge they embodied by means of interpretation.

Secondly, design research prototypes were developed in the studio to translate ideas into tangible proposals (figure 3-3, left). The prototypes were an intermediate of the final design deployed in the field. They were tested iteratively

to verify their technological reliability. Finally, the design research outcomes were different from the prototypes in the sense that they presented high quality finish (figure 3-3, right). The way they looked and felt was critical for their evaluation as I was concerned with assessing the qualities of people's experience and interaction. The design research outcomes were "Containers of Stories" and the "Interactive Tableaux", both brought into the museum and presented in the context of two exhibitions (see details in Insights and Implementation chapters). Indeed, they were considered beyond artefacts – more in terms of an experience. They were designed as ultimate particulars, bespoke to the museum and concerned with addressing the volunteers' needs and aspirations. In the exhibition, they did not intend to communicate new knowledge, rather, they were designed to prompt personal engagement and new ways of seeing the house. In the context of my research, they were instrumental to knowledge creation and acted as a catalyst for generating new ideas and directions about technology-mediated experience in house museums.

3. DOCUMENTATION: CREATING A CHAIN OF THOUGHTS

I found that traditional methods of analysis were not always appropriate as they did not keep within the provisional and inspirational nature of my research. I found my own way of assembling, making sense of and drawing conclusions from creative and collaborative processes. I created design research artefacts (e.g. figure 3-2) as a means to make sense of the rich materials generated during co-creation. The tangible artefacts acted as a form of documentation, which became an integral part of my process. I used them as a proof and a means to validate a decision or a particular direction in my process. By standing on my desk, they became part of the studio environment and I was referring to them several times for validation or inspiration. I refer to this as design synthesis: a process described in section 3.3.3 and illustrated through practice with examples such as the manifesto and scale model (section 5.1).

Such a form of documentation became an integral part of my design practice. For me, synthesising by doing was a means to slow things down when I felt overwhelmed by my fieldwork. In this process, audio-recordings and notes taken at the museum documented what happened in the field (see examples in 6.2); in the studio, I reflected on these materials by means of drawing and making design research artefacts. This fostered self-reflection, which enabled me to move in-between the steps of my process more confidently.

Documenting my process in this way provided me with the means to communicate to others; making it more transparent and rigorous. Overall, I was able to justify my decisions by referring to the documentation. Indeed, the design research artefacts formed a chain of thoughts, which assisted me to trace back connections. I used design synthesis as a means of transforming creative contributions into inspirational resources for design. This afforded continuity in the co-creation process while providing clarity as participants were able to see how they informed the development of the research.

4. PARTICIPATION: EMPOWERING VOLUNTEERS THROUGH CO-CREATION



Figure 3–4 Two examples of co-creation workshops involving the museum volunteers in my design process.

By using participatory design, I involved volunteers actively in designing interactive experiences: not only did they come up with their own ideas but also, they contributed directly to the design by generating content and creating arte-

facts for two exhibitions (figure 3-4). By including them as co-creators, the process was fuelled by their aspiration for longer-term and more sustainable scenarios. As a result, co-creation had a positive impact on the museum: first, it translated the museum's aspiration into practice and second, it empowered the volunteers whose practices were transformed beyond day-to-day management towards more creative and curatorial roles (see evaluation insights in 5.3.2).

Participation occurred over a long period of time and my role was instrumental in nurturing collective forms of creativity, for example by designing bespoke tools to involve volunteers in my design process (e.g. generative toolkits, see 3.3.2). Co-creation manifested through different forms of participation such as hands-on sessions, presentations at the museum, updates via social medias, focus groups etc. In this way, volunteers kept track of my process and slowly took ownership of the project. Some volunteers were more involved than others e.g. as advisers and regular points of contact vs one-off participation. Key to the participatory process was to allow different levels of participation so volunteers could contribute in their own ways: through hands-on sessions, during more discursive activities like focus groups or by volunteering extra hours during the exhibitions.

3.3 Beyond mixed-methods: a *bricolage* approach to RtD

In section 3.1, I showed that there is not one established way to conduct RtD: as my practice unfolded across different settings and involved other people, I adopted an interdisciplinary and participatory approach. I borrowed methods from other disciplines such as social sciences and ethnography to conduct research in the field. I also constructed my own ways to investigate the complex realities of design research (Yee, 2010). I crafted my own tools to generate, synthesise and communicate new knowledge. In design research, this attitude is described as *bricolage* (Louridas, 1999; Mose Biskjaer, Dalsgaard, & Halskov, 2017; Yee, 2010). The French term "bricolage" was first articulated in social sciences to describe the multiple skills and resourcefulness of the researcher

(Lincoln & Denzin, 1994). Also described as a “Jack of all trades”, a “professional do-it-yourself person” (Lincoln & Denzin, 1994, p. 2), a “makeshift artisan” (Crotty, 1998, p. 36) or as tinkering (Louridas, 1999), this approach to research goes beyond the use of mixed methods and foster methodological innovations (Yee 2017). Indeed, it is about invention; not relying on existing and conventional tools but paying attention to the objects of research and approaching them in a radical spirit of openness for constructing new or richer meaning (Crotty, 1998). In line with this, Turkle (2011) emphasises the material properties of *bricolage*: “a style of working in which one manipulates a close set of materials to develop new thoughts” (2011, p. 308). Below, I detail the methods I used and organise them as follow: first, *research in the field*; then, *generative design research*, and finally, *design synthesis*.

3.3.1 Research in the field

As described in 3.2.2, I researched in situ to inform my design process and built knowledge from direct experience in the field. This was achieved by conducting field visits, volunteering and semi-structured interviews. While field visits and interviews were limited to the Immersion phase of my research, I carried on volunteering all the way through my investigation to gain an insider perspective on one house museum (see details in 4.2).

Field visits

In exhibition design, a project usually starts with visiting the museum to familiarise with the collection and rooms. However, this is often limited to a brief one-off visit with a pre-set agenda. Early on in my PhD, I conducted field visits in different historic houses to experience what was so particular about them. I was motivated by the literature on historic houses (see 2.1) and my need as a practitioner to experience the research context by myself in order to feel inspired and develop my own understanding rather than just relying on the views of others.

Field visits pushed me to develop ideas that were inspired by my personal experience as a visitor.

I used observation and field notes to capture key moments during the visit and also, as a means for reflection after the visit (Bryman, 2008). I was inspired by sensory ethnography (Pink, 2015) and used sketching to record the atmospheric and experiential qualities of the place (figure 3-5). I focused my attention on multisensory elements (e.g. the textures, light, sound) that are so peculiar to historic houses (Naumova, 2015).

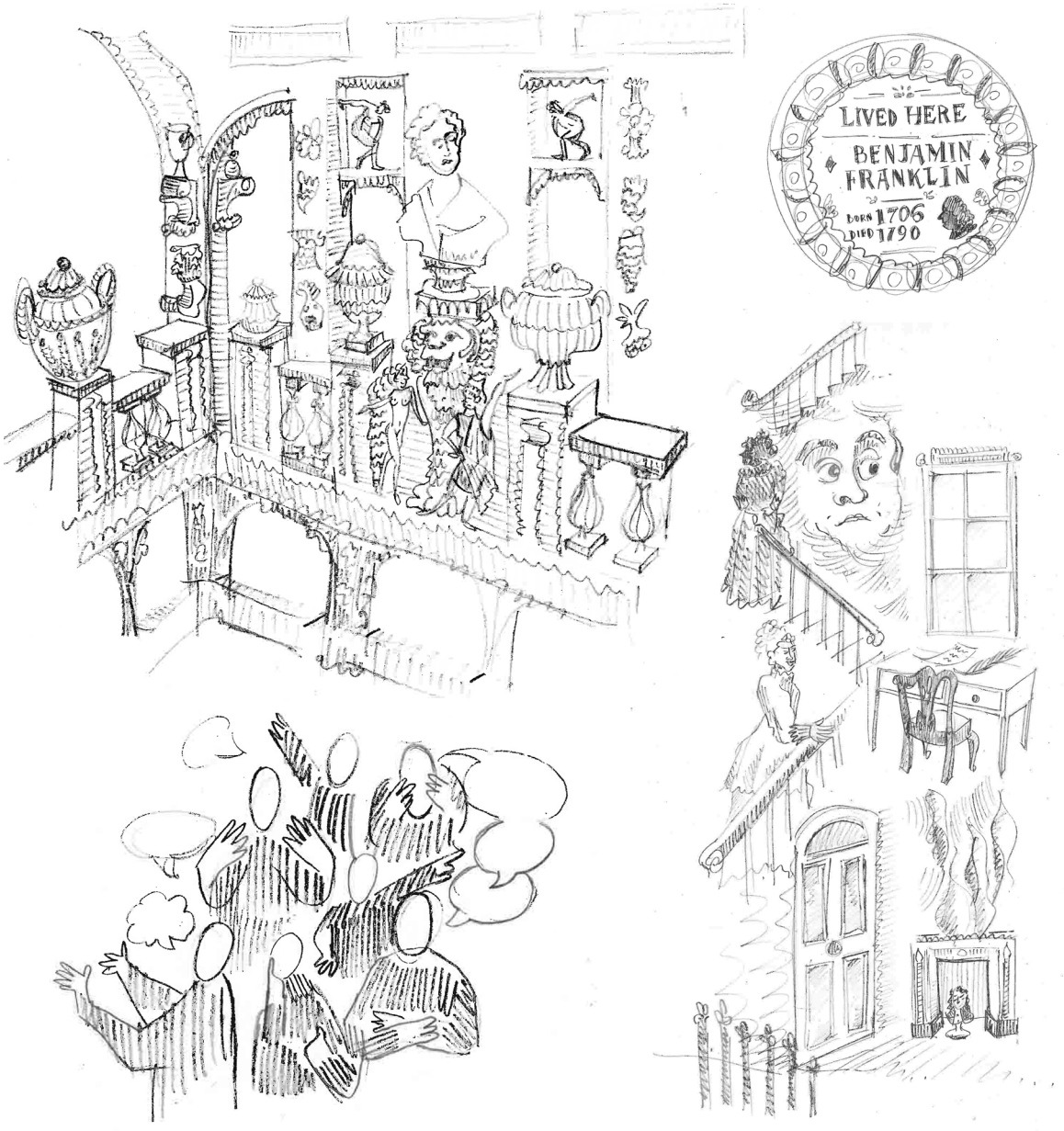

Figure 3–5 Field notes at Sir John Soane museum and Benjamin Franklin House in London.

This was an alternative to photography, which was not allowed in most museums I visited. I also drew my attention to particular exhibition strategies, the type of displays and the behaviour of other visitors onsite. Later, I focused on the Bishops' House museum and continued my field research mainly through volunteering. I adopted some ethnographic techniques such as observation and personal journal writing to document my experience at the House (see details in 4.2).

Semi-structured interviews

After visiting a dozen house museums, I noticed very limited use of technology, which motivated me to understand the challenges house museums face in bringing digital or interactive element in their exhibition space. I felt the need to have a more in-depth conversation about exhibition practice and the role of technology (if any) for historic houses. I conducted semi-structured interviews with staff at 6 historic houses to discuss their views on interactive experience in museums (see 4.1). The flexible structure of the interview allowed me to direct the conversation toward the focus of my research while having enough freedom to encourage a two-way dialogue by going off track and in depth when needed (Bryman, 2008). With the interviews, I saw an opportunity to understand the place from the perspective of museum professionals as well as asking more details about things I noticed during my field visits.

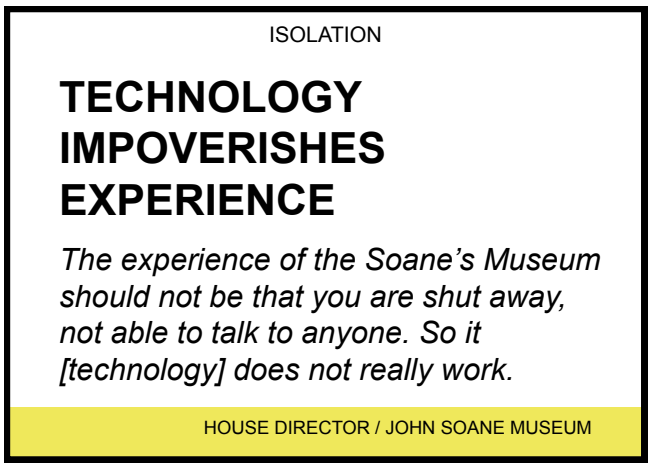

Figure 3–6 Example of one statement card for interview analysis.

After transcribing each interview, I used thematic analysis as a method for identifying, analysing and reporting patterns or themes from the conversation with the interviewees (Braun & Clarke, 2006). This process was facilitated by the use of statement cards (Sanders & Stappers, 2012) to move from raw data to interpretation (figure 3-6). In this process of analysis, I was motivated by identifying commonalities across the sites and outlining important considerations for exhibition design in house museums.

Four design principles (DPs) were generated from insights gained during the interviews and field visits (discussed in 4.1). Previously, design sensitivities have been used to translate insights from the field into soft guidelines to inspire creative design (Hornecker, 2005) and to provide a space for discussing the challenges practitioners might face when designing interactive experience for museums (Ciolfi, 2004). The DPs reflected the nature of my enquiry: rather than converging toward a specific brief, they were used for inspiration and future guidance, and as a means for generating ideas that would be sensitive to the particular setting of historic houses.

Evaluation

Evaluation was conducted during the Insights and Implementation phases of my research. First with visitors, I conducted observations and questionnaires to assess engagement with the two design research outcomes: Containers of Stories and the Interactive Tableaux. This generated insights to address my research questions (RQs), particularly RQ3: *how can tangible interaction engage visitors with heritage at the Bishops' House?* Second with volunteers, I organised focus group sessions at the museum to get feedback from the community. It gave us an opportunity to reflect on both the participatory process and the exhibitions. At the same time, it allowed me to observe how the volunteers made sense of their experience together (Bryman, 2008). As a result of these, our discussion shed light on the potential of tangible interaction for places like Bishops' House (RQ1 & RQ3) and the benefits of using co-creation with volunteers (RQ2).

3.3.2 Generative design research

As described in 3.2.1, design led my research process and generative design methods were used for divergent thinking, particularly in the Immersion and Development phases. Here, I describe how the Creative Package, generative toolkits and site-specific interventions opened up the scope of design by bringing insights to the surface and generating many ideas.

The Creative Package



Figure 3–7 The Creative package, bespoke with each participant's name (left), opened (top right) and example of one probe completed by a participant.

The Creative Package (figure 3-7) invited the volunteers to reflect on their experience at the house via a series of creative probes. It also served as a means to synthesise the knowledge I built in the Immersion phase. I used the package as a method to start a dialogue with the museum volunteers. It was inspired by design probes (Wallace et al., 2013) used in design research to elicit inspirational responses from participants. Initially introduced as cultural probes (Gaver, Dunne & Pacenti, 1999), this method allows design researchers to go away from the official-looking questionnaires and formal interviews.

While adaptions of probes have engendered concerns among the design community (Boehner, Vertesi, Sengers & Dourish, 2007; Gaver, Boucher, Pennington, & Walker, 2004), they have proved to be in some cases valuable tools for generating rich insights on people's lived experience. For instance, Wallace et al. (2013) have adapted them as a means to ask questions "through gentle, provocative, creative means offering a participant intriguing ways to consider a question and form a response through the act of completing the probes creatively" (2013, p. 3441). This inspired me to design the Creative Package as a means of opening up the scope for possibilities by inviting participants early in the process to express their ideas in forms and formats that provided me with inspiration for exhibition design at the Bishops' House. The creative probes featured in the package are detailed in section 4.2.2.



Figure 3–8 One generative toolkit used by museum volunteers during co-creation workshop 2 at the Bishops' House.

Generative toolkits

I designed bespoke toolkits to enable volunteers' creativity during the co-creation workshops (see in 5.2 and in 6.2). These aimed to give volunteers the tools to participate as co-creators and explore future scenarios for generating change in the way the museum engages the public (figure 3-8).

In contrast to design probes, generative toolkits are used in co-creation workshops to facilitate collaborative activities; “to follow a more deliberate and steered process of facilitation, participation, reflection, delving for deeper layers in the past, making understanding explicit, discussing these, and bridging visions, ideas and concept [scenarios] for the future” (Sanders & Stappers, 2014, p. 8). In my case, they gave my participants a language to collectively imagine and express their dreams and ideas for future experiences (Stappers & Sanders, 2012).

Site-specific interventions



Figure 3–9 The 4 site-specific installations commissioned for the 2016 *Curious House* exhibition. Lyndall Phelps (top left), Rachel Emily Taylor (top right), Louise Finney (bottom left) and Caroline Claisse (bottom right). See details in 5.2.2.

In relation to art practice, Kaye (2013) describes site-specific as an artistic intervention that is situated; more specially, “a ‘site-specific work’ might articulate and define itself through properties, qualities or meanings produced in specific relationships between an ‘object’ or ‘event’ and a position it occupies” (2013, p1). In museum, Robins (2016) describes this approach as artistic intervention where artworks are created in response to an existing collection or a particular site. This

approach has been used extensively, particularly in house museums to provide visitors with an alternative reading of the place (see 2.1). However, to the best of my knowledge, there is no design-led research in interaction and exhibition design that makes use of site-specific interventions as a means for opening up the space and possibilities for design. In my research, I initiated the *Curious House* exhibition (2016) and commissioned artists to create site-specific interventions at the Bishops' House (figure 3-9). The exhibition aimed to increase awareness and engagement with the museum. It broadened the possibilities for interpretation by means of creative practice: while the brief for the artists was open-ended, I required them to create a piece of work that was site-specific – meaning that their interventions had to be inspired by the house and sensitive to its particular setting. As a result, it provided visitors with alternative readings of the place while inspiring the volunteers and myself to see the house from a new perspective (see discussion in 5.3.3). With the exhibition, I succeeded in engaging a conversation with the place, which informed the making of a second exhibition described in chapter 6.

3.3.3 Design synthesis

By conducting research in the field, I turned towards social sciences to adopt appropriate methods for my fieldwork (see 3.3.1). The participatory nature of my research also pushed me to construct my own tools for co-creation and generative design (see 3.3.2). When dealing with participants' contributions (e.g. Creative Package), I found traditional methods of analysis restrictive and not keeping within the "probological attitude" of being inspirational (Boehner et al., 2007). Moreover, as discussed in section 3.2.2, my role was critical in giving forms to participants ideas and key to my research was for the design to reflect volunteers' aspirations and ideas. Thus, key to my process was to find ways to externalize insights from creative and participatory processes so they could be collectively discussed, used and reflected upon to inspire the design research outcomes. In this section, I present design-based



Figure 3–10 The Volunteers Manifesto. See details in 5.1.

methods adapted for the purpose of synthesising co-created materials. I show how designing a manifesto, scale modelling, drawing storyboards and personas were used in novel ways, as design research artefacts. They were a means of assembling, making sense of and drawing conclusions from co-created materials.

The Volunteers Manifesto

A manifesto is defined as a written statement declaring publicly the intentions, motives, or views of its issuer[6]. Since the 20th Century, it has been used as a standard feature to define and critically establish new forms of art such as the Futurist and Surrealist movements. Manifestos are visual documents, which are self-contained; standing alone as an ideology crafted to convince and convert (Caws, 2001). In my research, I designed a manifesto in response to what participants described important when volunteering at the museum. The visual statement inspired future designs by acting as a reminder of what it meant to be a volunteer at the Bishops' House (figure 3-10).

Scale model

Model making is used in exhibition design to translate proposals into three-dimensional and solid forms (Spankie, 2009). Designers use physical models for their immediacy and ability to represent aspects of an idea that cannot be captured on paper. Building models afford mobility and multiple perspectives: designers move around them and shift things to create new associations and narratives. To become more familiar with the museum, I created a model of the house and then, I mapped volunteers' favourite places onto it (figure 3-11). The model differed from the ones created in exhibition design, which are usually an intermediate representation of a future exhibition. In this case, I used scale modelling as a means to collect and preserve all meaningful places that were indicated by volunteers when completing the Creative Package.

6 Merriam Webster Dictionary: https://www.merriam-webster.com/dictionary/manifesto

Mood boards

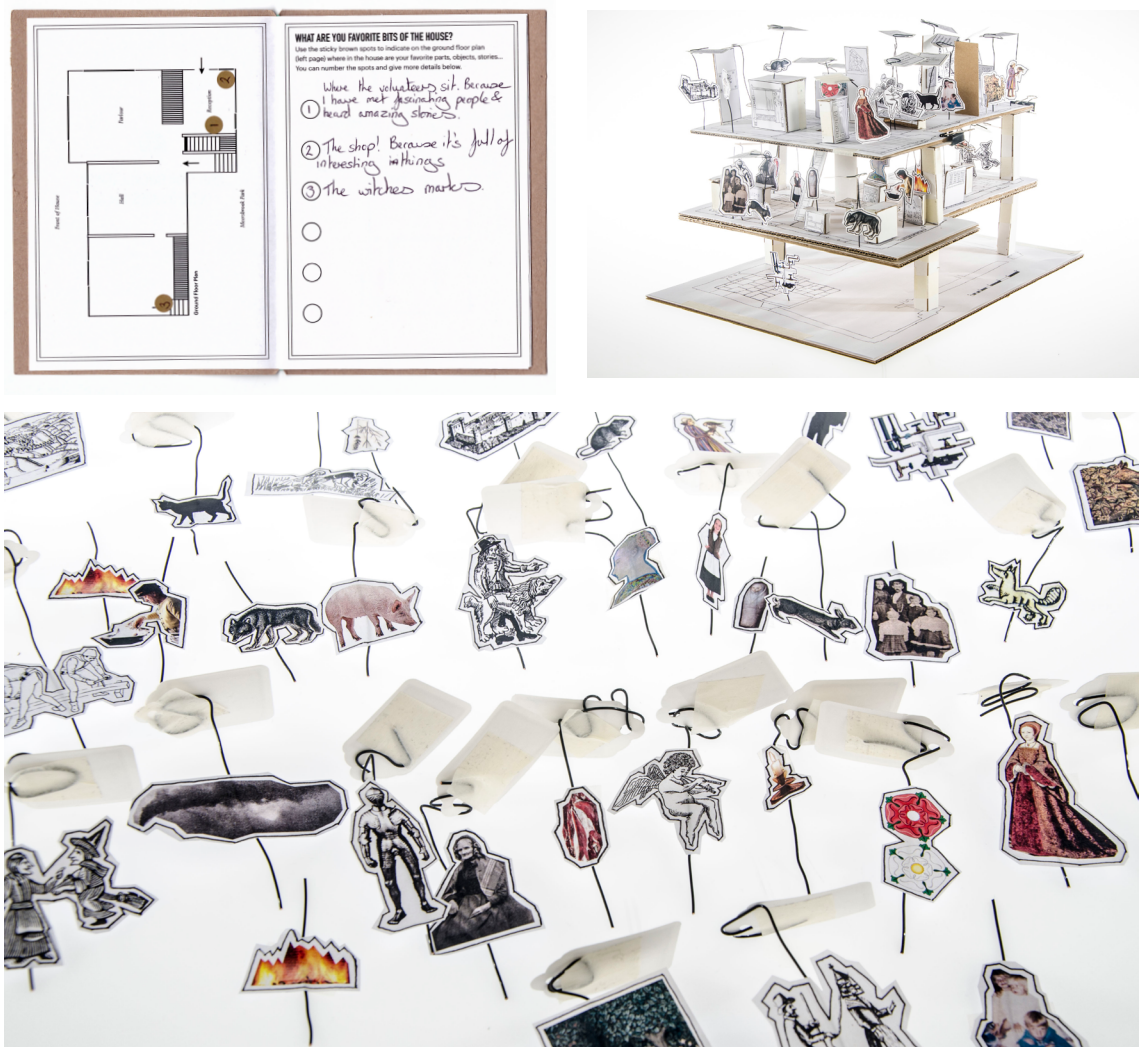

Figure 3–11 Volunteers' favourite place at the museum, probe completed from the Creative Package (top left), individual pins for scale model (bottom), scale model (top right). See details in 5.1.

To synthesise materials, I relied on visual tools like mood boards, which are used by exhibition designers to give a general feel of an idea through visual means. In practice, mood boards are created for inspiration and as a means to support concept development and presentation. In design research, they are used to communicate emotions and make the intangible tangible (McDonagh & Storer, 2004). They provide designers with a sensory-centric approach to aid communication, inspiration and immersion in the design process (McDonagh & Storer, 2004). I created mood boards at several occasions during my process: (1) to get a general feel of home, an abstract concept described by my participants

in the Creative Package; (2) to visualize participants' ideas for exhibition proposals at the museum (see details in 5.1), and (3) to support the development of interactive experience during a design critique session (figure 3-12). The mood boards were design research artefacts in the sense that they were created for the purpose of inspiration and progression in my research.



Figure 3–12 Mood boards used to present ideas during a design critique session with peers.

Storyboards and personas

Between the two co-creation workshops in the Development phase, an intermediary step consisted to give form to the characters and stories imagined by my participants. For this, I used drawing as a way to organize and clarify meanings. There is value in drawing to reveal new insights and understandings, something Schön (1983; 1984) called the drawing back-talk. An example is the visual investigation by Lyons (2009) who shows the value of drawing to better look, to understand a medical phenomenon through the activity of drawing it. In interaction design, this process has manifested in multiple forms; as sketches to get the

design right (Buxton, 2007), as comics to communicate the researchers' journey (Dykes, Blythe, Wallace, Thomas & Regan, 2016) and as scribing to document a research event (Wallace et al., 2015). In my process, I have explored the value of drawing for sense making. As an alternative to written transcription, I sketched while listening to participants' conversation (see details in 6.2.1).

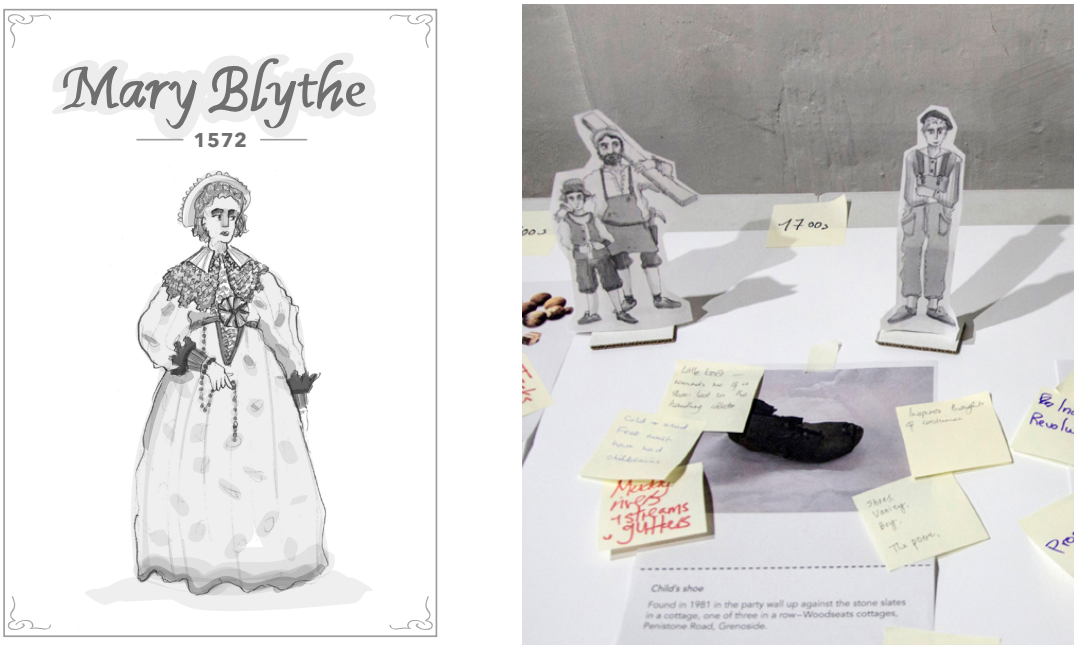

Figure 3–13 Example of one persona inspired by volunteers' contributions (left). Personas used for generating more content and discussion with volunteers (right).

In the Development phase, I also adapted storyboarding and personas to visualize the narratives imagined by my participants. Storyboards are widely used in the film industry for production purposes, to help directors visualise the scenes before execution. In the context of product design, this technique has encouraged designers to consider situations, atmospheres and feelings in product-user interaction (van der Lelie, 2006). The use of personas was first introduced by Cooper (1999) as a practical interaction design tool. Inspired by user studies, a persona represents an archetype of a user that helps designers to focus on addressing the design problem from the perspective of the user (Blomquist & Arvola, 2002; Chang, Lim & Stolterman, 2008; Matthews, Judge & Whittaker, 2012). By giving designers a person to connect with, persona is used to ensure human centered design (Chang et al., 2008). In a traditional de-

sign process, some have criticized the use of personas for being too abstract, impersonal, misleading and distracting (Matthews et al., 2012). Others have showed how practitioners have developed creative ways of using personas, from three-dimensional representation to personas generated based on designers' imagination and experience instead of "real" users (Chang et al., 2008).

In my process, I adapted these methods to the purpose of my research. In doing so, I broadened their use to enable a more dialogical process: storyboards were used to materialise participants' narrative in a sketchy way, which invited more comments and modifications. The personas I created were not inspired by potential users (e.g. museum visitors), instead, they represented characters that were created during the workshop with museum volunteers (see all personas in Appendix 6-D). The illustrated personas provided workshop participants with a tangible representation of previous inhabitants at the House, making them more real and legitimate. I presented the personas back to the participants to foster more discussion and content creation during the Development phase (figure 3-13).

Other design-based methods

As part of my research process, I used other methods like design critique and prototyping to refine and test ideas. I was familiar with these methods from my undergraduate and postgraduate studies. Design critique sessions were organised at the university with peers in which brainstorming and critical discussion were encouraged (see details in 6.1). The goal of these sessions was to assess ideas and identify future design directions. Design research prototypes (as described in 3.2.2) were created to test the user interaction and reliability of technology. Overall, prototyping occurred many times through my research to refine the design of probes (see 4.2.2) in preparing workshops (see 6.2) and developing the design research outcomes (see 5.2 and 6.3).

4 IMMERSION PHASE
Discovering and getting inspired

The aim of the Immersion phase was about generating insights to open up the possibilities for design. I focused on building knowledge by means of discovery and inspiration. In this chapter, I reflect on my experience in the field and show how it inspired my work as a designer. First, I discuss insights from field visits and interviews with museum experts about their views on interactive technology. This fieldwork deepened my understanding of visitor experience and informed implications for designing interactive experiences in house museums (see 4.1). Then, in section 4.2, I discuss how volunteering at the Bishops' House over a long period of time gave me an insider perspective and inspired my co-creation approach that started with the Creative Package, a bespoke tool designed to elicit volunteers' inspiration for exhibition design at the museum. Finally, in section 4.3, I reflect on the benefits of using creative methods with the volunteers and summarise how the Immersion phase has shaped the course of my design process.

4.1 Principles for designing interactive experiences in a special kind of museum

As described in my Methodology, I conducted research *for* the purpose of design and as a means to learn specific information about the research context. During the first six months of my PhD, I visited a large number of house museums in the UK. This was motivated by my need as a designer to understand, through experience, historic houses in contrast to other types of museum. I used sketching to document my visitor experience and to capture the particular character of house museums (see Appendix 4-A). I also volunteered at the Mr Straw's House during the Winter Clean where I joined the museum team who was in charge of emptying, checking and cleaning thousands of objects (figure 4-1). This gave me an insight on the work carried out by staff and volunteers in the "behind the scenes" of house museums.



Figure 4–1 Mr Straw's House during the Winter Clean (Worksop, UK). Photograph © Caroline Claisse.

As a means to deepen my understanding and inform my RtD approach, I conducted semi-structured interviews with museum staff at six house museums (table 4-1). Overall, the interviewees had a wide-ranging experience with their museum (between 1 and 30 years), and their role varied from visitor assistant to museum curator, to property manager. I chose house museums of similar scale; relatively small as opposed to stately homes and unique in their own way. Both Freud and Sir John Soane museums are places where important people lived, they are also defined in terms of collectors' homes where artefacts gathered by their owners are of extreme significance to the meaning of the house. In the case of the architect Sir John Soane, the house is also presented for its outstanding architecture; what Young (2012) identified as a walk-through artwork. The Georgian House and the Van Gijn Huis museums are both upper class houses where visitors can experience the late 18th and 19th centuries atmosphere and imagine how life was then for their wealthy owners; a sugar merchant and an influential banker respectively. They contrast with Mr Straw's House and the Tenement House, which tell the story of more ordinary people showcasing a home as it was left by their owners with their personal possessions.

Name	Role	Historic House Museum
M1	Deputy Director	Sir John Soane Museum (London, UK)
M2	Curator	Van Gijn Huis (Dordrecht, Netherlands)
M3	Visitor Assistant	Georgian House Museum (Bristol, UK)
M4	Curator	Freud Museum (London, UK)
M5	House Manager	Mr Straw's House (Worksop, UK)
M6	Property Manager	The Tenement House (Glasgow, UK)

Table 4–1 Detail of participants for the interviews.

The interviews took place on site and lasted between 30 and 45 mins apart from the one with the Van Gijn Huis (Dordrecht, Netherlands) where the Curator answered my questions via email. The questions were informed by both my research questions and field visits in house museums. I structured the interviews into four main themes, which addressed: (1) the nature of historic houses, (2) exhibition design practice, (3) visitor experience and (4) the role (if any) of technology at the museum (interview guide, participants' information and consent forms in Appendix 4-B).

Transcriptions of the interviews were thematically analysed (Braun & Clarke, 2006) and recurring themes were clustered around four Design Principles (DPs): *Maintaining the spirit of the House*; *Building on the domestic nature of historic houses*; *Telling stories about, for and by people*, and *Designing for seamless experience of technology*. In the following, I first detail interviewees' responses in relation to the four principles. I then summarise the DPs and outline future direction for my research.

4.1.1 Maintaining the spirit of the House

House museums were described in terms of authenticity and uniqueness (figure 4-2), as the only place in the world where visitors can experience significant features in the lived-in context, such as Sigmund Freud's "real couch" at the Freud Museum. House museums create authentic experiences by engaging visitors with artefacts displayed in their original setting or as if the inhabitants have just stepped out. They are defined as "extraordinary homes" (M5[1]) where visitors walk in to be immersed in the lives of previous inhabitants; *I think to step in this house… It's like stepping into Soane's imagination; architectural, personal, whatever it might be* (M1); *It is very ordinary on the outside but what makes Straw's house extraordinary and really unique is the scale of the possessions that have been collected and the breadth of time they represent* (M5).

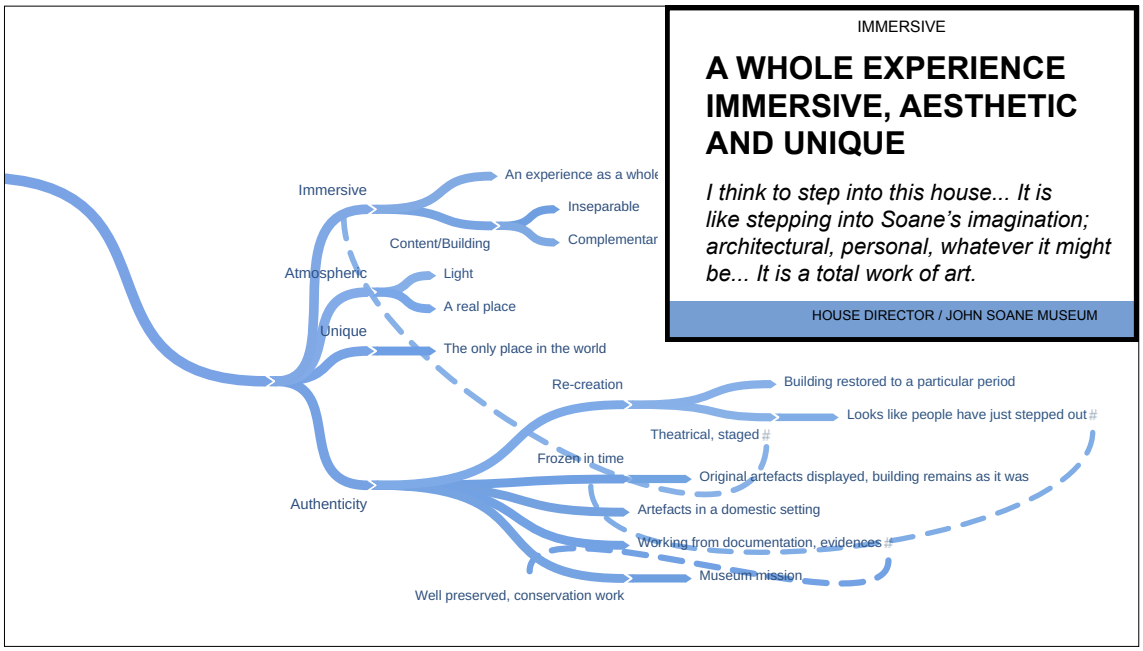

Figure 4–2 Example of methods for analysis: map and statement card for design principle #1. Map made with *coggle*.

Key to exhibition practice is to remain true to what the place is about. At the Sir John Soane museum, records and documentation from the architect shape conservation and exhibition guidelines. The Tenement House re-installed gas lighting for visitors to experience life conditions of a particular time, which in

1 Numbers in brackets identify the different interviewees. See table 4-1 for details.

turn increased the atmospheric qualities of the place. Interviewees described the synergy between the collection and the building, which are inseparable from each other. Indeed, nothing can be taken out as the museum would lose something. As confirmed in the literature (Naumova, 2015; Pavoni, 2001; Young, 2007), an exhibition at a house museum goes beyond the individual display towards creating an experience as a whole where the building acts as a container for the lives of previous residents.

4.1.2 Building on the domestic nature of historic houses

Consistently with the literature (see 2.1), house museums were described by the interviewees in terms of familiar environments (akin to visiting somebody's home) where the domestic setting encourages personal connections and a real sense of nostalgia (Bachelard, 1994; Donnelly, 2002; Young, 2007). Indeed, a house museum is not like any other museum; *it feels the family still lives there, and they could come around the corner, as if they can come home at any moment* (M2, figure 4-3).

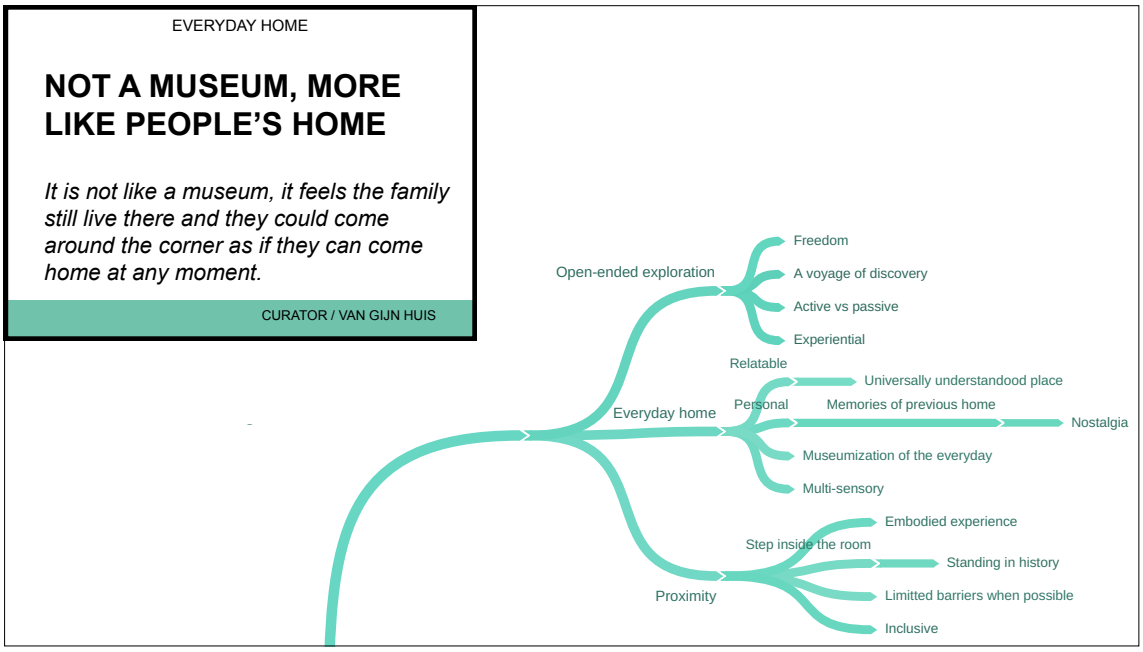

Figure 4–3 Example of methods for analysis: map and statement card for design principle #2. Map made with *coggle.*

At the Tenement House, the house manager (M6) describes how visitors find personal resonances with the place as they recall memories of previous homes; whether they lived in a tenement before or just remember visiting their uncle or grandparents' house. Personal engagement with the place is encouraged by adopting exhibition strategies that increase closeness and exploration of the place: *If you are in someone's home, you don't find a room that is cut in half by a rope. And half a room that you can't step into* (M1). When possible, barriers are removed to support freedom of movement and to allow visitors to step in the room, making them feel part of the house: *In some houses you can wander through the rooms without any cords or fences, then you are part of the house, and I do like that very much* (M2). Rather than only reading, visitors experience the place through embodied and sensory means, which makes it more memorable and inclusive: like at home with the atmosphere of the place that changes depending on the seasons. In terms of visitor experience, people are not forced into pre-defined paths or told what to think. This is important as the museums describe their visitors as explorers rather than passive receivers of information: To have a very imaginative experience and an inspirational experience in which they were participants you know, they were explorers and discoverers as oppose to passive absorbers, receivers of information (M1).

4.1.3 Telling stories about, for and by people

As outlined previously, visitors have expressed an increasing interest in the personal stories embodied in house museums (Bugler, 2015; Mårdh, 2015). At the Freud Museum, the curator recalls a popular exhibition, which featured Freud's personal life alongside to his intellectual work. The exhibition featured love letters and personal photographs, which succeeded in telling a more relatable and intimate story that aroused visitors' interest. The more intimate and personal sides of the house was also brought to life at the Van Gijn Huis with the

24 hours project[2] where museum staff cooked, cleaned and dined as if they were living in the 19th century. The interpretive materials generated from the project is used onsite for visitors to learn about the life of people during that time. Indeed, it is about that everyday connection with people's lives; *Not a famous person, just an ordinary person, that makes it unique in that respect* (M6). The House Manager at Mr Straw's House further emphasised: *I like the personal touch, I like the personal element here. It is not like some of the massive country estates that are glorious in their own right but feel quite remote from people's everyday expectations and experiences* (M5).

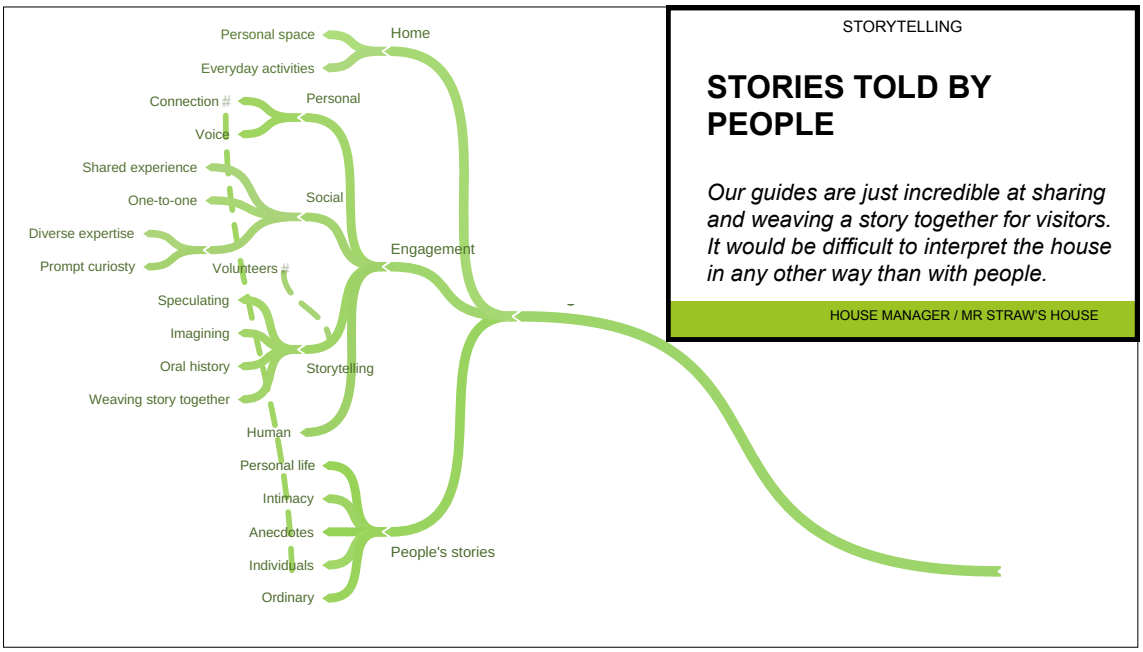

Figure 4–4 Example of methods for analysis: map and statement card for design principle #3. Map made with *coggle.*

At the different houses, volunteers play a key role: they are storytellers keen on sharing stories with visitors (figure 4-4); *The people who work here really love the museum and they get tremendous pleasure out of talking to visitors* (M1). Indeed, it is about that interaction: *between the volunteers and visitors. And that personal connection that you get because I think that's more important than anything else* (M6). And that volunteers-visitors interaction is key to house museums: *They must because we don't have labels and panels and if we did,*

2 See the project via YouTube: https://www.youtube.com/watch?v=_PSPT-skBow

we would ruin the museum forever (M1); *And their ability to read what the visitor is looking for… It would be very difficult for us to interpret the house in any other way than with people* (M5). Sharing insights and listening to others' stories are essential to the visiting experience. Volunteers have an important role in weaving the story together by sharing a mixture of facts, speculation and anecdotes about the lives of previous residents: *The challenge of interpreting a house like a home is difficult in the space that we have, and our guides are just incredible at sharing and weaving a story together for visitors* (M5).

4.1.4 Designing for seamless experience of technology

Findings from the interviews show that technology is mainly thought of as screen- or buttons-based interfaces that break or, when working, offers a detached or isolated experience. In the context of house museums, technology is a barrier to the actual space as it tends to shut people away and limit their physical and social engagement (figure 4-5).

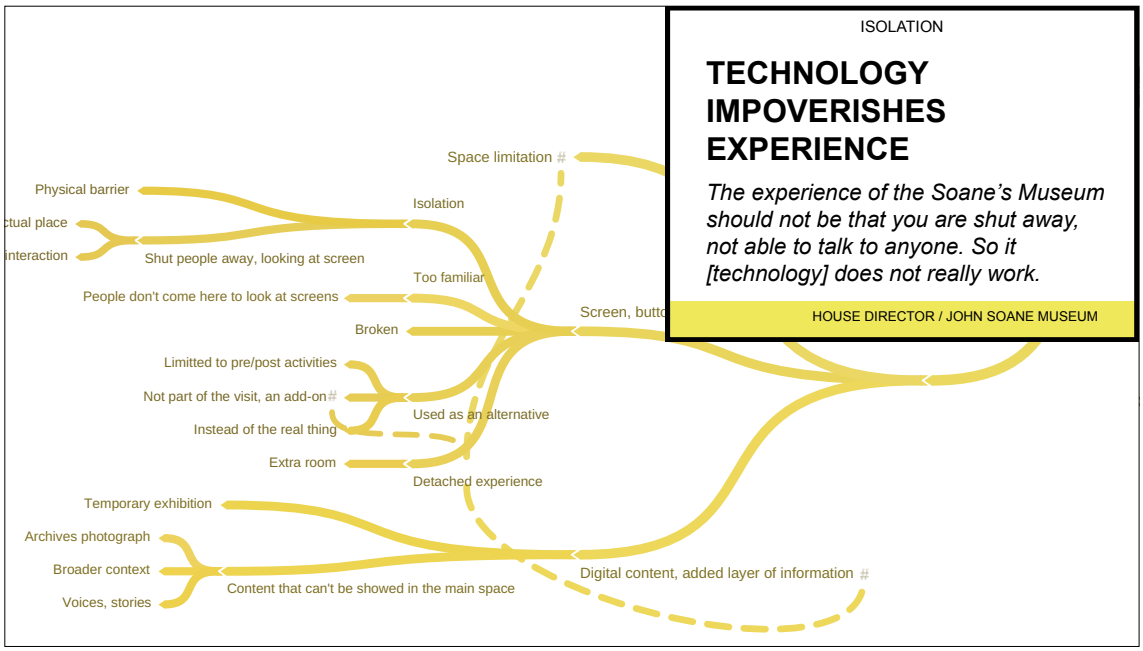

Figure 4–5 Example of methods for analysis: map and statement card for design principle #4. Map made with *coggle*.

Interaction onsite is about the personal touch of people; it takes place on a human level rather than through the lens of technology; *they are visiting a museum and they don't want to stare at a screen for hours* (M1). In the interviewees' opinions, interactive experience should encourage active forms of learning: *To me, interactive means that somebody is engaged really; their mind is broadened with something they've done* (M6). However, current use of technology in house museums is not very interactive; it is limited to a single user and conceived separately from the main experience; *We have got some iPads, films showing on there but the actual interaction here is more on a human level* (M4).



Figure 4–6 Audio display at Mr Straw's House. Photograph © Caroline Claisse.

When technology is available, it stands in a separate room where visitors can interact without interfering with the main visit. Thus, digital technology is limited to pre- and post-visit activities where, for example, visitors browse archive photographs of the city via a digital picture frame or operate a listening station to hear memories of previous residents (figure 4-6). Overall, the interviewees have raised the challenges to adopt technology; first, because of the space limitation; *We are in a historic house so you can't magic up another*

room… More space… Where would it even be? (M4). Second, because of the disruptive and aesthetic character of technology: *How could we use technology better? But how could we keep within our spirit that it is very much about the boys, their lifestyle and their stories and not sure how comfortably it would fit to have screens everywhere* (M5).

4.1.5 Summary of the Design Principles

The interviews with museums were useful in discussing in more detail opportunities and challenges for exhibition design in historic houses. Already then, I saw an opportunity to increase the domestic feel of house museums by means of designing for multisensory experience. Challenges were also identified particularly with regards to technology, which was described as not fitting in historic houses. However, museums' concerns showed a promising start for using embedded technologies to design for seamless experience of technology. I now summarise the four design principles (DPs) before introducing the next step of my research.

DP1: Maintaining the spirit of the House

Interactive exhibitions should be in keeping within the house's spirit by facilitating an immersive experience and a feeling of authenticity. Connections between the building and its content should be reinforced. The exhibits must engage visitors with the house as a whole, while drawing their attention to significant details of the actual place.

DP2: Building on the domestic nature of historic houses

The domestic atmosphere of house museums should be part of the design, and embodied forms of interaction should invite visitors to actively engage with the place. By building on the sensory properties of home, the evocative connections with the place will increase.

DP3: Telling stories about, for and by people

The exhibits should tell individual and intimate stories about ordinary people for visitors to empathise with on a personal level. There is an opportunity for including volunteers into the design process for their particular and diverse expertise. Social interaction and shared experience should be facilitated with stories told for and by people.

DP4: Designing for seamless experience of technology

Technology should be part of the whole experience rather than considered as a detached element of the visit. Efforts should be put toward designing a unique experience that is bespoke to the museum and that facilitates interaction between people and throughout the museum.

4.1.6 Summary

My fieldwork confirmed what I previously identified in the literature: exhibition design in house museums was not a case of one-size-fits-all approach. It should be site-specific by responding to the unique qualities and stories of one house museum. I also noticed a gap between the museums' aspirations discussed during the interviews and the current practice I observed when visiting historic houses in general. For instance, I found that a lot of museums relied on text-based interpretation, which did not keep within the feel of the house. At this stage, I identified an opportunity to experiment with more bespoke means and craft-based approach to exhibition in house museums. I was also motivated to test my design principles through practice. This informed my decision to approach one local museum: the Bishops' House museum in Sheffield.

4.2 Gaining an insider perspective of the Bishops' House

Located in the grounds of Meersbrook Park in Sheffield, the Bishops' House is a museum ran by a voluntary group who established themselves as the

"Friends of Bishops' House" (see section 1.1.1 in Introduction for details). In this section, I describe the ways I started engaging with the place and its community, through volunteering (4.2.1) and deploying the Creative Package (4.2.2).

4.2.1 Being a volunteer at the Bishops' House

A space for opportunity

Like other house museums, Bishops' House was a home; unique in its own way, but different from other places I visited for being exclusively staffed by volunteers. Nonetheless, I quickly realised that this situation had relevance beyond the case of the Bishops' House. Indeed, I noticed that many house museums relied on volunteers who assisted with visitors and the behind the scenes (e.g. Mr Straw's House, Winter Cleaning). In the literature (see 2.2), volunteers were also described as actors of growing importance across the whole cultural sector (Groom, 2017; Holmes, 2003; Museum Association, 2017).

Volunteers' introduction meeting

I joined the group and we introduced each other. Everyone had different backgrounds from history degree to working in education or as a social worker… We shared our skills and expertise; one of us who was a retired school teacher was keen on helping with children whilst a young graduate suggested she could take care of the social media. It was clear that people wanted to help in their own ways.

Journal extract 1 – Saturday 15th November 2015

I first entered the Bishops' House as a visitor in October 2015. Following from my visit, I was invited to join a meeting about volunteering at the House (see below journal extract 1). This led me to start my first session as a museum volunteer in November 2015. The purpose behind volunteering was to gain an insider perspective on the House, however, I was aware of entering the field with my own agenda and research interests. Those were discussed early on

with the museum who recognised a space for opportunity and joined as a collaborative partner in my practice-based investigation.

During my time at the House, the sessions for volunteers were organised every weekend for three hours in the morning or afternoon. For the House to be open, a minimum of two volunteers was required and emails were sent out every week to encourage volunteers to sign up for upcoming sessions. Between November 2015 and January 2018, I covered a total of 80 sessions (240 hours) at the museum, which meant that overall, I volunteered once or twice a month. I kept a personal journal to document my time at the House, which allowed me to reflect on my experience and role at the museum. In the remaining of this section, I show how I gained an insider perspective by getting to know both visitors and volunteers. Moreover, I expand on how I deepened my understanding by engaging with the behind the scenes of the House.

Volunteering with Sarah

Around midday, a few visitors came in. They seemed curious so I walked around with them and told them about the witches' marks and other curious features at the House. I showed them one of the folders that features pictures of the house in the Sixties. It shows how it was when inhabited by the last family – the park keepers. They loved it! They could not believe how the house looked like back then. Later, Sarah said it was also her favourite thing about the house and she thought it was a shame that this part of the story was not visible somewhere in the house.

Journal extract 2 – Sunday 24th January 2016

Getting to know museum visitors

One of my roles as a volunteer was the front-of-house where I was in charge of introducing visitors to the House while recording how many of them stepped through the door. From my experience at the welcome desk, I realised that people visited mainly in groups and identified two types of visitors: the locals,

who regularly stopped by on their way to the adjacent park, and the “one off” visitors including many tourists visiting Sheffield for the day.

The more time I spent at the museum, the more confident I felt as a volunteer. I enjoyed talking to visitors, showing them around the House, pointing them to secret marks and stories that other volunteers had shared with me (see below journal extract 2). This face-to-face interaction with visitors was key in revealing hidden features and stories. For instance, because the museum panels mainly focused on life in Tudor time, most visitors ignored that the House was inhabited until the 1960s. I also spent time exploring the place by walking around the museum, which was a very sensory experience. Two of my favourite features were the light changing throughout the day and sound of the creaking floorboards when going up and down the stairs.



Figure 4–7 The Bedchamber at the Bishops’ House. Photograph © Caroline Claisse.

During my time at the House, I was also able to observe and engage more directly with visitors. I took this opportunity to conduct observation and informal conversations about their experience at the House (details about the questions in Appendix 4-C). Overall, visitors appreciated volunteers’ efforts in keeping the

place open to the public. They generally felt welcome and liked having the choice to explore the place at their own pace, not being forced to go any particular way. Parents liked that they could let their children free to run around the rooms and touch things without much restriction. A couple of visitors observed the benefits of being able to stand inside the exhibit, which made their experience more immersive than when visiting museums with white walls galleries. When asked, visitors usually preferred the two most furnished rooms at the House: the Bedchamber and the Parlour, which were both staged as if the inhabitants have just stepped out (figure 4-7). In these, they said they could better imagine what life was like and what the rooms were used for in Tudor times. On a busy day, one visitor observed that the museum felt inhabited in ways that reminded her of the hustle and bustle of an everyday house.

By conducting research in the field, I built knowledge through direct experience and generated rich insights that informed my design process. For instance, I learned about the type of visitors, their experience and absorbed sensory features (e.g. light, sound) that were peculiar to the place.

Getting to know museum volunteers

At the time of my study, around 40 volunteers were registered as part of the Friends of Bishops' House. Volunteering fulfilled my desire to get to know the wider community of people involved in looking after the House. During each session, I met different volunteers every time in ways that were friendly and informal. Most of them were locals who enjoyed volunteering because they felt part of a community. They also liked that they could contribute in their own way and without too much commitment (see below journal extract 3). As a volunteer myself, I observed a feeling of belonging that increased with time as I slowly became an active member of the community. I attended monthly meetings, helped to design educational and promotional materials, and became close friends with other volunteers.

Volunteering with Linda

I was on with Linda this morning; it was her second session at the house. She was also involved in other voluntary works and really enjoyed it. She liked the fact that she did not have to be committed to things too much; she could choose what she wanted to do and when. (…) Linda told me she had come here before and now as a volunteer, she very much enjoys being in the house, she likes the atmosphere. We talked about other museums in the area but for her, there were not many places like Bishops' House.

Journal extract 3 – Sunday 2nd February 2016

Some volunteers were more active than others as they engaged with the House on a weekly basis by volunteering regularly and taking care of special events or routine maintenance. For example, one who lived nearby was committed to open the House every weekend all year around whilst others took responsibility for planning school visit and preparing the materials ahead of each session. People who were passionate for history and music organised monthly concerts and evening talks, which occasionally attracted different kind of visitors to the House. Overall, volunteers' contributions were unique and intrinsically motivated. In my case, volunteering was necessary to understand the House beyond its physical building, as a lived place indivisible from its community. By spending time onsite, I built a relationship of trust with the volunteers who became interested in my research. As a result, the museum supported me and felt confident with the development and implementation of interactive experiences at the House.

The "behind the scenes" of the Bishops' House

Initially, I intended to limit my time as a museum volunteer to the Immersion phase but after a couple of months, I realised how important my fieldwork was and committed to volunteer all the way through my PhD. My fieldwork helped me con-

textualise my research and grounded my practice into the aspirations and needs of the community. I also developed a sense of belonging and attachment, which transformed my design practice. The more I took part in the everyday of the House, the more I realised that looking after the place was more complicated than just opening it every weekend. The Friends' commitment to Bishops' House was totally voluntary and demanded time, organisation and effort. One of the main concerns they had was to recruit more volunteers and to do so, they needed to raise awareness and interest from the local community.

Occasionally, I was attending the House Committee meetings to discuss my progress and ideas for my project. It was also an opportunity to understand the museum's mission and aspiration more at large. For example, the Friends aspired to develop their exhibition programme for the community to learn about the House, the locality and its connection with the wider history of Sheffield[1]. Discussion with the House Committee shed light on the potential to involve the volunteers more actively in exhibition planning. I saw this as an opportunity to develop and update the current interpretation at the museum, which did not reflect the expertise and interests of the volunteers.

By volunteering at the House, I developed my own understanding and sensitivity to the place. I built knowledge about volunteers' practice in ways that would not have been easily communicated through other means such as interviews. Volunteering went beyond researching for the purpose of my PhD as I started caring for the place and its community. As a result, I shifted my attention towards the volunteers and placed them at the heart of my design process. This informed the design of the Creative Package (figure 4-8), which I detail next.

4.2.2 The Creative package to elicit inspirational responses

With the support of the House Committee, I organised a coffee morning at the House to invite the volunteers to participate in my research. Everyone

1 Bishops' House website: http://www.bishopshouse.org.uk/

was very enthusiastic, and 10 volunteers signed up to take part in the Creative Package activity: a series of hands-on probes that I designed to gain insights on the House from the volunteers' perspective. I gave each participant a package to complete in their own time within 5 weeks (participants' information and consent forms in Appendix 4-D). I then met each one at the House to discuss their creative responses.



Figure 4–8 Creative package completed by 10 participants.

Designing the Creative Package

The Creative Package was inspired by previous examples of probes in design research (e.g. Gaver, Dunne & Pacenti, 1999; Wallace et al., 2013). These examples from the literature guided my creative process, which relied on defining the questions, themes and materials used for the design (details about each probe in Appendix 4-E). First, I identified questions that emphasised my research themes, specifically volunteering, home and exhibition design. Then, I translated my questions into tangible prompts through a process of prototyping and experimenting with materials (figure 4-9). In the end, each probe was designed to be evocative of a particular theme and question. I designed probes that were

bespoke to the place and its community. I integrated evocative details into the design and personalised each package with the name of the participants.

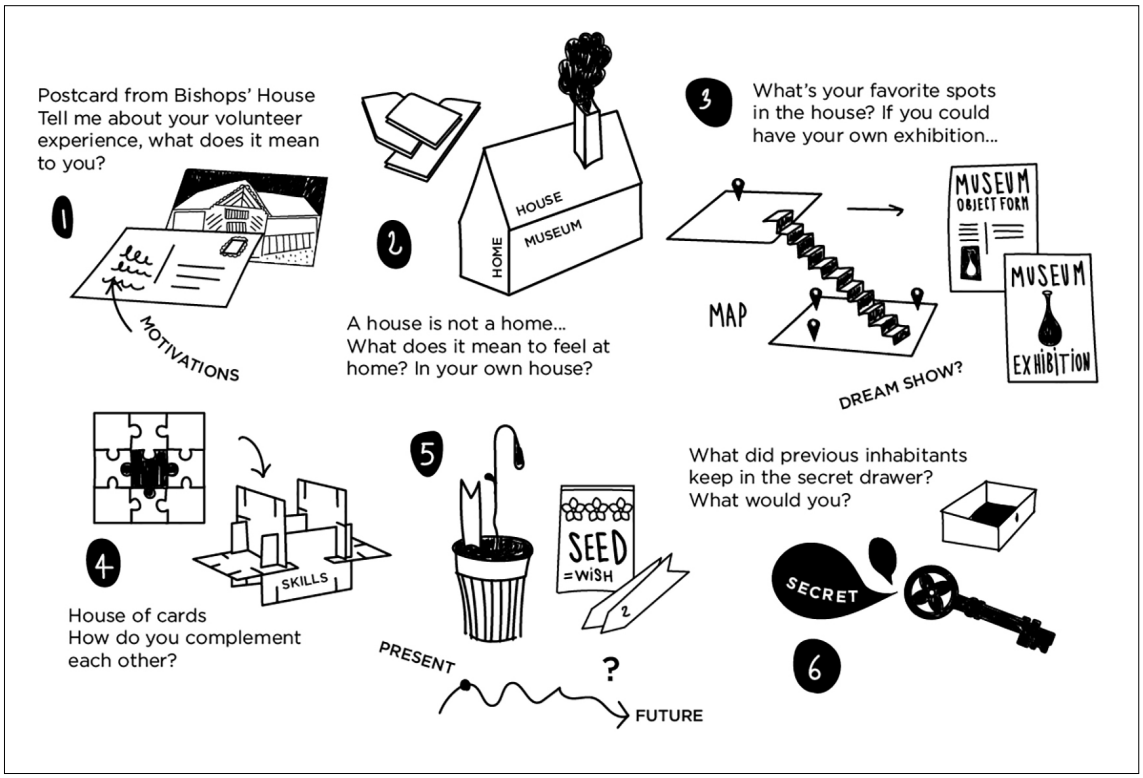

Figure 4–9 Sketch of the final ideas for probes featured in the Creative Package.

The package did not look too polished but rather, it stood as a hand-crafted gift made of various textures and materials (figure 4-10). Each probe was self-contained and supported with basic guidance on how to respond. I focused on the user experience and spent time refining the narrative, handmade and unfinished qualities of the design. The probes were numbered so participants progressed from simple to more imaginative ones; starting with reflecting on their current experience at the House, progressing towards sharing their favourite stories or museum objects, before imagining their own exhibition. In the remainder of this section, I detail the probes in relation to the questions they addressed and illustrate them with participants' responses.

Probe #1 "Best Wishes" acted as an introductory activity using a familiar format, a pre-addressed and stamped postcard of the museum, to prompt volunteers to share personal insights and feelings about their experience and moti-

vation for volunteering at the Bishops' House (figure 4-11). The postcards established an informal and friendly mode of communication between the volunteers and myself. I also found that the pace of receiving the postcards over time was something I was looking forward to: it provoked surprise and excitement. This is particular to this method, which intends to stimulate designers with inspirational insights for their design process (Gaver, Dunne & Pacenty, 1999).





Figure 4–10 (top) Preparation of the Creative Package given to 10 participants.
Figure 4–11 (bottom) Probe #1 "Best Wishes" (completed).

Volunteering with Sarah

Later we talked about Bishops' House and we both wonder about what kind of home it was. Sarah loves the fact that people lived there until modern times. For her, the house could do with a bit more of a home feeling as right now, she observed it felt more like a museum.

Journal extract 4 – Sunday 24th January 2016

With probe #2 "House is not a home", I was interested in unpicking the definition of home by getting participants to build and decorate their own house. The probe aimed to inform future designs where I intended to bring back the more domestic character of the Bishops' House – something described as missing by the volunteers (see below journal extract 4). Probe #2 required a lot of prototyping with scale and materials; from folded paper to a wooden flat-pack kit. The House was designed with a clipping system for participants to easily put it together without the need of glue. Wood was chosen so that the house was strong enough, once assembled, to be customised; it did not fall apart or cause any frustration. The surfaces were smooth to write on or to glue on craft materials provided with the kit (e.g. coloured and textured papers, pipe cleaners, feathers etc.). The probe also featured visual aids to assemble the house and the different wooden parts were engraved with evocative details that were inspired by the architecture of the Bishops' House (e.g. an outline of the timber-framed building). To introduce the activity and inspire participants, I included this quote: "A house is not a home […] despite real estate advertisements to the contrary, you cannot buy a home. You can buy (or rent) a residence and, with luck, time and effort, turn it into a home" (Gifford, 2002, p.118). Participants used their own ways to personalise the house into their idea of home (figure 4-12). They filled in both outside and inside spaces with hand-written words, found materials and cut-

out from magazines, soft and rough textures, and in some cases, they painted the parts. Inside, participants added partitions walls, folded notes, paper sculptures and stuck opaque and translucent coloured paper to the windows to increase a feeling of intimacy, warmth and domestic atmosphere.



Figure 4–12 Four probes #2 (completed). Participants customized the house in their own ways.
Figure 4–13 Probes #3 part 1: “what are your favourite bits of the House?” (completed).

Probe #3 "My dream exhibition" aimed to gather details about important objects and themes to be used as a resource for future exhibitions. It was inspired by my field work where I noticed the expertise and ideas volunteers had for the museum. Organised in two parts, the probe first prompted participants to attach stickers to a map of the museum to spot their favourite things in the House (figure 4-13). Maps were used previously in cultural probes to prompt participants to consider their environment in new ways (Gaver et al., 1999) or as "lightweight activities" with more direct and simple acts of responses (Wallace et al., 2013). In my case, the map acted as a scaffold for a follow-up activity in which volunteers filled in a sketchbook with details about their dream exhibition. Pre-printed questions prompted them to think of a title, to draw their objects and write labels for their exhibition.



Figure 4–14 Probe #4. Pack of blank cards and example of customized cards assembled together.

Probe #4 "The skills of volunteers" was inspired by my time at the House where I noticed the many facets of volunteers' practice and the way they brought their own skills and expertise to the House. With probe #4, participants were presented with a set of interlocking cards on which they wrote keywords inspired by the strength of the community (figure 4-14). The concept was informed by Eames'

House of Cards – a set of cards that can be assembled in different ways to form visual compositions. During our conversation, we used the customised cards and assembled them together to discuss how volunteers complemented one another.



Figure 4–15 Probes #5 "Seed wish". Handmade packaging and seeds.

With probe #5 "Seed wish", I prompted participants to think about what aspects of Bishops' House they valued the most or wanted to see grow. It was inspired by the work of Wallace et al. (2013) who used metaphors in probes such as seeds to help participants externalize feelings and more complex aspects of experience. In probe #5, I created bespoke packaging that were customised with evocative plant names and information about how to grow them: their ideal position, the best time to sow, when they blossom and how tall they grow (figure 4-15). This intended to inspire participants to create their own seed by turning things they wanted to see grow at the museum into plant names. For instance, they used labels to describe what the seeds would grow into; whether it was something small or big, long or short lived and what was needed to grow successfully. The seeds acted as a vehicle to enquire about the future of the museum and encouraged volunteers to share their hopes, dreams and fears. This was designed to be a positive experience for participants: they expressed

what was meaningful to them in a tangible form through the physical metaphor of seeds being planted and growing into something that had the capacity to flourish over time.



Figure 4–16 Key for probe #6 (left). The secret drawer at Bishops' House (right)..

In probe #6 "Drawers are a place of secrets", participants were given a key (figure 4-16; left) to imagine what both previous inhabitants and themselves would keep in their "secret drawer" – an existing feature at the museum that a volunteer once showed me (figure 4-16; right). With this probe, I wanted to address the theme of intimacy and explore the potential of objects for storytelling; particularly personal belongings and how these could serve as anchors for memories. Inspired by Bachelard's *The Poetics of Space* (1994), I included a quote to trigger participants' imagination: "Wardrobes with their shelves, desks with their drawers, and chests with their false bottoms are veritable organs of the secret psychological life" (1994, p. 78). The key was used for its association with privacy and for its potential in enabling access to a personal space where participants imagined what objects were most valuable to both people from the past and then, for themselves. The imaginary drawer acted as a time capsule for participants to speculate on past, current and personal histories that were meaningful to them.

4.3 The benefits and values of the Creative Package

4.3.1 Opening up the space to generate many possibilities

Designing the Creative Package was highly reflexive: I refined my ideas and questions by means of translating them into a hands-on and participatory activity. The probes were designed to open new spaces for design through capturing volunteers' experiences, ideas and aspirations for the museum. This was achieved through creative enquiry, which encouraged "such things as play, intuition, serendipity, imagination and the unexpected as resources for making sense" (Kara, 2015, p. 22). As a result, the creative package encouraged a "probological attitude" geared toward opening up rather than narrowing opportunities for design (Boehner et al., 2007). The multiple and diverse responses generated reflected the diversity of the community and provided me with inspirational insights for future steps.

4.3.2 Craft as a means of caring and shared creation

Participants realised how special the package was in comparison to more traditional methods such as questionnaires and interviews. They noticed the level of care that was put into it, which in turn showed them evidence of my motivation and investment in the project: *I thought you got into a lot of troubles [sic], it would have been so easy to give us a questionnaire. I was just fascinated by all!* (Liz[2]). Each probe was crafted as partly made, awaiting for participants to complete them: *You can express a bit of your personality in the kit* (Wes). As a result, they took ownership and were proud of the outcomes: *I did enjoy it, I quite like it as a piece of art* (Pete). Some participants even showed their creation to friends and family: *I took it to work and showed people. They thought it could be used with our children, a good way to express themselves* (Jenni).

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2 Name in brackets identifies the different volunteers who participated in my research. They were happy to be named by their first name and because of their important role and contribution, I wanted to acknowledge them.

In completing the package, participants helped me refine my ideas while sparking new ones. This was reinforced with follow-up meetings that encouraged a two-way dialogue where participants led the conversation by talking me through their creative responses (figure 4-17). With the Creative Package, I was able to establish a “common ground” for both parties to contribute, which encouraged a sense of shared creation (Wallace et al., 2013). This approach facilitated early forms of collective creativity, starting with my own interpretation as an initial trigger, leaving enough space for participants to formulate their own responses, which were then discussed and taken forward.



Figure 4–17 One participant talking through his response to the creative package.

4.3.3 Seeing things from a new perspective

Volunteers who took part in the creative exercise felt privileged because they gained something from it. They described a very positive experience, which was fun and relaxing while being reflective. They described the connective and associative aspects that grabbed their attention. For them, the design helped to channel their thoughts and be more creative: *The whole thing was a privilege. It was so creatively produced that each activity triggered something new* (Jan).

In completing the probes, participants took time to really think about their experience and their role at the museum: *How do we preserve not just the building but the cultural history? How do we link living heritage to a building?* (Wes). Thinking through making enabled participants to see the House from a new perspective. This was facilitated by the use of multisensory means, which enhanced their perception of the place. One of the participants described: *It made me think about this place in a very different way than I have ever thought about it. It means now that I have got a much bigger picture in my head than I would have ever done by just sitting in here or even learning how to do a tour […] In fact, it has taken my senses, I thought about the sounds and the smells… What I hear, what it feels like to touch them and… apart from taste, I think I thought it all!* (Jan).

4.4 Summary

In the Immersion phase, I discovered and got inspired by means of immersing myself in the research context. The four threads of my RtD process identified in my Methodology (see 3.2.2) were brought together: first, by researching in situ, I became part of a community and developed a sense of attachment to the Bishops' House. Then, with the Creative Package, I designed artefacts for the purpose of inspiration and progression. The package also helped me document my experience in the field by means of reflection through making. Finally, I prompted early form of participation with volunteers who felt included and empowered through making.

So far, I addressed research questions 1 and 2; first, with the design principles where I identified the opportunities and challenges for designing interactive experiences in house museums (RQ1). Second, by designing the Creative Package, which opened up the design space and initiated a start for collective creativity with the museum volunteers (RQ2). Next, I report on the Insights phase where I continued to work with the volunteers to address RQ3 through co-creating an interactive experience for the House. In this phase, I

was concerned with translating my understanding into practice; first, by synthesising insights from the Creative Package to inspire the creation of an interactive experience that reflected the value and aspiration of the volunteers; second, by using the design principles as guidelines to underpin the design of tangible interaction at the Bishops' House.

5 Insights Phase
Materialising my understanding through practice

In the Insights phase, knowledge gained from the Immersion phase was materialised and tested through design. This process converged towards the creation of Containers of Stories, one of the two design research outcomes presented in this thesis. The interactive experience was informed by participants' responses to the Creative Package and deployed at the Bishops' House during the *Curious House* exhibition. In this chapter, I first describe three design research artefacts to show the value of using design synthesis as a way to make sense of participants' contributions (see 5.1). In my case, the design research artefacts also acted as a form of documentation, which helped me create resources for my design that were inspirational. In section 5.2, I first focus on the process of co-creating Containers of Stories with a group of museum volunteers. Then, I report on findings about visitor engagement during the *Curious House* exhibition. Finally, in section 5.3, I address my research questions and show how the exhibition helped refine the scope of my research while introducing a new area of exploration.

5.1 The value of design synthesis for co-creation

In co-creation, I have argued that practitioners have the responsibility to include participants' contributions in the creative process so that the resulting designs reflect the aspiration of participants (see 3.2). For this, they have to find ways to document the in-between steps of co-creation in order to make the connections between participants' contributions and final designs more explicit. In my case, I found this challenging, particularly when wanting to move from the completed package to the phase of ideation. In fact, making sense of probes is a highly subjective and complex process, thus making it difficult to provide with clear guidance on how to do so (Gaver et al., 2004). As a result, designers tend to black-box the interpretive stage, making this rich process impersonal and

leaving undocumented the methods they used to make sense of participants' responses (Boehner et al. 2007).

In my case, I was motivated to document my process in ways that would keep within the provisional, contingent and aspirational nature of design-led research (Gaver, 2012). Next, I report on my experience of using design synthesis, a design-led process that helped make my process more transparent. I illustrate this by presenting a set of design research artefacts created in response to the completed package.

5.1.1 Design research artefacts

A manifesto as a visual statement

In the Creative Package, participants were prompted to reflect on their experience at the House. More specially, probes #1 #4 asked them about their motivations for volunteering and the skills they developed as volunteers (figure 5-1). The Creative Package and follow-up conversations with participants generated insights about the meanings of volunteering, and the importance of togetherness and complementarity in the community.

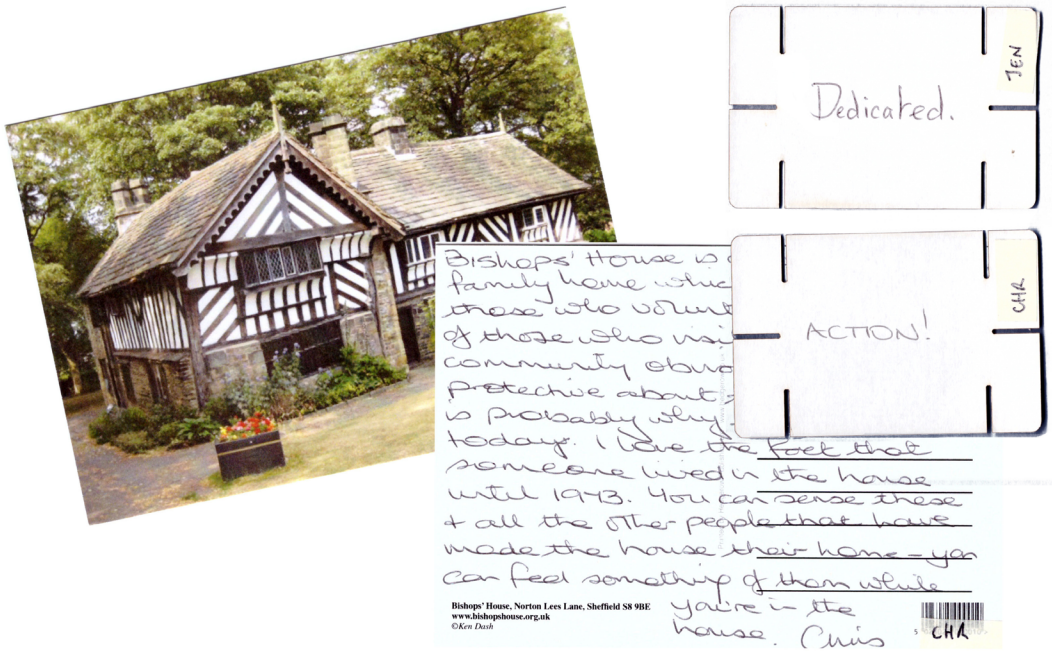

Figure 5–1 Examples of probes #1 and #4 completed by participants.

Creating a manifesto was a way to grasp volunteers' experience as a whole, to bring the different voices together into a visual statement that acted as a catalyst for inspiration and discussion. By using quotes from our conversation, the manifesto acted as a visual document; reminding me of what it meant to be a volunteer at the Bishops' House (figure 5-2). In fact, it succinctly communicated the motivations, meanings and values the local community finds in volunteering at the House. In essence, the manifesto helped me to understand the personal, social and emotional dimensions of volunteering at the Bishops' House as explained below.



Figure 5–2 The Volunteer Manifesto © Caroline Claisse.

Firstly, volunteers engage on personal level with the House. By spending time onsite, they can be close or involved in something they are passionate about: *a love of history; this isn't common across all the volunteers but a passion for the past drives many of them to help it carry on* (Jan[1]). Participants' responses also reflected the broad interests they have in the museum, which is constantly enriched by their inquisitive nature. Indeed, they described themselves as curious and eager to learn something new every time they volunteer. Thus, they take personal care to record new discoveries; for instance, by means of creating a new guided tour or updating the museum leaflet. The volunteers also manage the behind the scenes, which is an important part of their duty. To do so, they bring in their own expertise, which ranges from local and historical knowledge, to networking, planning and educational skills.

Secondly, people enjoy the social aspect of volunteering. Central to their role is welcoming visitors and guiding them during their visit. Participants described the active role volunteers have in sharing their knowledge and communicating heritage to different audiences. Most of all want visitors to come back to tell them amazing stories about the House. Indeed, volunteers also talked about their role of bringing the House to life. For them, heritage should be conceived as something active, shared and created by people. They observed the importance of volunteer-visitor interaction, which takes the House beyond its physical structure, toward a "living thing" (Wes). For them, being a volunteer also means being part of a community where they support each other: *We met because of wanting to keep an old building open but one of the best things is that many of us became real friends* (Ken).

Thirdly, volunteers are emotionally involved: they really care about the Bishops' House. By giving their own time, they are committed to keep the place open to the public. Most of the volunteers became personally attached to the museum and through their commitment, they feel they can give something back to

1 Participants' quotes extracted from the completed probes and conversation.

the community. While they are aware of the challenges of keeping the museum open, they feel extremely responsible and protective about the place, not only because it is an old building, but also for what it represents for them and future generations: *this is part of our community, local people actually care about it* (Eileen). They want to see the museum grow and wish for longevity: “Long lived old oak tree, Bishops House carries on pleasing future generations” (Liz, probe #5).

Small scale model as a 3D representation

Inspired by volunteers’ ideas for exhibition described in *My dream exhibition* (probe #3, Creative Package), I created a small-scale model to show participants’ favourite spots at the museum. Creating a model allowed me to transpose the personalised maps into a three-dimensional visualisation of volunteers’ favourite things at the museum. I photographed and illustrated things that were labelled as important by participants and I pinned them onto a rigid plan of the museum, which were then assembled into a two-floor model of the House. Snippets of text describing the stories or reasons for being volunteers’ favourite spots were attached onto the meaningful spots (figure 5-3).

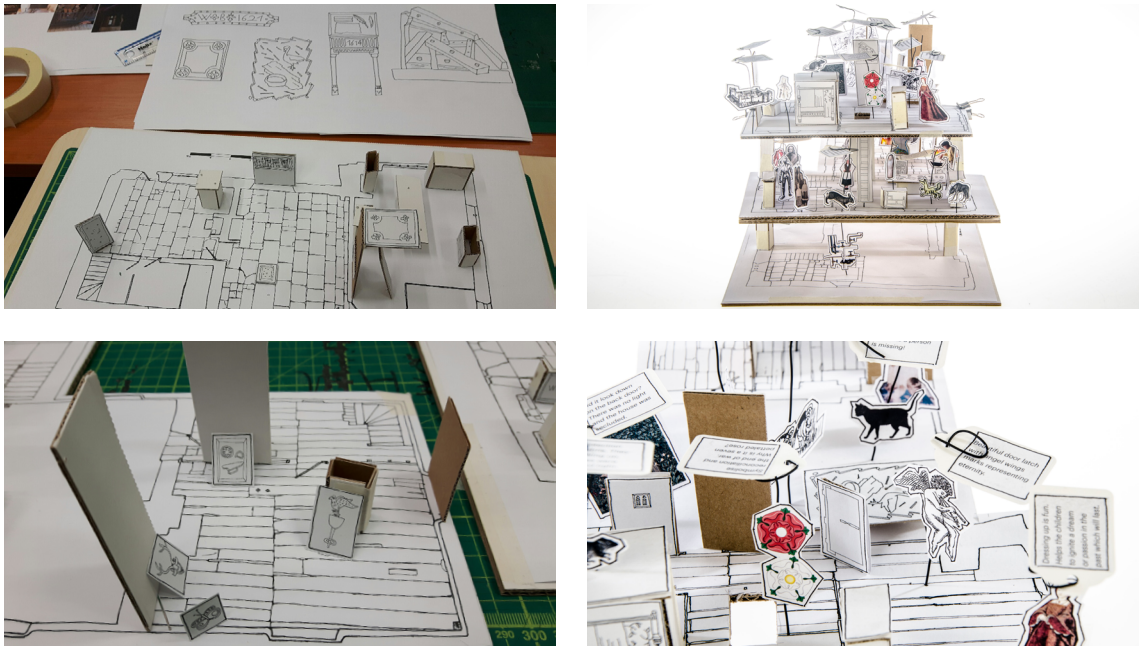

Figure 5–3 Small-scale model of the museum with participants’ favourite spots.

Artefacts were generally selected for their historical connection to the City or the memories they embodied; *The decorated plaster work from Sheffield Castle* (Ken); *The reception, where the volunteers sit. Because I have met fascinating people and heard amazing stories* (Jenni). Entire rooms were highlighted for their theatrical and atmospheric qualities; *the parlour, quiet domesticity, you can almost feel that the owners have just stepped out of the room* (Chris), whereas other things were chosen for their curious character, which pushed volunteers to speculate about what they were and their contemporary relevance; *Tudor Roses on the ceiling in the parlour. Symbolise reconciliation and the end of war – why is it seven petals rose?* (Ken); *I love the chest with its bottom drawer. I wonder how many things were in it? How it felt to prepare for marriage?* (Jan).

Like the manifesto, the physical model was a document of what volunteers liked or valued at the museum (figure 5-3). In contrast to traditional model making, it did not intend to represent a final idea for an exhibition, rather, the model allowed me to crystallise the multiple and varied things volunteers liked about the House without reducing them to a single layered or textual description. Using 3D representation also helped me to familiarise with the space and to visualise volunteers' stories in place. Indeed, modelling and drawing the different points of interests gave me time to process and think about the content in relation to the building. The multiple stories and emplaced connections explored through modelling sparked new ideas. By looking at it, I was inspired to imagine scenarios where visitors could engage with the multi-faceted character of the House. Also, encouraged by spatial mode of representation, I became interested in using embedded technologies to reveal multiple narratives in place.

A collection of mood boards to give a general feel

With probe #2, participants explored their own definition of home through making. Their responses aimed to inspire future designs to bring back a feeling of home into the museum. Both the customised houses (figure 5-4) and our con-

versation generated rich insights on what home meant for the volunteers e.g. *What makes a home? The people! But I also think it is important to have us warm, have a fire or kitchen for people to be nice and warm. Without people, it is just a shell really* (Liz). At this stage, I created mood boards as a way to get a general feel of participants' definition of home. The process of selecting and assembling found images facilitated my understanding without reducing it to one definition. In contrast to written description, the images were evocative of feelings and sensory properties, which went beyond visual means. They reflected intangible aspects described by the participants: *Home as both an indoor and outdoor spaces, somewhere to recover from the outside world* (Pete); *It is all about the people and the environment […] I feel more at home in spring* (Jenni), and also, *as partly physical, partly emotional* (Chris).



Figure 5–4 One probe completed (left) and a mood board about home (right).

I hung the mood boards by my desk to remind me of the importance of light and smell, the ephemeral shadows and fragrances, how they affect the place differently depending on the seasons and time of the day. Indeed, I used the mood boards as sensory aids to inspire and incorporate a domestic feel into the design of interactive experiences for the Bishops' House.

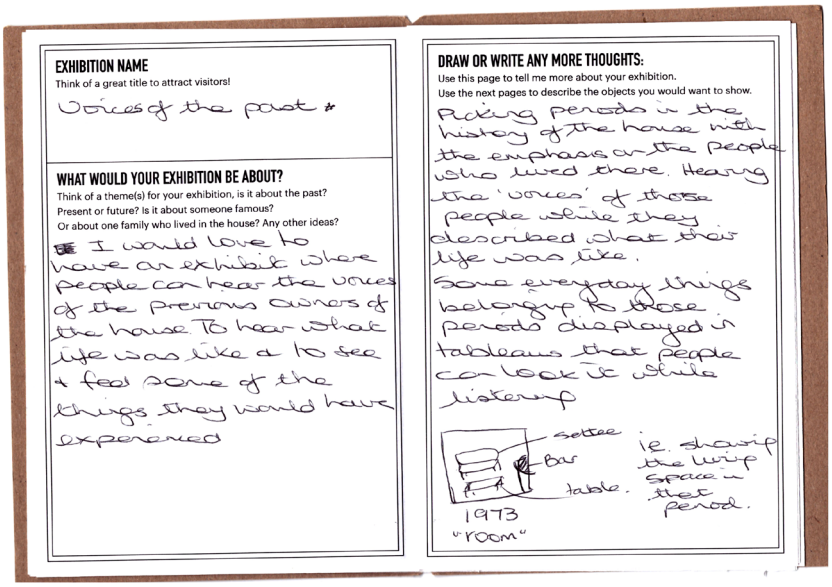

Figure 5–5 “Voices of the past”, an exhibition idea imagined by one participants. Probe #3, Creative Package.

In a similar manner, I used mood boards to visualise participants’ ideas for potential exhibitions at the museum. Inspired by their dream exhibition (e.g. figure 5-5), I collected images from the web, photographs of the house and keywords that were then organised thematically on different boards (figure 5-6). This gave me an overview of relevant and meaningful topics for exhibition at the Bishops’ House. Examples of mood boards that represented volunteers’ ideas included:

Voices of the Past, an exhibition where people could hear the voices of previous residents and learn about their life at the House. I chose images of previous inhabitants together with references of dollhouse. The mood board was also inspired by the concept of “domestic tableaux” that one volunteer described as an exhibition where visitors could experience what the House looked like when it was lived in. *The Secret Life of Bishops’ House*, an exhibition idea that addressed ways of dealing with religion and superstition in the past. On this board, I presented images that were evocative of spirituality together with photographs of hidden marks at the House.

While they visualised potential themes for exhibition design, the mood boards acted as a reminder of the broad interest volunteers had in the House. It inspired me to design for diversity and inclusion; more specially, to use tech-

nology as a means to tell multiple stories that represented the aspirations and knowledge of volunteers illustrated by the mood boards.



Figure 5–6 Examples of mood boards inspired by volunteers' exhibition ideas shared in the Creative Package.

5.1.2 Reflection on design synthesis

As described in my Methodology chapter (3.2), I found traditional methods of analysis not keeping within the provisional and inspirational nature of my research. Despite the challenges, I found my own ways of analysing and documenting the richness of participatory and creative processes. In section 5.1.1, I showed examples of design synthesis that helped make my process more explicit for both myself and others. By creating design research artefacts, I was able to handle interpretation of the completed package in ways that remained faithful to the nature of my research. Through making, I externalised what is usually performed in the head of designers (Kolko, 2010). New connections were forged, ideas sparked, and information was absorbed from different directions. I expand on this next to show how this process of synthesis encouraged sense making and reflexivity.

By synthesising materials, I familiarised myself with the masses of data via a slower process. In making design research artefacts, I was active in the

construction of meaning (e.g. model making), which enabled me to bring insights to the surface (Sanders & Stappers, 2014). Rather than being limited to reading and categorising information, I experimented with various forms and formats for meaning making, which encouraged *designerly* thinking. I organised and worked with materials in new ways (e.g. the Manifesto), which captured aspects of experience that were sensory, unspoken, tacit and invisible (Pink, 2013). In this process, I traced connections between participants' experience and my own, which were then brought together through design. Design synthesis also served as a means of documentation and as described before (see 3.2.2), tangible artefacts acted as a chain of thoughts, which became part of my creative environment. They stood by my desk for me to re-visit participants' responses along the way for inspiration or validation. Their physicality also made the ideas and connections more real; in fact, it gave tangible forms to an abstract and chaotic process. As a result, design synthesis encouraged reflexivity at different stages of my research and documented my process by means of keeping track of my decision and informing the design research outcomes (see reflection on this in 5.3).

To summarise, I materialised insights from research into tangible forms; through the creation of design research artefacts that were instrumental to my design process. I describe them as an act of documenting participatory practices in RtD. This process became an inherent part of my research where participants' contributions were transformed into a resource for inspiration (see more examples with storyboards and personas in 6.2). While I reflect on this further in the conclusion, I want to emphasise here the potential of design synthesis for handling interpretation of co-created materials. This step was important as it strengthened my decision to involve volunteers as co-creators of interactive experience. It also inspired the creation of "Containers of Stories"; an interactive experience co-created with four volunteers at the Bishops' House. In the following section, I first describe the inspiration and co-creation process before discussing findings from the evaluation with museum visitors in section 5.2.2.

5.2 Testing and refining insights through design

I describe the process of co-creating an interactive experience with a small group of volunteers at the Bishop's House. It led to the design research outcome; "Containers of Stories", which served as a means for testing and refining my understanding at this point in my research. The interactive experience was deployed and evaluated at the museum in the context of the *Curious House* – an exhibition I initiated as a means of exploration, inspiration and for generating new design opportunities.

5.2.1 Co-creating Containers of Stories with museum volunteers

For the *Curious House* exhibition, I developed "Drawers are a place of secrets" (probe #6) into a set of interactive cabinets and invited 4 volunteers to fill each one with their own collection of objects (figure 5-7). The concept for the interactive installation was inspired by cabinets of curiosities – a form of display dating from the 16th Century in which objects were categorised to tell stories about the world[2].



Figure 5–7 Volunteers' drawers (in progress). Materials generated by workshop participants.

2 The British Library, Cabinet of Curiosities: http://www.bl.uk/learning/timeline/item107648.html

Key to my process was the creation of design research artefacts (e.g. scale model) through which I realised the potential to involve museum volunteers in designing exhibits for the House. With the scale model, I identified artefacts and stories that were meaningful to them, and when designing the manifesto, I understood the role volunteers had in bringing the house to life by communicating new discoveries and sharing hidden stories to visitors. Indeed, the concept of cabinet of curiosities imagined for Containers of Stories was also inspired by the "secret drawer" – an existing feature at the museum that some volunteers described as their favourite spot in the House (see Immersion, figure 4-18). Through design synthesis and by creating design research artefacts, I was able to crystallise insights generated during participation and channel what was meaningful to volunteers in my design process. Some of the connections between the design research artefacts and design research outcomes are annotated in Appendix 5-A.

Volunteers' drawers



Figure 5–8 Objects for Wes' drawer. 3 objects from the workshop and 4 final objects handmade for the exhibition.

Participants took part in one co-creation workshop to develop their ideas generated from probe #6 (Creative Package) into a story and collection of bespoke objects. During the session, each participant worked from a toolkit composed of: a drawer, museum labels, prompts cards and plasticine (figure 5-7). With the exhibition in mind, participants developed content for their cabinet by imagining a set of four objects to be displayed in their secret drawer.

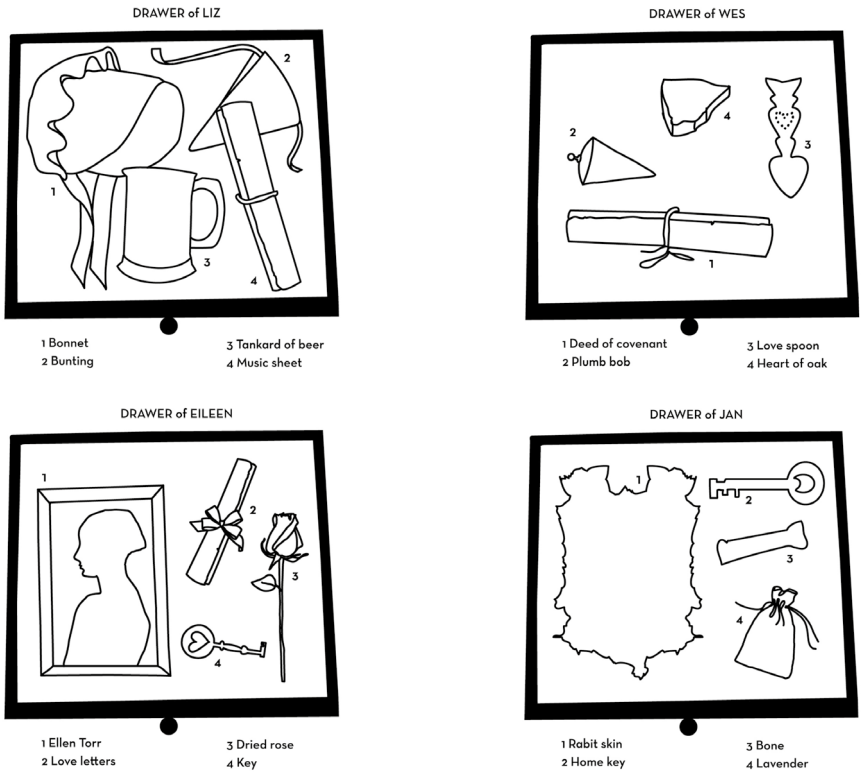

Figure 5–9 The four final drawers for Containers of Stories. Illustration © Caroline Claisse.

During the session, participants first used prompt cards to think about their narrative before matching their objects to key parts of their stories (e.g. a character, feeling, place etc.). They were then encouraged to draw or model objects to which they then attached museum labels with parts of their imagined story (figure 5-8, top). In a following meeting, the participants recorded their content in relation to the final objects, which were handmade or lent by the volunteers and, in some cases, objects were purchased from antique shops (figure 5-8). As a result, each cabinet was presented as a mini exhibition in a drawer; featuring a collection of personal artefacts that told imaginative, unique and meaningful stories about the House (figure 5-9).

I briefly describe each drawer to give a sense of the diversity of content imagined by the volunteers (all content for each drawer can be seen in Appendix 5-B). Liz's cabinet featured objects that were typically used during May Day, a traditional, cultural and yearly celebration that was one of Liz's favourite. Eileen's cabinet was inspired by a wedding chest at the House and imagined the story of a young middle-class woman who was forced to marry someone she was not in love with. Wes' cabinet reflected his passion for craftsmanship and Tudor architecture as he told the story of the first inhabitant to address what it meant to build and own a home like Bishops' House in the 16th Century. Jan's cabinet featured everyday artefacts, each was matched with a nursery rhyme to evoke visitors' childhood memories followed by a set of questions to encourage personal reflection on how different life used to be.

Containers of Stories at the Curious House exhibition

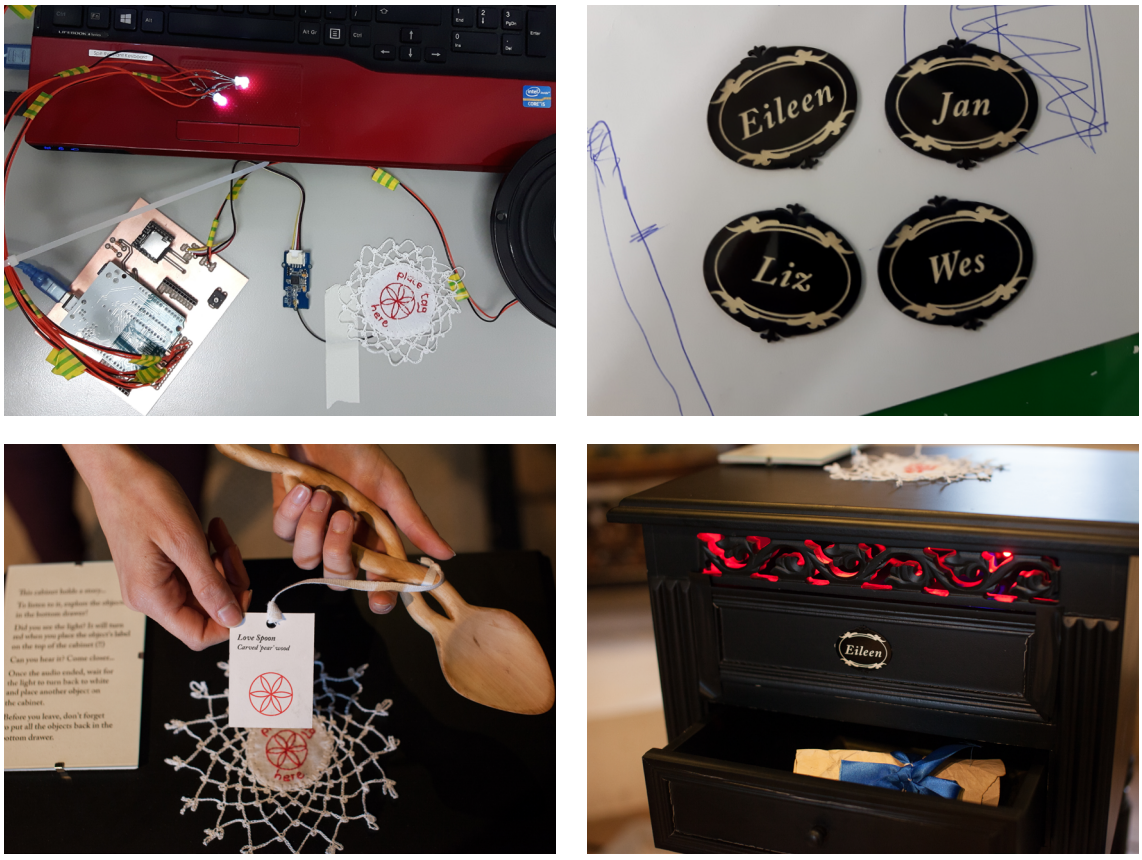

Figure 5–10 Arduino and NFC reader with handmade dolly and volunteers' name engraved in labels (top). NFC tag attached to one object to trigger audio content and light changing from blue to red when content activated (bottom).

Informed by the design principles identified in the Immersion phase, the concept was refined and developed into four interactive cabinets where embedded technology (e.g. NFC tags, Arduino) enabled objects to function as tangible keys to unlock the snippets of audio content created by the volunteers (figure 5-10). The interactive system was developped in collaboration with Dr Alireza Janani from Sheffield Robotics (see visuals in Appendix 5-C).



Figure 5–11 Containers of Stories, *Curious House* (2016).

In *Curious House*, the cabinets told stories about the House from the volunteers' perspective. During the exhibition, visitors encountered the cabinets in the main room upstairs (figure 5-11). They took objects out of their drawers and listened to volunteers' stories by placing the object on the top of the cabinets. The installation was designed to be bespoke, evocative and sensitive to the place; for example, the cabinets were chosen for their domestic feel and while they looked identical to one another, each of them was personalised with the name of the volunteer who was involved in co-creating them. Other details included minimal instructions that were sewed in handmade dollies while a pulsating light changed colours to indicate visitors when to place an object on the cabinet (figure 5-10).

5.2.2 The Curious House Exhibition



Figure 5–12 Flyer for the *Curious House* Exhibition (2016). © Caroline Claisse.

As discussed in the Literature (see 2.1), historic houses have experimented with artistic interventions to provoke new interpretation of house museums. As part of my research, I used a similar strategy and organised *Curious House: unlocking Bishops' House through creative practice* – a two-week art exhibition (April 22nd to May 8th 2016) where together with three artists, we created site-specific interventions at the Bishops' House (figure 5-12). The exhibition was innovative in the context of my research: it went beyond exhibition purposes (e.g. audience engagement), to serve as a platform for research experimentation and a means for inspiring my design process.

The three artists were asked to respond to the place by creating an installation that represented their personal interpretation of the place (see more details in Appendix 5-D). In contrast, Containers of Stories was designed to be inclusive and manifested as the result of a collective endeavour with the volunteers. My aims

were to understand how tangible interaction can increase engagement with heritage in places like the Bishops' House (RQ3) while including the volunteers in the process of designing new experiences of heritage for their museum (RQ2).

Overall, the exhibition was very well received by visitors and generated a significant footfall to the House. During two weeks, I conducted observations by taking visual notes of visitors' behaviours and interactions with the cabinets. The sample of participants observed reflected the usual type of visitors at the Bishops' House: 12 groups were couples, family or friends, and 3 visited alone. People spent an average time of 15 minutes with the installation and nearly everyone went through all four cabinets (13 out of 15 groups). I also collected questionnaires to get feedback from visitors on their experience of Containers of Stories. I asked participants to first describe their experience, then if the objects reminded them of anything and finally, it asked to share their favourite thing or if there was anything they disliked (evaluation materials can be seen in Appendix 5-E). I used thematic analysis (Braun & Clarke, 2006) to identify themes and evaluate visitor engagement with Containers of Stories. Here I organize my findings in relation to the four themes featured in the framework for tangible interaction (Hornecker & Buur, 2006): (1) *Tangible manipulation*; (2) *Expressive representation*; (3) *Spatial interaction*; (4) *Embodied facilitation*.

1. TANGIBLE MANIPULATION:

To design for closeness with heritage

The cabinets relied on using embedded technologies to create innovative means of storytelling in which objects were described as tangible links to the past: *Some are familiar e.g. common everyday objects like bunting, pictures, keys. They remind me of links to the past* (visitor6[3]). Visitors enjoyed handling objects: *Interesting objects, liked the interaction with the objects. Happy that we could touch the things* (visitor12); and felt closer to the stories, which gave them

3 Numbers in brackets identify different respondents. Quotes taken from the questionnaires.

a sense of being part of the House: *Amazing way to interact, to open the cabinets and hold the objects and listen to the stories made the whole experience more personal* (visitor4); *I like the feel of the objects associated with the house and the stories that they told. It gave you a sense of being part of the house* (visitor14).

Tangible manipulation was observed to be a valuable means for engagement as by being able to touch objects, visitors felt more curious about the stories: *Being able to hold the objects made you more curious about their history* (visitor6). Indeed, visitors described the stories as *short bits of information* (visitor12), which prompted their interest in wanting to know more. They described how *the art of selecting the objects and hearing songs was a lovely way to explore the history behind them* (visitor11); *I wouldn't have normally considered the story behind the objects… picking them up – handling them, made me more interested* (visitor7). Using objects to unlock content gave them free control while increasing their attention. For example, I observed how people would still hold an object after the audio finished playing. The objects varied in size, textures and shapes, which encouraged collocated interactions; e.g. visitors passed objects tp one another while discussing and enjoying their material properties.

2. EXPRESSIVE REPRESENTATION:

To create personal relevance with heritage

As discussed in the Critical Review (2.2), the design of hybrid objects is successful when physical and digital components are intertwined together and linked to the overall storyline. This was the case with Containers of Stories where the cabinets acted as containers holding stories of previous times: *I thought the idea of cabinets holding stories interesting. Most of us have cabinets full of objects with memories attached... like the tags* (visitor5); *Great because it told a story rather than being disparate* (visitor6). Like with house museums, content and container were one: first, through the objects that were described in terms of their authenticity; as part of the museum collection or related to it in some ways.

Second, through the narrative and digital content that had clear connections with the House, inviting visitors to look up, away from the cabinet, and around the actual place; *Look in the cradles in Bishops House. Can you see the padding of straw?* (Jan's cabinet); [the wedding chest] *It now stands in the parlour at Bishops' House. Do take a look* (Eileen's cabinet). By being augmented with personal stories, the objects gave visitors things they could relate to, which prompted them to discuss and share their feelings: *The cabinets gave us things to talk about* (visitor16).

Visitors identified with the stories and engaged with the installation at emotional and personal levels: *The story of the young woman married off against her will was sad, the story was intimate and moving* (visitor11). First, by holding the objects and listening closely to their stories: *Listening closely to the audio creates a sense of the hardness of life in days gone by. The matrimony of the young girl was particularly poignant* (visitor4). Second, while some objects were familiar, visitors found personal relevance in the stories. For example, one visitor described how Eileen's story could be straight from a Brontë novel, how the nursery rhymes from Jan's cabinet brought back the songs of her childhood and how the story told by Wes evoked her DIY attempts (visitor2). Another visitor with her partner felt emotional and empathised with Eileen's story when she compared it to her own relationship and realised that life for women was not as easy back then: *Some of the "stories" made me sad – comparing them to the relationship I have with my partner and how it was not forced* (visitor3). Indeed, the stories that encouraged reflection and comparison were preferred because they gave visitors things to talk about.

3. SPATIAL INTERACTION

To promote a voyage of discovery in place

Tangible interaction supports spatial and full body interaction. With Containers of Stories, visitors were active; for example, they passed objects to one another, tried them on and used them as prompts for acting out. The traditional

May Day song played by Liz's cabinet or the nursery rhymes sang by Jan prompted visitors to dance around and sing together: *I danced to the May Day music* (visitor6). Visitors reported their experience in terms of learning: *Little memory prompts e.g. nursery rhymes and reminders of previous learning now forgotten (visitor6); I really like it. It was quite a different way to learn* (visitor15). Indeed, visitors described their experience as experiential and explorative: *Very interesting. Loved the interactive aspect of being able to explore the artefacts* (visitor3); *so varied, it took me on a little journey* (visitor2). While listening to the cabinet, they engaged with stories through sensory and embodied means. They liked using more than one sense to experience the stories; particularly when being able to smell objects such as the lavender bag, which visitors found surprising and highly evocative: *I loved the way that you use all your senses apart from taste!* (visitor6). Freedom of exploration was encouraged by the way the cabinets worked: while telling particular stories, they did not force any particular order. Visitors felt active and free to explore the cabinet at their own pace: *It was good to learn at our own pace* (visitor15).



Figure 5–13 One visitor listening closely to Liz's cabinet.

4. EMBODIED FACILITATION:

To share stories between people

Each cabinet acted as an avatar: they embodied volunteers' perspective about the place whilst facilitating the telling of multiple stories, which visitors found innovative; *Very interesting and innovative way to tell a story […] an unusual way to interact with some of the objects in the collection or related to it* (visitor9). The way the cabinets were designed informed visitors' behaviour and facilitated different aspects of experience. For example, I observed how the size of the cabinets prompted visitors to bend down toward the cabinets to listen to the stories or to look inside the drawers (figure 5-13).

The installation also encouraged shared interaction between groups where visitors gathered around the cabinets to try them together. I observed the way visitors were socially engaged; how they smiled at each other, shared memories, asked questions and laughed together. In some cases, visitors would show each other how the objects worked; more specially, children often showed their parents how to operate the cabinet; *I (mum) think Isaac (aged 7) enjoyed the "magic" of matching up the tags* (visitor5).

5.3 Consolidating insights through co-creating an interactive experience

The exhibition served as a method of enquiry to investigate my research questions (RQs) through practice: by means of co-creating Containers of Stories. In this process, insights were consolidated: first, by using the design principles identified in section 4.1 to inform the creation of an interactive experience and then, by using insights from design synthesis (see 5.1) to embed volunteers' values and ideas in the final design. In this section, I reflect on my research questions and highlight the temporal aspect of place as a new area of exploration for tangible interaction in house museums.

5.3.1 Being sensitive to a particular setting and community

The Insights phase led to the design of Containers of Stories – an interactive experience that was informed by insights from my fieldwork and interviews in house museums. This design research outcome served as a means for testing the design principles and investigating my research questions through design by means of observing the design-in-use at the Bishops' House. In the Methodology (see Artefacts in 3.2.2), I described such outcome as an ultimate particular; an interactive experience designed to be sensitive to the environment of historic houses and bespoke to the needs of the museum.

The design principles (DPs) defined in section 4.1 were instrumental to my design process. By using them as guidelines, I was able to address the challenges and opportunities for bringing technology into house museums (RQ1). As a result, Containers of Stories kept within the spirit of the House by engaging visitors with the actual place (DP1). The cabinets also built on the domestic nature of historic houses and encouraged embodied interaction, which prompted visitors' personal engagement (DP2). I took the opportunity to include volunteers as co-creators who through digital augmentation told their own stories about the place (DP3). Finally, by using embedded technology and multisensory such as smell and light, I designed for a seamless experience of technology, which encouraged shared interaction at the House (DP4).

I was also sensitive to the needs of the community, which were documented through the design research artefacts (e.g. the Volunteers' Manifesto). As a result, Containers of Stories reflected the meanings and values of being a volunteer at the Bishops' House. By interacting with the cabinets, visitors engaged with the house in ways that were similar to the volunteers, at personal, emotional and social levels. Firstly, they found personal relevance in the stories, which in turn made them feel concerned and interested in the House. Indeed, like the volunteers, they started to care and empathise with the place. Secondly, by using tangible manipulation, visitors engaged through touch, which increased their

proximity with heritage at the House. As a result, they adopted an inquisitive attitude, which was similar to the one described in the Volunteer Manifesto. Then, by designing for tangible interaction, visitors engaged with the stories in place and through embodied means. Like the volunteers, they connected to the House from their own perspective, shared stories with others and became explorers. To some extent, the cabinets acted as an interface for volunteers to communicate heritage in ways that was actively shared and created through interaction; yet another dimension of volunteering at the House. Those levels of engagement were made possible by the co-creation approach I used, that is discussed next.

5.3.2 Channelling volunteers' voice through co-creation and tangible interaction

Bringing the community together through co-creation

By using co-creation, I placed the volunteers at the heart of my design process. In doing so, it strenghtenned the community and provided volunteers with an opportunity to come together to co-envision new experiences for their museum. They described their participation in the design process as an opportunity to create something that was meaningful for them personally while being a joint effort: *Although it was a joint effort, we all did our own particular part that was interesting to us… A little bit that was mine, but I wouldn't have liked to not have it as part of the whole collection* (Eileen).

With Containers of Stories, the volunteers also found value in telling their own part of the story about the House. Indeed, through co-creating tangible interaction, they engaged in valuable and enjoyable experience whilst actively contributing to the museum's goal; *With my cabinet, I was able to create something that was linked to the museum and that really spoke to me personally; almost like living history* (Wes); *The little tiny contribution that I made was only about May Day celebration, but you closed your eyes and you could see it happening around you. It kind of brought it to life!* (Liz).

Enhancing the role of volunteers through digital augmentation

With Containers of Stories, I intended to use technology to support volunteers' role in interpreting and communicating heritage at the House. I used their voices and perspective as a vehicle for storytelling at the museum. The final design, however, moved beyond supporting volunteers. It transformed their practice from maintenance towards more curatorial and creative roles. Digital augmentation also allowed to communicate volunteers' enthusiasm for the place more directly; by using their own voice, which resonated in the space. Indeed, through digital augmentation, their presence was magnified which in turn increase a feeling of belonging, making them feel part of the House: *What a privilege it was to be a volunteer in a place and then become part of its history* (Jan).

The volunteers also reported how the installation aroused visitors' curiosity about the individual behind each cabinet. Visitors were intrigued by the voices and names that featured on each drawer. The episode below shows how the volunteers became some sort of personality associated with the House: *One child came to me and said: "Who is Eileen and Liz and Jan and Wes?" I said: 'They are all volunteers and I am Jan'. She said: "That Jan!?" [Pointing to the cabinet]. And I said: "That Jan!" She said: Could you sing me one of the songs?" So, I sang one of the nursery rhymes and she said: "It is, it is!" And she shouted to her friends: "The person on the tape is here!"* (Jan).

Accessing experience of technology through design

For their dream exhibition (probe #3, Creative Package), volunteers described interactive scenarios where visitors could touch objects and press buttons to hear stories about life at the House. By using tangible interaction, the design research outcome challenged volunteers' expectation of technology. While building on their ideas, the final design broadened the possibilities of what volunteers first envisioned. It showed them that technology can be used to reach a broad audience – not only young people; *I think it invoked different things for different ages* (Wes).

The exhibition also transformed the museum into a platform for experimentation. Being able to see the design-in-use provided both parties – myself and the museum – with a means to access new experience of technology while understanding its potential for the Bishops' House. As a result, new forms of interactions became observable through Containers of Stories; *What you research has shown is not only we had a lovely time doing it and not only we had a wonderful time watching people interacting with it. But now you have the evidences to show that it was a generic thing: everybody who came said something positive about it. And they all engaged with it in different ways* (Jan).

5.3.3 Revealing the temporality of place: a new area of exploration

The *Curious House* exhibition provided me with a framework to showcase the design research outcome for evaluation with visitors at the museum (exhibition materials can be seen in Appendix 5-F). In this context, I addressed my research questions (RQs) and developed my understanding through co-creating Containers of Stories. Firstly, by applying my design principles to practice, I addressed the challenges and opportunities for interactive experience in house museums (RQ1). Secondly, by developing a bespoke approach, I included volunteers as co-creators and channelled their voice through design (RQ2). Thirdly, I reported findings of visitors experience to shed light on the potential of tangible interaction for places like Bishops' House (RQ3).

Besides my installation, the *Curious House* exhibition allowed me to broaden my perspective as a designer via the work of three artists who contributed by creating site-specific interventions: **Lyndall Phelps** worked from archive photographs and created *Remnants of Domesticity*; a series of large scale and hand-drawn Sixties wallpaper patterns that were overlapped onto the centuries-old timber framed walls. **Rachel Emily Taylor** met with one of the last inhabitants of Bishops' House and recorded her memories about growing up in the House, which she played as part of her multimedia installation *The girl who lived in Bish-*

ops' House. With *Encounters*, **Louise Finney** connected past and present by replacing all museum boards with her own interpretation that was more subjective, personal and associative.

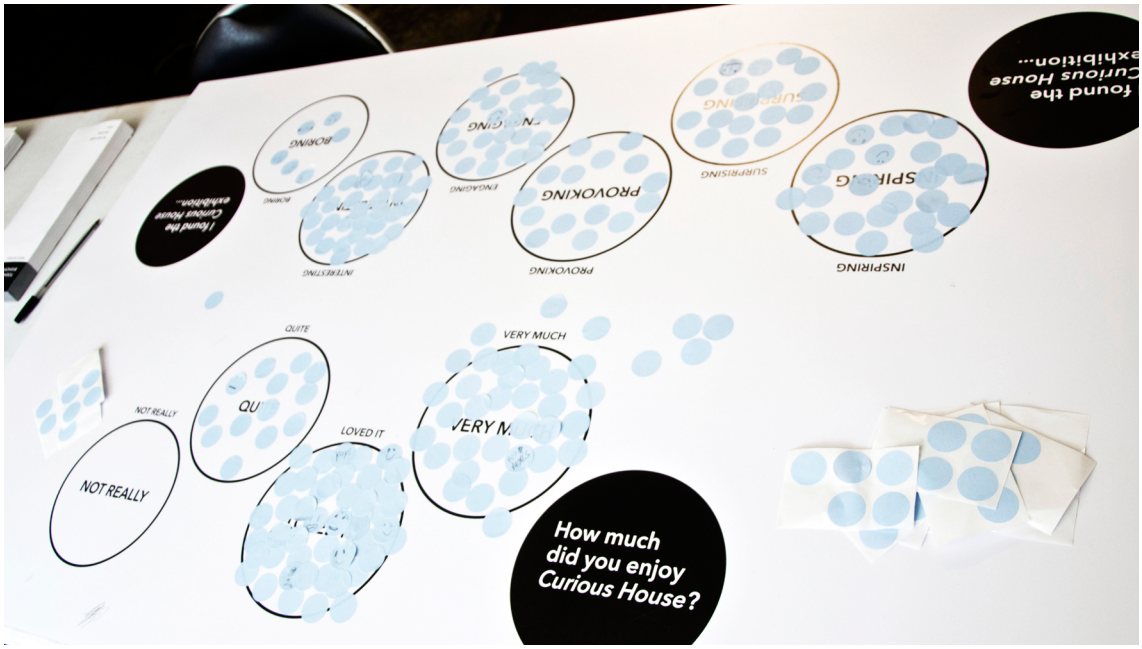

Figure 5–14 Visitors' feedback about the *Curious House* exhibition.

By proposing alternative readings of the place, the exhibition confirmed that visitors were interested in experiencing other facets of the House (figure 5-14). As a result, the House Committee recognised the potential for creative practice: *[The exhibition] demonstrated the potential for art to function successfully at the level of heritage interpretation. We had identified a need for a greater variety of exhibits responding to a wider range of historical periods in the house and the exhibition has been useful in confirming that there is just as much public appetite for information about the most recent inhabitants of the 1970s as there is about the families from the seventeenth century, for example* (Nick, Head of House Committee).

Curious House also inspired the volunteers to see the House from a different perspective and beyond a Tudor building. For them, the artists provided a refreshing range of responses, which extended the offer of the museum. In a subsequent focus group with volunteers, we imagined new scenarios for an

interactive experience to expand to the whole House: *What if you could walk into the place and the audio triggers automatically? In the kitchen, what sounds would you have experienced? You could not probably do smell… Would that be possible? But that's the idea, when walking through the house, how can you automatically bring in a particular time period?* (Wes)

Together with Containers of Stories, the site-specific interventions pointed towards new directions. They inspired the museum to think about the temporality of the place and prompted volunteers to envision new possibilities for interactive experience at the House. Together, we discussed the possibilities for tangible interaction to reveal the layers of time at the House. This was introduced in my research as a new question: *how can tangible interaction reveal the temporality of a place?* To conclude, the Insights phase helped me refine the scope of my research and consolidate insights from the Immersion phase. It pointed towards a new area of exploration, which was investigated through co-creation with a larger group of volunteers and over a longer period of time. The next two phases (chapters 6 & 7) focus on reporting this process, which led to the design and implementation of the Interactive Tableaux – the second design research outcome of my thesis.

6 Development Phase
Revealing the temporality of place through co-creation and tangible interaction

The purpose of the Development phase was to investigate through practice the potential of tangible interaction to reveal temporality. This was investigated through co-creating a second interactive experience with the Bishops' House volunteers: the Interactive Tableaux. Section 6.1 describes how ideas were collectively assessed and refined into the final concept. In section 6.2, I present two workshops in which volunteers generated characters and stories for the tableaux. Then, section 6.3 describes the prototyping stage of the tableaux where participants' contributions were integrated into the final design.

6.1 Exploring temporal aspects of a place through design

Inspired by the knowledge I gained from the Immersion and Insights phases, I sketched about 30 concepts that investigated ways to reveal the temporality of the Bishops' House. Examples of scenarios were visitors stepping in the shoes of previous inhabitants or going back in time. One idea featured a physical timeline for visitors to experience the house through different times. This was directly inspired by exhibition ideas shared in the Creative Package: *You would start a time before the house and entirely reset the house if you could… Ideally, there would be interactives you could touch to listen to things. The timeline would take you all around the house up and back down again* (Jenni, probe #3).

Alternative ideas featured the use of a time or listening machine to imagine "what if the walls could speak?". Ideas like the "memory box" was envisioned as a portable device that visitors would take around the house to collect insights from their visit. Another idea, "chairs as storytellers", was conceived as a series of standalone exhibits and invited visitors to have a conversation with previous inhabitants. The large set of ideas was assessed by peers in a design critique

session (figure 6-1), which helped me distil ideas into five design concepts for interactive experiences at the Bishops' House. Those were presented to a large group of museum volunteers (see 6.1.1) before being refined into the final concept of the Interactive Tableaux (see 6.1.2).



Figure 6–1 Design critique session with peers at Sheffield Hallam University.

6.1.1 Collectively assessing ideas with the volunteers

I organised two focus groups at the museum where I introduced five design concepts to be discussed together with the volunteers. The format of the sessions encouraged a two-way dialogue in which volunteers were active in discussing, exchanging and refining the suggested ideas. The concepts "Dear Diary", "Sensory Home", "Domestic Tableaux", "Conversation Pieces" and "Collecting Stories" are summarized in this section together with volunteers' feedback.

"Dear Diary" (figure 6-2) featured a digitally-augmented diary through which visitors could experience life at the House in different times. I imagined different scenarios: by using a bookmark, visitors could activate stories and experience different times of the day depending on where they were in the House, or the use of several bookmarks to experience a day in the life of different characters at the House. Volunteers described the potential of the diary in bridging

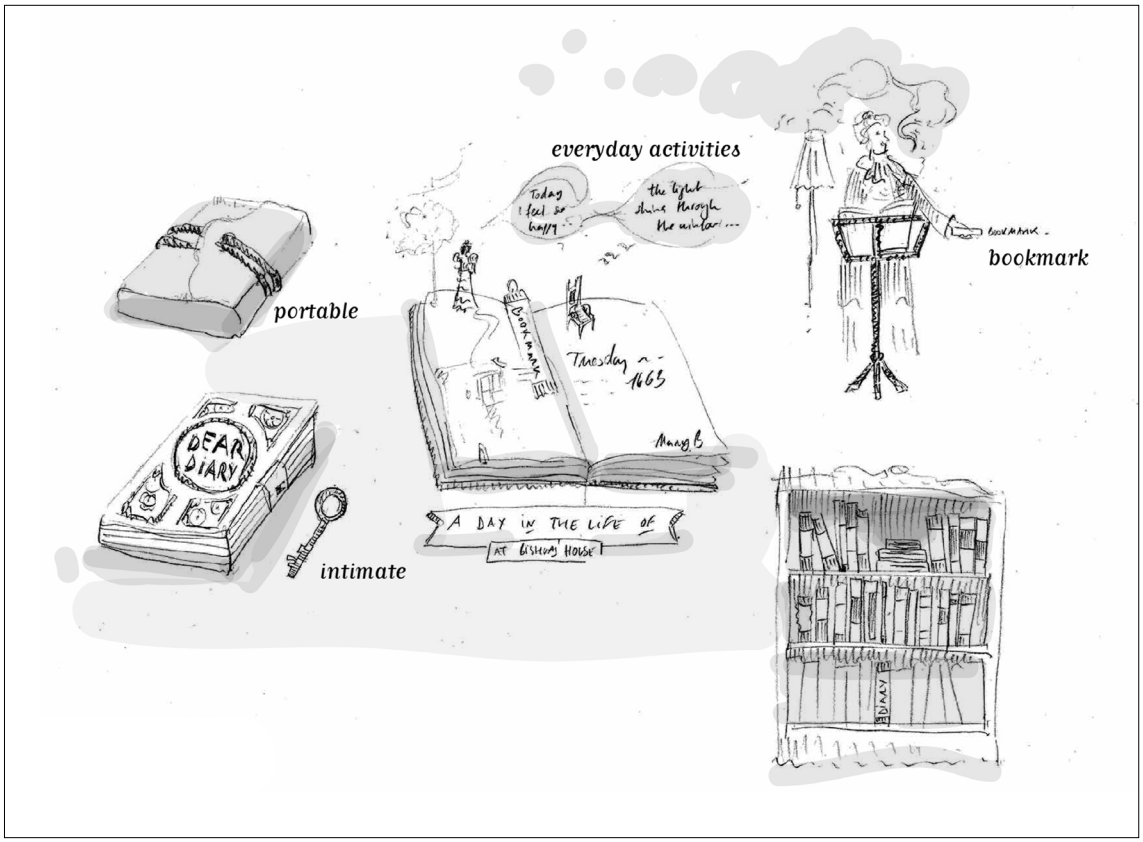

Figure 6–2 *Dear Diary* concept. Illustration © Caroline Claisse.

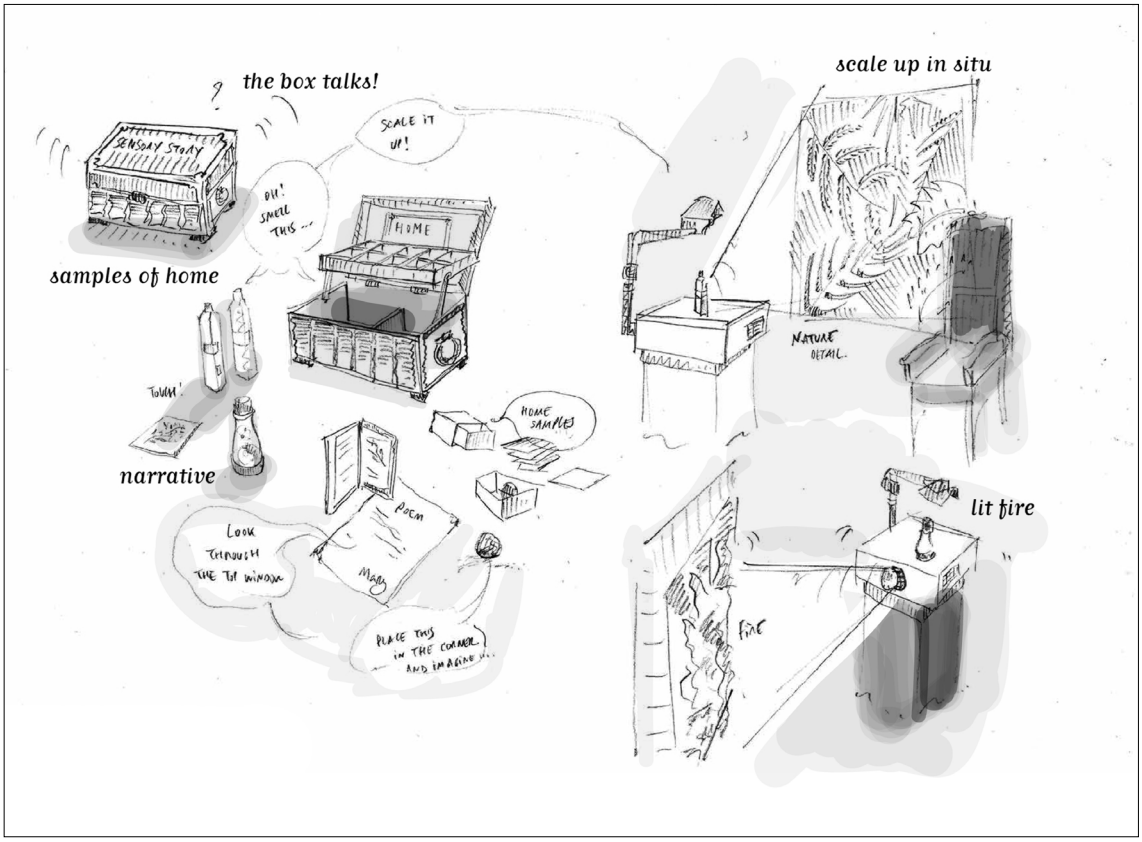

Figure 6–3 *Sensory Home* concept. Illustration © Caroline Claisse.

between different dates in history by showing life in various times simultaneously: *To me the diary shows the history as layers of time, and it's not only a long line that stretches all the way along. There are actually layers and you can go down and you can feel the connections between them. It is like pages…* (Terrence[1]).

When discussing the idea, they reflected on the House and emphasized how it was not only about Tudor England, and how much they would like to take visitors on a journey through time to understand the broader history of the place. They saw the potential with the diary to reveal the layers of time and appreciated the tangible aspect of having an object to carry around in order to activate stories.

"Sensory Home" (figure 6-3) provided visitors with an explorer's suitcase containing tactile samples evocative of home. At different stations, visitors could use the samples to bring the place to life by playing digital content to augment the place with projection or sound; for example, by lighting fire in the fireplace. This idea was inspired by the mood board of home created in response to probe returns and intended to bring back a domestic touch in the House, which for some volunteers felt too much like a museum. This concept brought volunteers' attention to the sensory qualities of the House. One volunteer recounted an exhibition she saw about First World War where visitors could lift the lid of boxes to smell gas as if they were in the trenches: *It is quite like err – but smell brought it immediately to life* (Annie).

"Domestic Tableaux" (figure 6-4) was directly inspired by a volunteer who described her idea for an exhibition with reconstruction of rooms: *Voices of the past. I would love to have an exhibit where people can hear the voices of the previous owners of the house. To hear what life was like and to see and feel some of the things they would have experienced* (Chris in the Creative Package, probe #3). I was also inspired by the period room displays at the House, which encouraged visitors to imagine life in the past. I envisioned the display of a dollhouse with a series of rooms, each representing different times and

1 Name in brackets identify volunteers' first name.

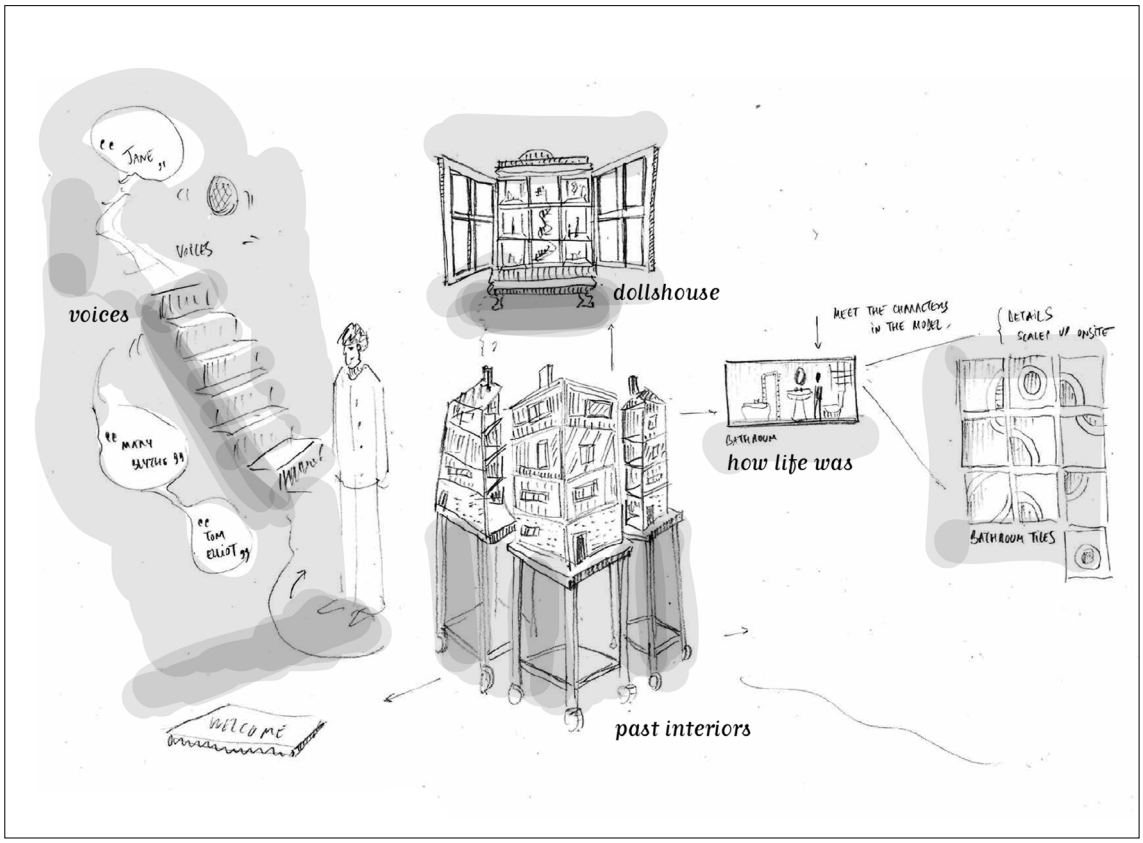

Figure 6–4 *Domestic Tableaux* concept. Illustration © Caroline Claisse.

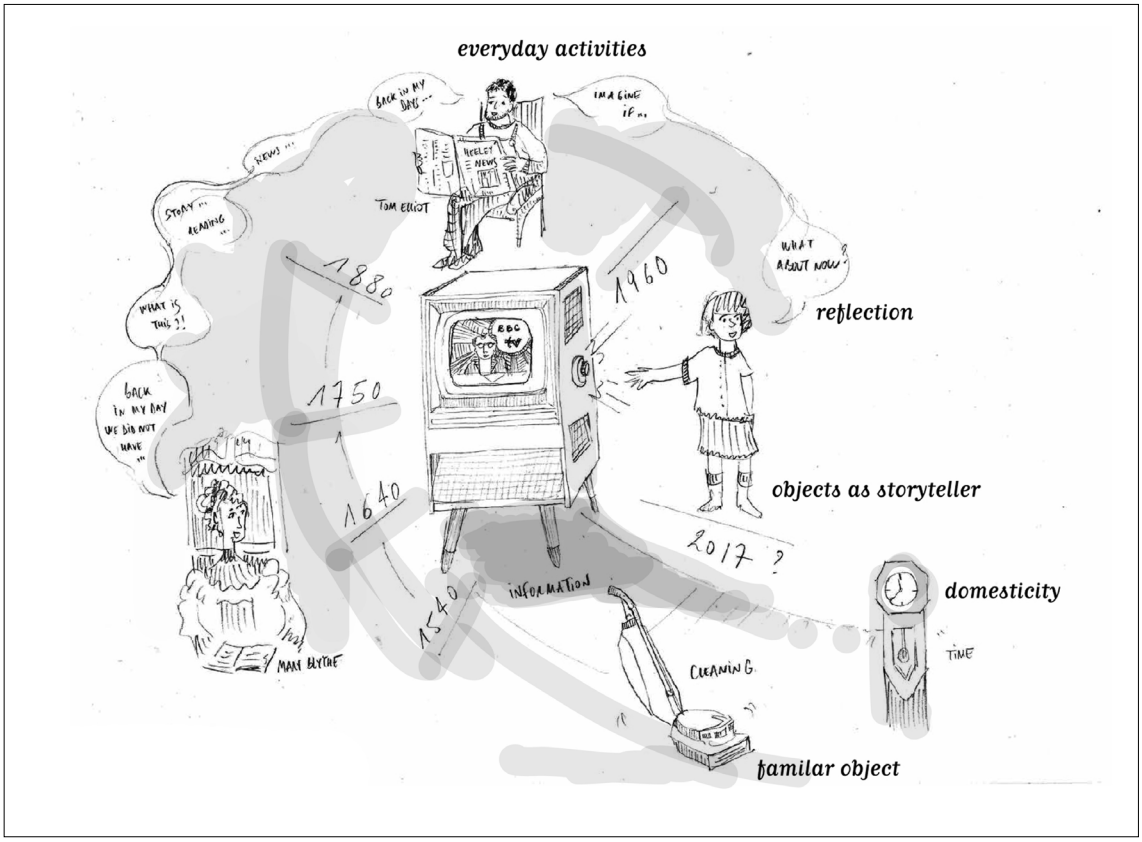

Figure 6–5 *Conversation Pieces* concept. Illustration © Caroline Claisse.

interiors. Visitors could use miniature objects to activate the rooms and hear about the lives within them. The concept of the dollhouse prompted volunteers to reconsider the nature of the House and question its function as a museum of Tudor History: *How can it just be about the Tudors? It may have been built in Tudor times or as part of it, but people have lived in there for generations!* (Terrence). With this idea, volunteers saw the potential in presenting the house as a home where the rooms could be displayed as a set. In this way, visitors could imagine how life was in the House, and key to this was by bringing back a more domestic feel into the place.

"Conversation Pieces" (figure 6-5) featured a trail of objects that would belong to the last resident family as if "forgotten there". They would contrast with the actual place and remind visitors that the House was inhabited until 1970s. I imagined each item as a "storyteller", acting as a provocative device or point of encounter between people from different times. Visitors would be able to meet with previous residents who would respond differently depending on how familiar they are with the item.

For example, a vacuum cleaner would trigger different reactions about the way people cleaned through times e.g. from beating carpets up to hoovering. Whilst some volunteers were worried about confusing visitors, others liked the idea of having a modern object because it was thought-provoking: *That's the thing with this House, it has been lived in continuously from then which is unusual! And I think reflecting on that and maybe having a hoover in the corner looks weird but then, you wonder how does it fit with the history of the House? You find out it does because it's a continuum* (Annie).

In **"Collecting Stories"** (figure 6-6), visitors could show clues to interrogate characters about their life at the House. Some characters would be more helpful than others depending on when they lived and what they witnessed during their time at the House. Volunteers liked the way this concept encouraged visitors to ask questions, and how characters could get it wrong, pushing visitors to come

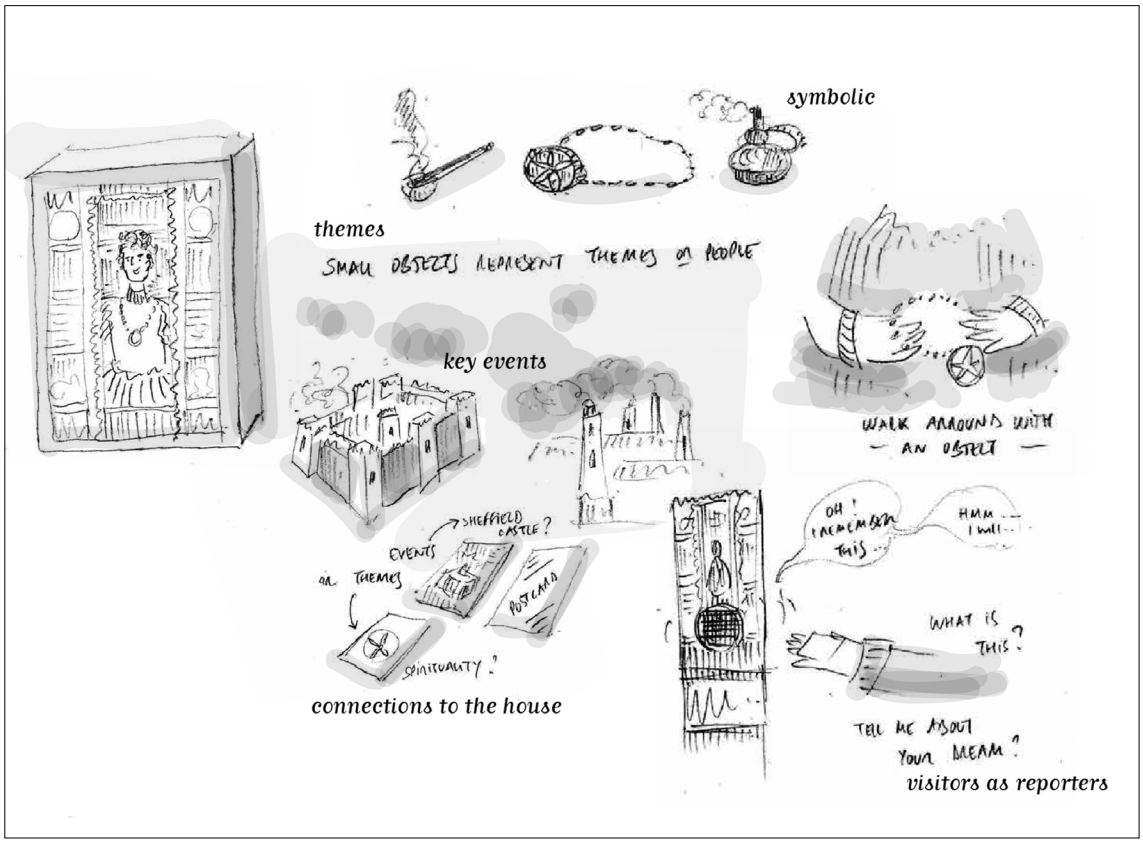

Figure 6–6 *Collecting Stories* concept. Illustration © Caroline Claisse.

back later or to question someone else. An example would be visitors showing characters a drawing of the nearby castle that was destroyed in the 17th century: like a lot of visitors, the modern character would not know about it and advice to come back later or point to another character who lived here before the castle was destroyed; *Children get really excited because they get it wrong… It's about learning through making mistake as well!* (Taf). Volunteers particularly liked this idea because it used characters as a means to question history and one-way didactic learning. For them, it embraced the museum's mission of using Bishops' House as a way to appreciate the history of the City and beyond.

By using knowledge gained from previous phases, the sketches made volunteers' wishes manifest and communicated ideas that were meaningful to them and bespoke to the House. During the session, we collectively assessed ideas and identified the main aims (in **bold**) and considerations for future development: (1) **For visitors to be able to connect with heritage at the House**. To

design for relevance so they can identify with the place from their own perspective; (2) **For visitors to recognize the depth and breadth of the Bishops' House.** To present the House beyond an individual era so visitors are aware of the many people who lived in the House and the connections with its broader context; (3) **For visitors to come back and hear more stories.** To design for repeated visits and extended interaction.

Practical considerations were also discussed e.g. how the interactive installation should encourage multiple forms of engagement, accommodate different visiting styles and facilitate social interaction within family groups. One volunteer emphasized: *I think it's finding the right balance really between having enough content and enough variety so people feel they can come multiple times and experience it in different routes but then also not having it so fragmented that if you are that one-off visitor, you did not get the whole thing* (Emily).

By generating ideas and sharing them with the volunteers, I was able to consolidate key aspects of experience: first, the importance for the museum to be understood beyond Tudor history; second, to offer a multisensory experience of what the House might have felt like as a home in the past; third, to use provocative content to question visitors and make them look at the place with new eyes rather than passively receive information; and finally, to design for multiple forms of engagement that can satisfy different kind of audiences. This informed the design of the Interactive Tableaux, which I summarise next.

6.1.2 The concept of the Interactive Tableaux

The final concept brought together the 5 ideas discussed in section 6.1.1. Inspired by "Sensory Home" and "Domestic Tableaux", I imagined each tableau to be presented as a miniature set of an interior scene of what the Bishops' House might have looked like in the past. Later, I used archive images and information about previous residents to create imaginary snapshots of the House at different times (see details in 6.3). Like with "Collecting Stories", visitors could interact

with the tableaux by showing characters an object, which prompted them to say something about their life at the House. Based on volunteers' feedback, I decided to experiment with content that was evocative and thought-provoking; for example, characters would challenge visitors by questioning or sending them away to look for more clues.

As with "Conversation Pieces", the characters would respond differently to the objects depending on how familiar they were with what visitors showed them. Like with the vacuum cleaner (figure 6-5), which evoked the theme of cleaning, the objects would be evocative of a theme (e.g. fashion, cooking) to prompt the characters to respond from their particular time and perspective. As proposed with "Dear Diary", visitors would carry around an object belonging to one of the characters. They would hear different perspectives on the same object; thus, exploring the potential of showing life in different times simultaneously. Indeed, I imagined the tableaux as a timeline through space; building on previous ideas shared by the volunteers in the Creative Package.

Building on Containers of Stories

The Interactive Tableaux built on Container of Stories and were designed for the purpose of exploring in more depth the potential of co-creation and tangible interaction (research questions 2 and 3); firstly, by investigating ways to reveal temporality at the Bishops' House; secondly, by allowing more time for development and evaluation, and also, by including a larger group of volunteers in the design process; thirdly, by envisioning an experience throughout the House rather than limiting it to a single room in the museum.

As an inspiration for temporality, I used the novel of George Perec *Life a User's Manual* (1978) in which the author portrayed residents from different eras through the descriptions of objects they owned. For the tableaux, I used personal belongings as a means to learn about the lives of imagined residents. I was also inspired by the book cover, which depicts a section of an apartment block with

its façade removed, exposing characters compartmented in rooms as if frozen in time. I used the same idea for the exhibition poster where I illustrated each floor as a different layer of time at the House; starting from Tudor era in the attic right to the ground floor with the Sixties (image 6-7).

In essence, the Interactive Tableaux were envisioned as five interactive stations; each representing one character from a particular era. Depending on what objects visitors showed to a tableau, the character would react differently. The interactive experience was designed as an ensemble, with the stations, the objects and the content crafted to create a coherent yet surprising experience. This is described next with two co-creation sessions, which prompted volunteers to imagine the characters, their object and narrative.



Figure 6–7 *Life a User's Manual* book cover (left). *Curious House* 2017 exhibition poster (right).

6.2 Co-creating with museum volunteers

The ideation process informed two co-creation workshops for developing the Interactive Tableaux with the volunteers. The workshops were organized as four sessions of two-hours each. They were introduced via Eventbrite as hands-

on activities for volunteers to take part in with the aim of bringing Bishops' House to life (see details in Appendix 6-A). Overall, twenty volunteers signed up and participated in co-developing the tableaux. In preparation for the two workshops, I designed bespoke toolkits that intended to elicit participants' creativity (see 3.3.2). The generative tools were used in the first workshop to help identify the "voices", or characters, while being instrumental in the second workshop to create multiple threads of content inspired by the imagined characters and their respective stories. Section 6.2.1 describes workshop 1 where volunteers imagined a family of characters who might have lived at Bishops' House between the 16th century (when the House was first built) up to the late 1960s (when it was last inhabited). The characters were then materialised through design synthesis to inform workshop 2 where volunteers co-developed content for the installation (see 6.2.2).

6.2.1 Co-creation workshop 1: imagining characters

In pairs, the participants first imagined a character who might have lived at the House, then, they had to step in the shoes of their imagined character and acted a day in their life at the House. I audio recorded each group to observe how they compromised and influenced each other during the co-creation session.

Inspire, generate and describe

To create their characters, the groups received a bespoke toolkit intended to make them think outside of the box. The toolkit had three steps: *inspire*, *generate* and *describe*. A set of mood boards and prompt cards aimed to inspire ideas for potential characters (figure 6-8, 1). The mood boards featured images and exhibition themes inspired by the probes returns (see 5.1.1). At this stage, they were used as visual aids for volunteers to help them construct a narrative and setting for their characters. For example, one mood board; *The Secret Marks of Bishops' House*, featured images of the witches' marks that are carved all around the house while another one; *Meersbrook through time*, showed images of the

local area in different times. In using the mood boards, participants imagined characters that were inspired by previous contributions from volunteers.

The prompt cards (figure 6-8, 2) featured questions and evocative visuals to broaden participants' ideas and encourage them to discuss between each other e.g. the card with an image of witches had on the reverse the question "Am I human?"; the one with the Tudor princess asked "Am I Rich?". The card with the farmers cutting wood asked "Am I strong?"; etc.

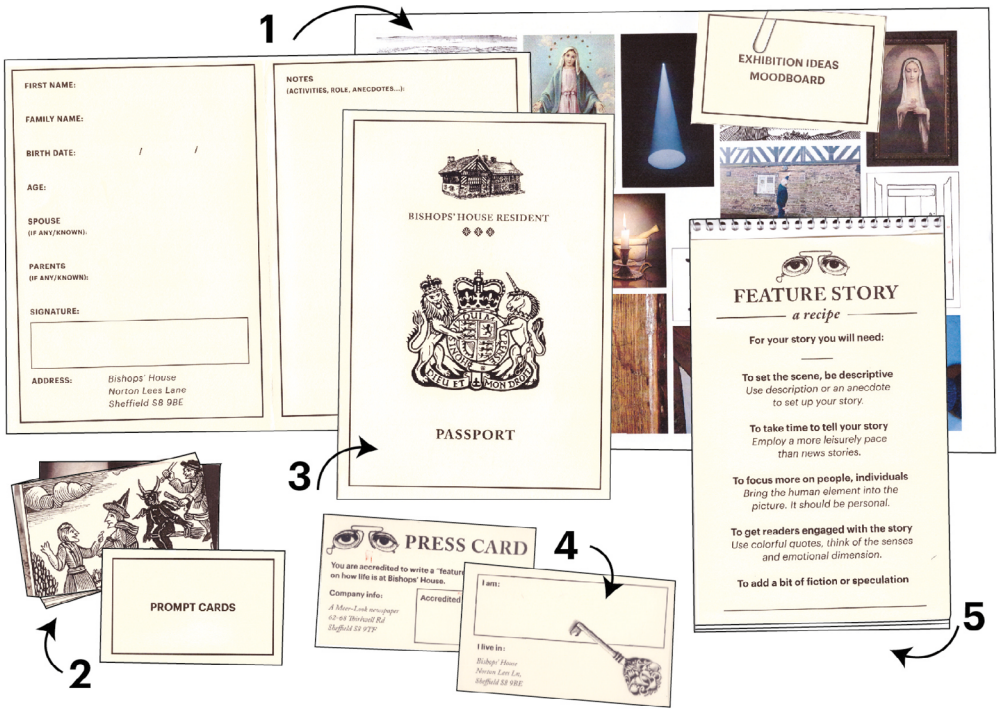

Figure 6–8 Generative toolkit: mood boards (1), prompt cards (2), passport ID (3), ID badges for reporter and character (4) and reporter's notebook (5).

Once the pair reached an agreement on which character to focus on, they had to generate content. They filled in a passport ID (figure 6-8, 3) with imagined personal information and used the role play activity to think about the life of their characters at the House. One participant in the group acted out the imagined character whilst the other one took on the role of a reporter with the task of interviewing the character and writing a "feature story" about life at the House.

Props such as small ID badges (figure 6-8, 4) helped participants to step into the shoes of their characters: one badge for the "reporter" and one labelled

with the name of the imagined character. The toolkit featured a bespoke notebook for the reporter with basic tips on which questions to ask and how to write their story (figure 6-8, 5). Participants used the House to act and think in place, which helped them to imagine how life was. Being in a team was key to this process as the “reporter” prompted the “character” to think about their imagined life in-situ (figure 6-9).



Figure 6–9 Participants using the generative toolkits and the House to imagine characters for the installation.

The third step was for the pairs to describe the day of their imagined character in two ways: as the character by writing a diary entry and as the reporter by writing a front-page article (figure 6-10). Participants were encouraged to use their own expertise to create characters that were personally relevant to them. Like with Containers of Stories (see 5.2), partcipants imagined content that represented their expertise and interest in the House. For example, Wes created a character that reflected his interest in buildings and his passion for carpentry. In his group, he imagined “John Capenter”, a craftsmen hired to work on the extension of the House during the 17th Century.

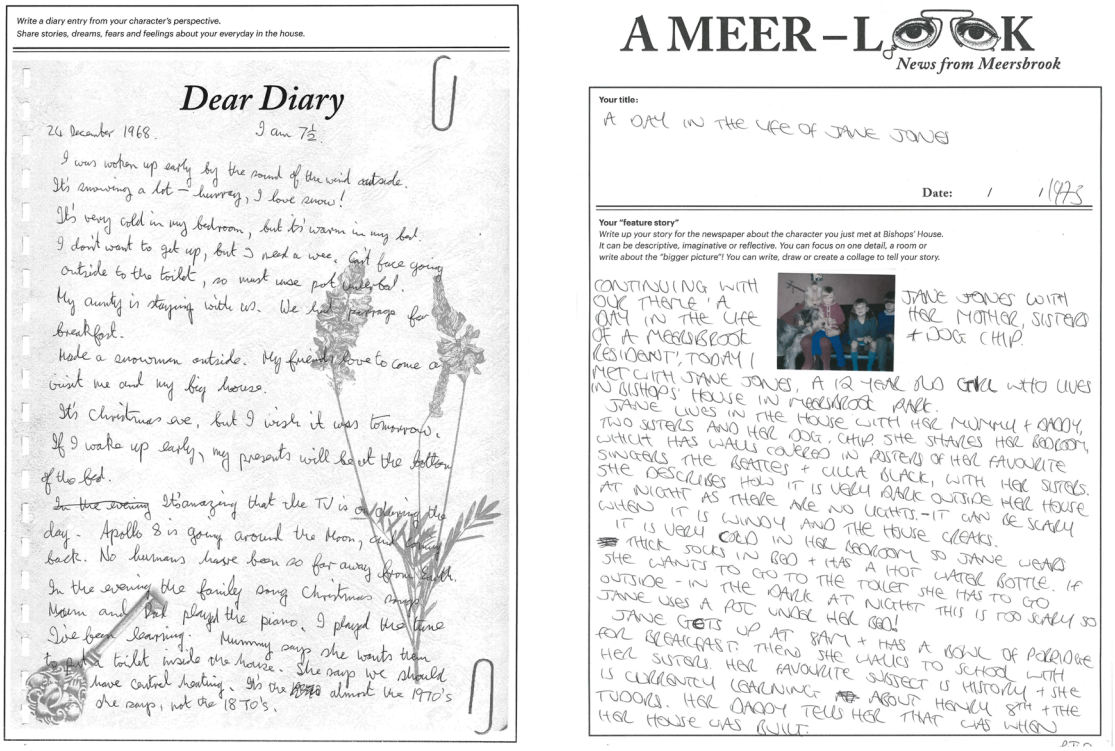

Figure 6–10 *Describe*, the third step of the co-creation workshop where participants described life at the House from two perspectives: the character and reporter. An example of a completed set: a diary extract and front-page article.

The generative tools featured in the toolkit also inspired participants to include details of the actual place in their stories. For example, below is an excerpt of the narrative generated for Tom, a boy of 10 from the 18th Century. It shows how participants included in their story elements that were initially featured in the mood boards (e.g. witches' marks, religious and sensory aspects): *Sometime after dark we tell stories – the floorboards are very creaky and make noises when the mice run across them. We think the witches are around after dark – did you know there are witches at Bishops' House in spite of the witches' marks?* (diary extract for Tom).

The toolkit was instrumental in helping participants to draw connections to the place and with themselves, which in turn allowed them to create content that reflected their own experience of the place. The generative tools enabled participants to collectively re-imagine the social history at the Bishops' House in ways that were more diverse and personal.

Materialising the imagined characters and stories

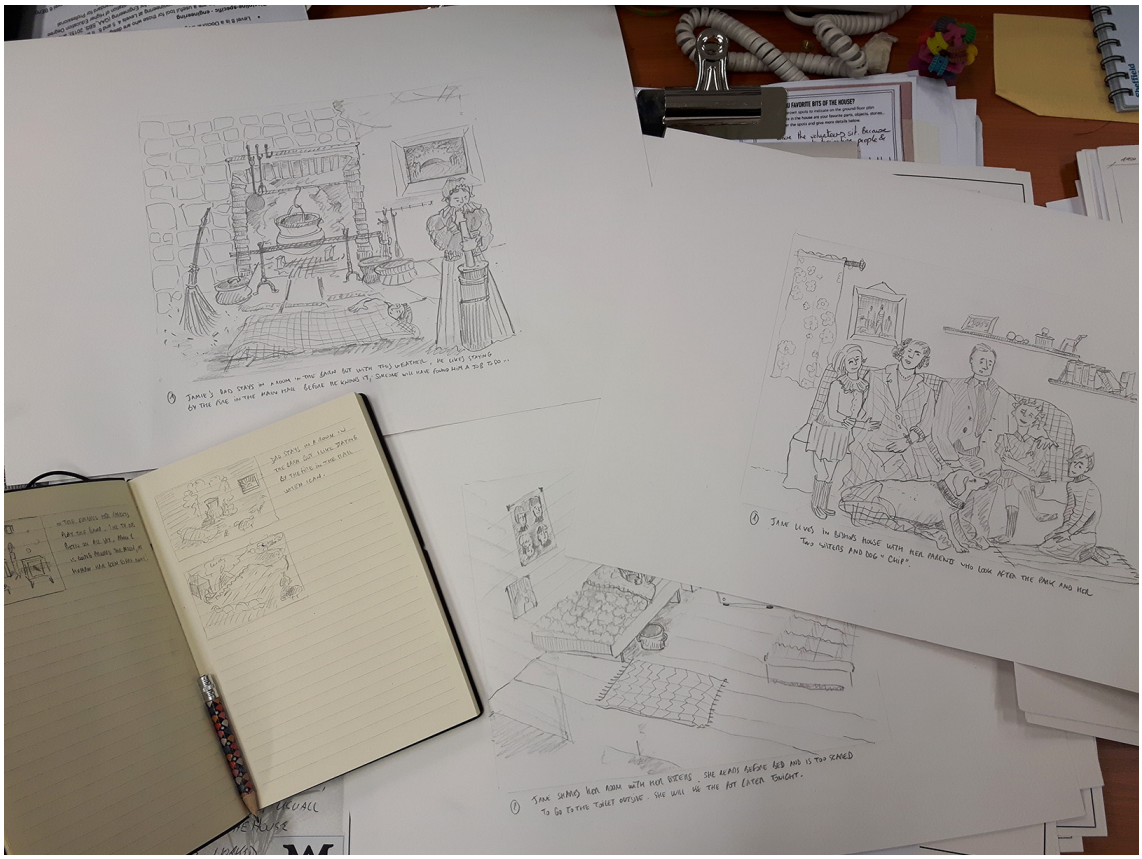

Figure 6–11 Storyboarding the plot and scenery for each imagined character.

The output of workshop 1 was the creation of eight characters with rich narratives that encompassed five centuries and varied profiles. The materials generated by participants included passports ID for the characters, diaries and front-page articles describing what a day in their life might have looked like (figure 6-10 and Appendix 6-B). Like previously, I used design synthesis as an intermediary step to make sense and refine participants' contributions (figure 6-11). As a result, I created a set of design research artefacts with the purpose to inform the development of a generative toolkit for workshop 2. Those are described below as sketches, storyboards and personas.

First, I used the audio recordings from the workshop to draw insights from participants' conversations. Instead of transcribing like previously (e.g. see interviews in 4.1), I chose drawing while listening as a means to materialise the rich narratives imagined by the different pairs. The resulting sketches (figure 6-12)

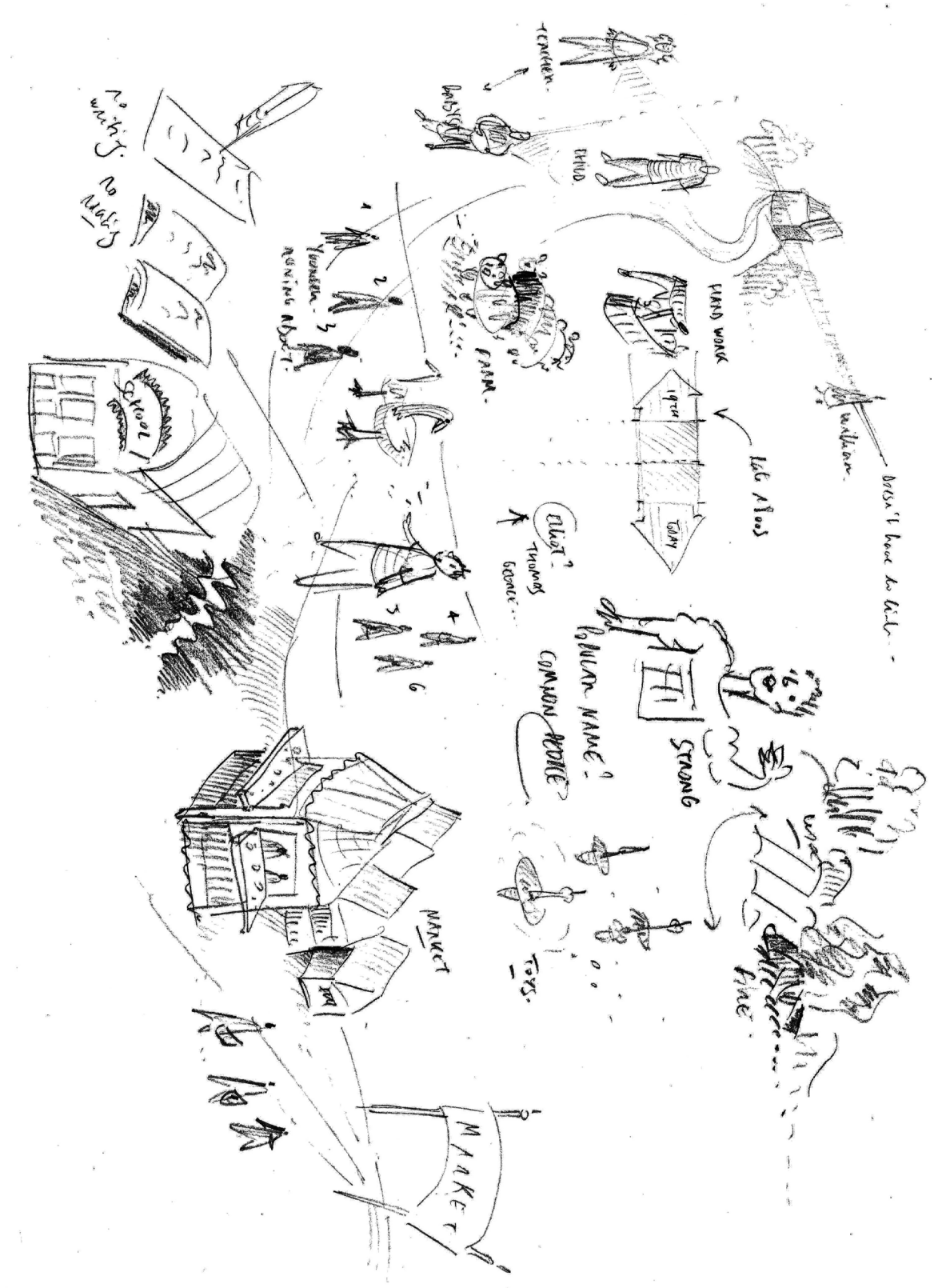

Figure 6–12 Drawing while listening to participants' conversation.

captured the complexity and non-linear aspects of participants' conversation: each presented a character in a state of becoming. The spontaneous and immediate qualities of my sketches embodied the negotiations and compromises participants made during the co-creation process. Drawing while listening encouraged me to have a reflexive conversation with the workshop outputs where insights from participants' contributions were revealed in action, through drawing. At the same time, I was able to slow down and absorb important characteristics described by participants. This informed a second stage of design synthesis where I used storyboarding (figure 6-11) to visualise the characters' plot and sceneries from the diaries and front-page articles (e.g. figure 6-10).

In storyboarding, I was able to condense the dense narratives into a sequence of drawings. The storyboards featured key moments of characters' lives from waking up to bed time. They presented rich pictures of the characters' everyday, showing them in the place they inhabited together with the people they lived with. For example, one of the sequences showed Mary doing her embroidery by the fire (figure 6-13).

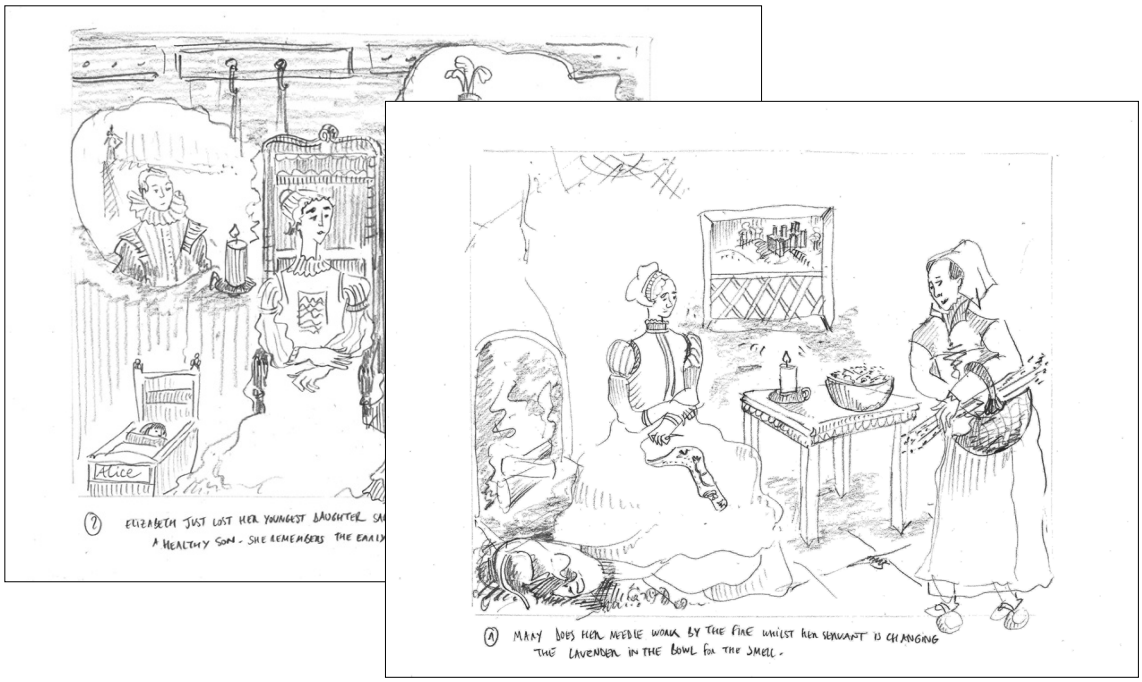

Figure 6–13 Illustrations from the storyboard for Mary, a character from the 16th Century.

In the same drawing, I was able to show the servant stepping in the room to change the lavender from the bowl, the dog sleeping next to Mary's feet and the flame of the candle light flickering. In the window, I drew the castle at a far distance, which situated the scene within its wider context. It reminded me about the link between the Bishops' House and Sheffield Castle – an important connection for the volunteers. In other drawings, I drew windows with the sun rising to symbolise an early morning start for the character or a dark path leading to the outdoor toilet, which referred back to one character's story in the Sixties when there was no indoor toilet at the House (storyboards can be seen in Appendix 6-C). Whilst the storyboards allowed me to reveal the multi-layered aspects of the stories, they gave substance to the characters and their personality slowly took shape. Figure 6-14 shows an example of how the sketches drawn from participants' conversation informed the narratives for the storyboards.

The storyboards were used in a follow-up meeting with a smaller group of volunteers as a tool for refining the stories whilst checking for their accuracy. The volunteers shared more insights about the place and I annotated my drawings with their suggestions and corrections. In this process, I became familiar with the characters, which were illustrated within an environment that was partly imagined by the volunteers and myself. Drawing the stories was a way to complete the pictures first envisioned through the creative writing exercise conducted in workshop 1. With design synthesis, I went beyond representing participants' stories: I drew qualities and relationships that were invisible beforehand, when just reading about participants' imagined narratives.

I merged some characters together (e.g. John and Jamie, figure 6-15) and together with the volunteers, we selected five final characters for the interactive experience: one for each century at the House (figure 6-15). I sketched personas to materialise the characters, making them more real and legitimate (for details see Appendix 6-D). Together with drawing and storyboarding, the resulting illustrations acted as design research artefacts, which helped me craft a scenario for the installation.

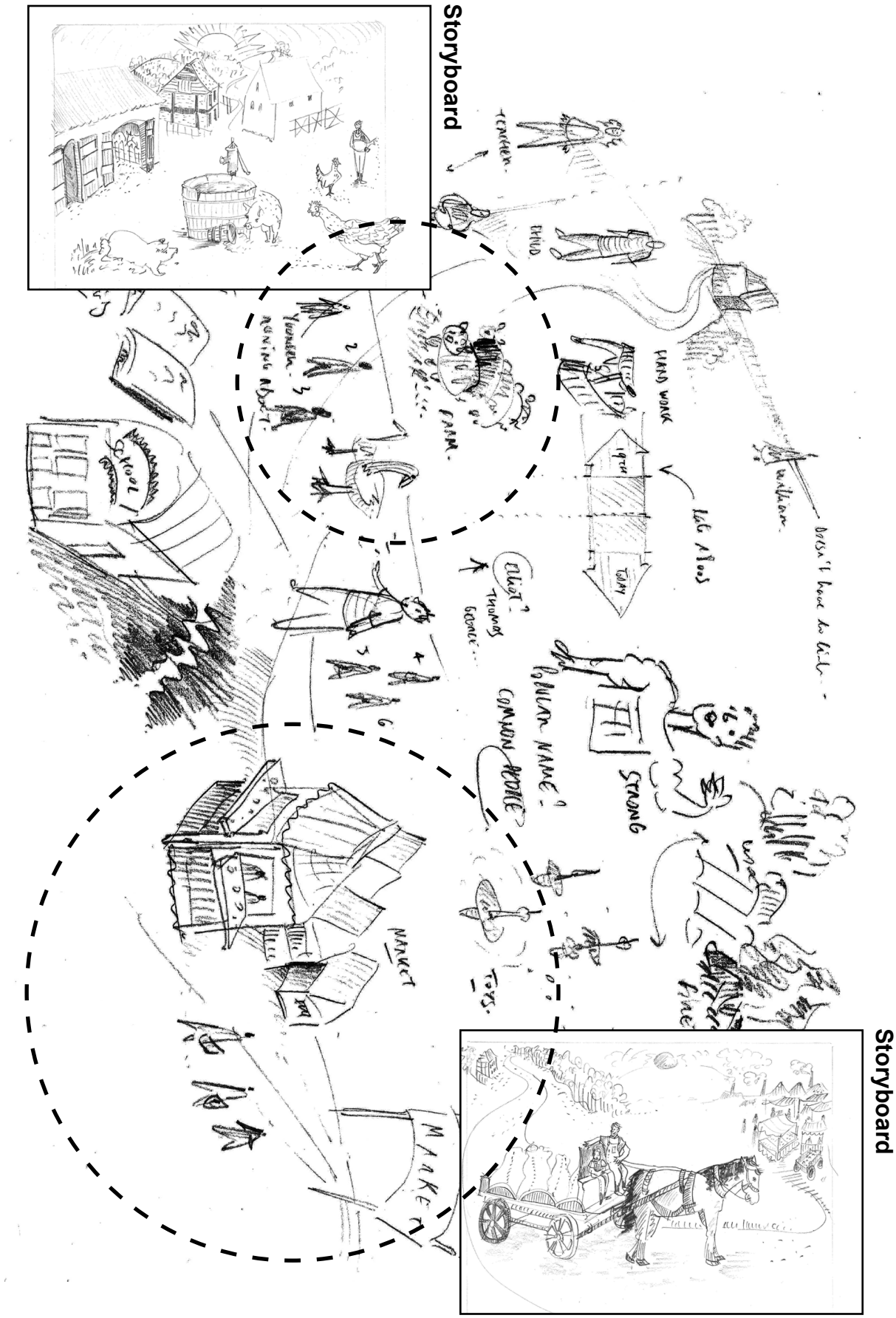

Figure 6–14 Connections between the storyboards and the sketches drawn while listening to participants' conversation.

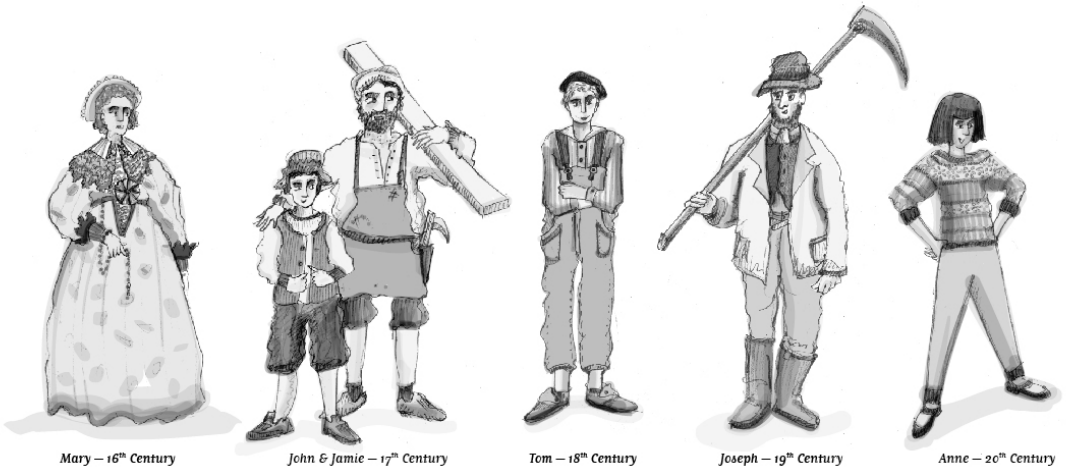

Figure 6–15 Final characters for the Interactive Tableaux, one per century.

The characters translated volunteers' ideas in formats that were appropriate for developing the Interactive Tableaux. The drawings also afforded continuity in the co-creation process. I describe this next with the personas that were used for generative design in workshop 2.

6.2.2 Co-creation workshop 2: generating multiple content

As discussed in section 6.1.1, content needed to provoke visitors with questions while making them look at the place with new eyes. In workshop 2, volunteers used the personas to generate thought-provoking content. Prior to discussing participants' contributions, I first describe an intermediary step where objects from the museum collection were selected.

Objects inspired by the museum collection

At this stage, the concept for the Interactive Tableaux (described in 6.1) was finalised: by showing an object to one character, visitors would trigger different reactions from them. The same object could be shown to different tableaux to provoke multiple reactions so whilst belonging to one character, the object had to resonate with other characters and their time periods. The final concept was informed by previous ideas ("Conversation Pieces" and "Collecting Stories", see 6.1.1) where by showing clues to characters, visitors would

interrogate them and prompt different reactions depending on how familiar characters were with the clues.

In the end, five objects (one per character) were selected in collaboration with both the Friends of the Bishops' House and Museums Sheffield. Inspired by the five personas, the Curator of Social History first identified potential objects from the museum collection. Together with one volunteer, we then visited the museum store and selected five objects for the Interactive Tableaux (figure 6-16). The objects were all very different and connected with both the character's story and their respective era (figure 6-17, left image). They were also selected for their evocative quality and thematic resonance throughout time and with different characters.



Figure 6–16 One volunteer going through potential objects from the museum collection.

For the exhibition, replicas were created with embedded technology (NFC tags) for visitors to use the objects as a means to trigger content. The replicas matched to the five characters are featured in figure 6-17 and 6-18. They were (1) **a piece of embroidery** made by Julie (volunteer) and inspired by the embroidered cushion, which was associated with Mistress Mary (16th Century) – a gentlewoman described as spending her days doing her embroi-

dery by the fire. (2) **An old folding knife**, which matched the story imagined for John (17th Century) – a carpenter who worked with his son on the extension of Bishops' House. The museum object was replicated by Wes (volunteer) who is a trained blacksmith. (3) **A child's shoe**, which was associated with Tom (18th Century) – a young boy from a lower status who helped his dad at the farm rather than going to school. Like many children at that time, he would have shared everything with his brothers and sisters. Rather than a shoe, we purchased an old shoe last, which was also evocative of mending shoes.



Pincushion. 1675-1700. From the Wilson family. On display in the house © Museums Sheffield.





Made by Thomas Wilson, Sheffield. Steel pocket knife with inscription © Museums Sheffield.





Child's shoe. Found in 1981 in the party wall up against the stone slates in a cottage © Museums Sheffield.





Omnibus token with inscription of first railway in Sheffield © Museums Sheffield.





Sunday Times magazine, August 10th 1969 "from blast off to Splash down" © Museums Sheffield.



Figure 6–17 Objects selected from the museum collection (left), replicas created for the Interactive Tableaux (right).

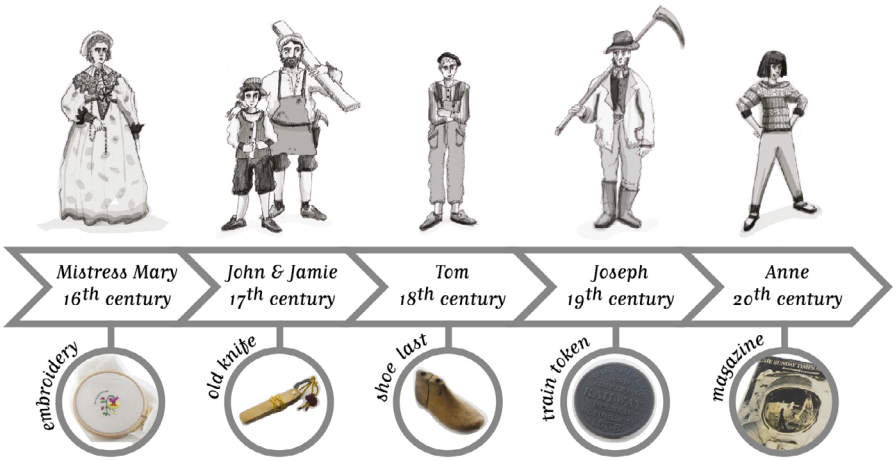

Figure 6–18 The characters, centuries and 5 replicas for the Interactive Tableaux.

(4) **A small token** inscribed with the date of the first railway opening in Sheffield in 1838. While the curator was unsure about its usage, the token matched Joseph's story (19th Century) of wanting to move from farming the land at Bishops' House to become a train driver. Later, we 3D scanned the token and enlarged it so the inscriptions were legible and evocative of a time of change and new industries in Sheffield. (5) T**he Sunday Times magazine** (August 1969) featuring the first man who landed on the moon was picked for Anne (20th Century) – a teenager who was one of the last residents at Bishops' House. The magazine was scanned with key pages assembled for visitors to browse through.

Generating thought-provoking content

Workshop 2 was divided in two parts: brainstorming around the imagined characters and chosen objects; followed by an activity where volunteers customized small portraits with characters' reactions to objects. In the first part, photographs of the five museum objects were placed on a large timeline alongside the personas (figure 6-19). Participants were asked to write down what the objects reminded them of, or what they thought they were. This enabled them to think about the objects from their own perspective whilst questioning and speculating about their origins and use.



Figure 6–19 Workshop 2 brainstorming around personas and objects.

For example, the embroidery reminded them about craft, skills and labour, and about their mothers or grandmothers' daily activities. One participant shared her memory of her grandmother not having electricity and how cold and poor the light was during winter time. When discussing the embroidered cushion, they also questioned the broader context at the time: *[The first residents] were yeomen farmers so they actually owned their land so they weren't poor people (…). She [Mary] would have had status. The thing that struck me about the cushion is where would you get your fabrics? There would not be a John Lewis near by!* (Jan) .

The most recent item (The Sunday Times magazine) triggered volunteers' memories of watching the Moon landing on an old TV whilst looking at the Moon and thinking *Oh! There is a man up there!* (Liz). Other objects such as the knife evoked local history and the many cutlery factories in the city. One volunteer compared with today's eating habits: *A reminder that everybody used to carry their own knife. You would not have opened your cutlery drawer and got out six knives! If you did not own one, you did not have one!* (Jan). The train token encouraged discussion about social history and the first local railway, prompting

volunteers to think how, since then, so much has changed in the city; *People started having holidays and because of the railway, they started to go to the coast, places like Scarborough developed with the spa, the promenade and the shops* (Eileen). Lastly, the shoe provoked critical reflection about the way we consume shoes and how back in the day we would mend shoes, keeping them for life; *My mum she could remember in 1930s not going to school because she did not have any shoes. They had to wait until they were mended* (Liz); *Expensive… Shoes eating up your family's budget* (Judy); *My mum said that in the 90s, when I was a kid, they spent a fortune on nice shoes for me from Clarks rather than buying five pounds in Tesco* (Jenni).



Figure 6–20 Generative toolkit using personas and museum objects to inspire thought-provoking content.

After our discussion, I revealed the historical back story behind each object and placed the characters close to their relevant objects on the timeline. The stories of the objects were, at times, surprising as they were distant from what was discussed by participants. For example, the shoe was found between partition walls at another building in the local area. Like the witches' marks featured on the doors at



Figure 6–21 One completed frame by a participant inspired by the persona and museum object.

Bishops' House, shoes in the 18th century were placed between walls as a form of protection against bad spirits. Volunteers started wondering and speculating about where people in the past could have placed items like the shoe in the House. This challenged their imagination and prepared the mood for the next activity. In the second part of the workshop and in pairs, participants were given a toolkit featuring one of the five personas, a set of speech bubbles in different shapes, and five wooden frames with one museum object attached to each (figure 6-20). Images from the mood boards (see in 5.1.1) were included to encourage evocative thinking. The activity asked volunteers to place the character within the different frames, one by one, and imagine what reactions their character would have depending on the object attached to the frame. The bubble speeches with the characters' reactions were then attached to the frame with the images that were supplied in the toolkit (figure 6-21).

Details in the toolkit intended to provoke participants to think outside of the box. Different shapes of speech bubbles were used to convey contrasting reactions.



Figure 6–22 Reactions from Mistress Mary when presented with two objects.

The varied shapes and colours prompted expressive responses and allowed to convey different tones of voice (e.g. sad, scared, surprised etc.). Figure 6-22 shows contrasting reactions from the character Mistress Mary (16th Century) when faced with her embroidery and with Anne's magazine. Whilst she is familiar with her object, she is scared by the magazine as in her time period she would not have seen anything like this. The personas encouraged volunteers to empathise with the characters. During the workshop, participants shared their own every day and personal life experience, which fostered the creation of more personal and, in some case, emotional and humorous content. For example, here are some snippets created for different characters in response to the shoe: *I am so sad to think my baby boys never lived to be big enough for shoes. This shoe would have moulded to a foot. My babies had such tiny feet* (Mary); *Did children really wear things like this? Poor things!* (Anne); and when showed with the magazine: *I was told the moon is made of cheese* (Jamie); *Eh Sunday Times, that's what posh people read!* (Joseph).

The content generated from the workshop was then refined and developed in one final script for each character (see details in 6.3.2). Five volunteers offered to be the voices of the characters and to act out the different stories. In parallel of finalising the content, I was developing the aesthetics of the Interactive Tableaux, which I detail next.

6.3 From design principles to practice

The concept for the “Interactive Tableaux” was collectively envisioned and refined with the volunteers (see 6.1) who also actively contributed to developing the content for the installation (see 6.2). As before in the Insights phase, co-created materials were synthesised through design to crystallise insights and ideas generated during the workshops. Connections between the design research artefacts (e.g. storyboards) and the design research outcomes are annotated in Appendix 6-E.

To summarise, the final installation featured five fictional characters that represented the five centuries at the House, from when it was built in the 16th century, to when it was last inhabited in 1970s. Their presence in the house manifested by their “portraits”, the tableaux, placed in different rooms on the two floors of the Bishops’ House. Each tableau was designed as a domestic scene, a possible view of the House in that century, as if the character lived in it. Five replicas (figure 6-17, right), each belonging to one character acted as a smart object to activate the different tableaux. Different objects triggered different reactions from the characters, and visitors could show the same object to the same character many times to keep the conversation going. Once the content was exhausted, the audio played back in different orders (see details in 6.3.3).

To achieve this, I used NFC tags (attached to the objects) and NFC readers to control each Tableau. A Wi-Fi communication system allowed me to register the visiting path followed by each object, which later served for evaluation purposes (see details in Chapter 7). Next, I describe the prototyping stage of the tableaux through the lens of the four design principles (DPs, see 4.1). By using the DPs as guidelines, I turned the challenges raised by interviewees (4.1) into design opportunities and brought technology in the museum in a way that was sensitive to the particular setting of the Bishops’ House.

6.3.1 Drawing visitors to meaningful details in and out the House

Theatrical qualities

I designed the tableaux in ways that were sensitive to the setting of historic houses. To keep within the spirit of the place (DP1), I built on the immersive and authentic character of house museums. I researched into the way theatre maker design set and I was inspired by studios like Atelier Bruckner[2] who uses scenography as a means for designing immersive exhibition. I was also inspired by my fieldwork where I noticed the popularity of period room displays, which were described as theatrical, as if inhabitants have just left the room. This informed the design of miniature interior scenes where I used set design techniques to create bespoke scenes with visual depth. The tableaux were designed as three layers; the façade of the House, the interior scene and the background scene. The in-between scene featured a three-dimensional element that was key to the character's story: a Tudor chair on which Mary spent her days embroidering, a precious toolbox handed down to John, a chicken fed by Tom, a fireplace to keep Joseph warm and a TV set on which Anne's family watched the Moon landing (figure 6-23).

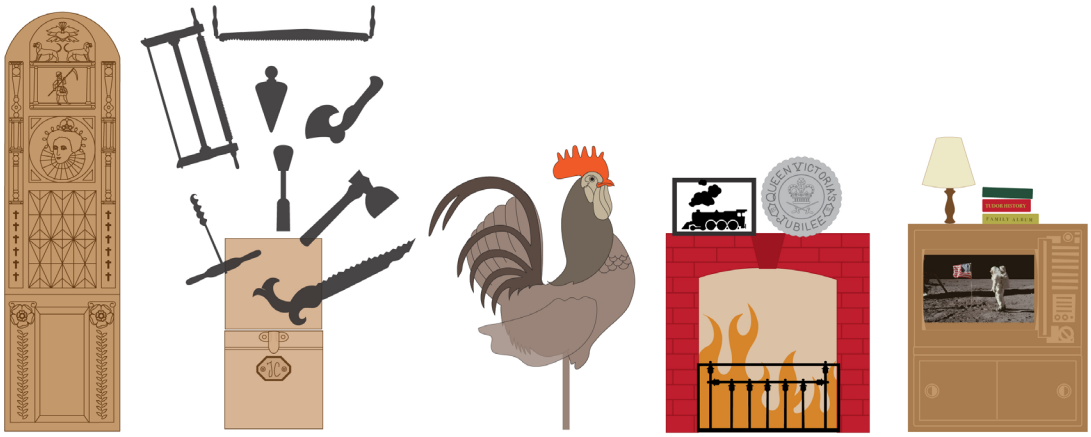

Figure 6–23 Illustration of 3d elements featured in the tableaux.

Emplaced connections

It was key for the installation to shed light on significant details in the actual place (DP1). Both the physical design and digital content aimed to draw visitors' attention to things that were meaningful to the volunteers. Details were documented previously through the model (see 5.1) and incorporated into the final design.

2 Atelier Brueckner studio website: http://www.atelier-brueckner.com/en



Figure 6–24 Tudor roses at the Bishops' House (left), Tudor roses featured in Mary's tableau (left).

For example, one volunteer initially marked the Tudor Roses on the ceiling as one of his favourite spots in the House (Creative Package in 4.3). These were engraved in Mary's tableau to match the ones in the actual parlour at the House (figure 6-24). Volunteers also wondered why, instead of the traditional Tudor rose with five petals, the ones at the Bishops' House have seven; *Tudor Roses on the ceiling in the parlour. Symbolise reconciliation and the end of war – why is it seven petals rose?* (Ken in Creative Package). This curiosity became part of characters' discourse and while it drew visitors' attention to look at the Tudor roses, it prompted them to think about this unresolved detail while: *They are called Tudor roses! Look closer and you will notice that instead of five petals these have seven. I wonder why? […]* (Anne, when shown the embroidery).

The witches' marks, another favourite detail of volunteers were featured in the tableaux. I first learnt about witches' marks from Ken, one of the volunteers who spent time recording the marks around the house. One of his drawing featured the back-door downstairs with over twenty witches' marks and the initials "GW", which are believed to stand for one previous resident (George Wilde) who lived there during 18th Century. This door became a key element of

the set for Tom who was inspired by the Wilde family (figure 6-25). Such details were subtle but referenced key things in the House that volunteers discovered or wanted to tell visitors about.

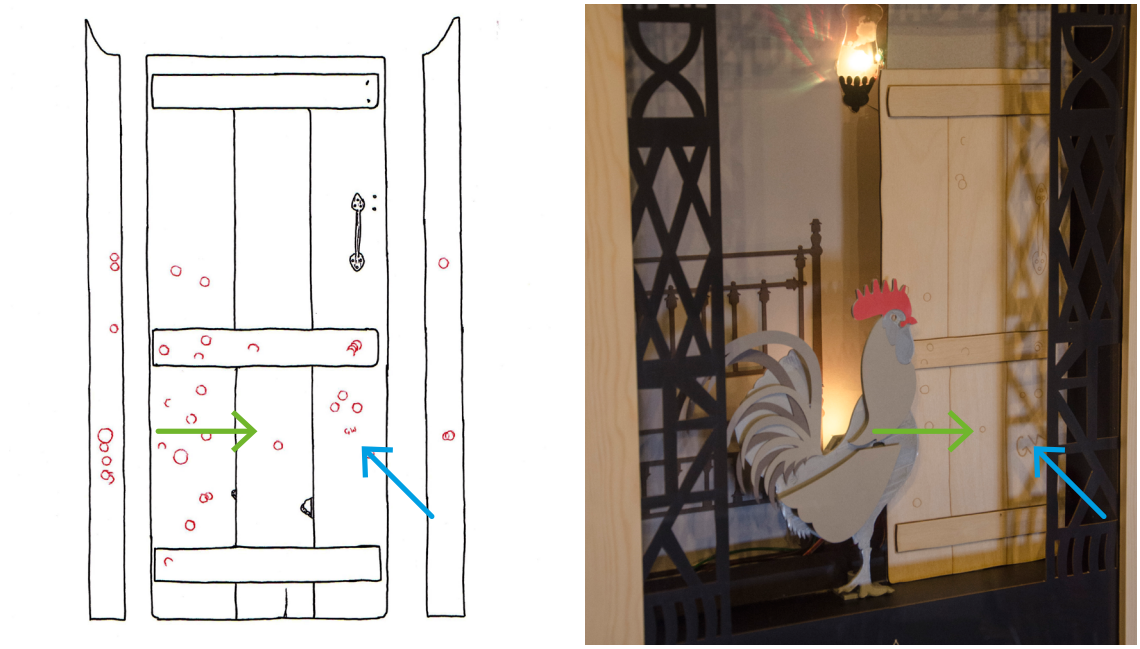

Figure 6–25 Ken's drawing (left). Final tableau for Tom using Ken's drawing as a reference (right). Witches' marks (see green arrow), GW initials carved in the back door (see blue arrow).

Connecting the House with its broader context

The tableaux also drew visitors' attention to meaningful details outside the House. In doing so, I aimed to address the museum's mission of providing visitors with a way to appreciate the history of Sheffield in a broader context. The characters often referred to this wider history and invited visitors to look and reflect. For example, when shown John and Jamie's knife, Joseph spoke about the way cutlery was made in Sheffield during his time: *That is a very nice knife you are showing me, it must be made in Sheffield. Did you know in my days we exported a lot of Sheffield cutlery to America! If you look at the window, you will see a thick cloud of smoke on the other side of town, that's where they produce all the cutlery and steelwork […].*

6.3.2 Bringing domesticity back in the House

Sensory properties of home

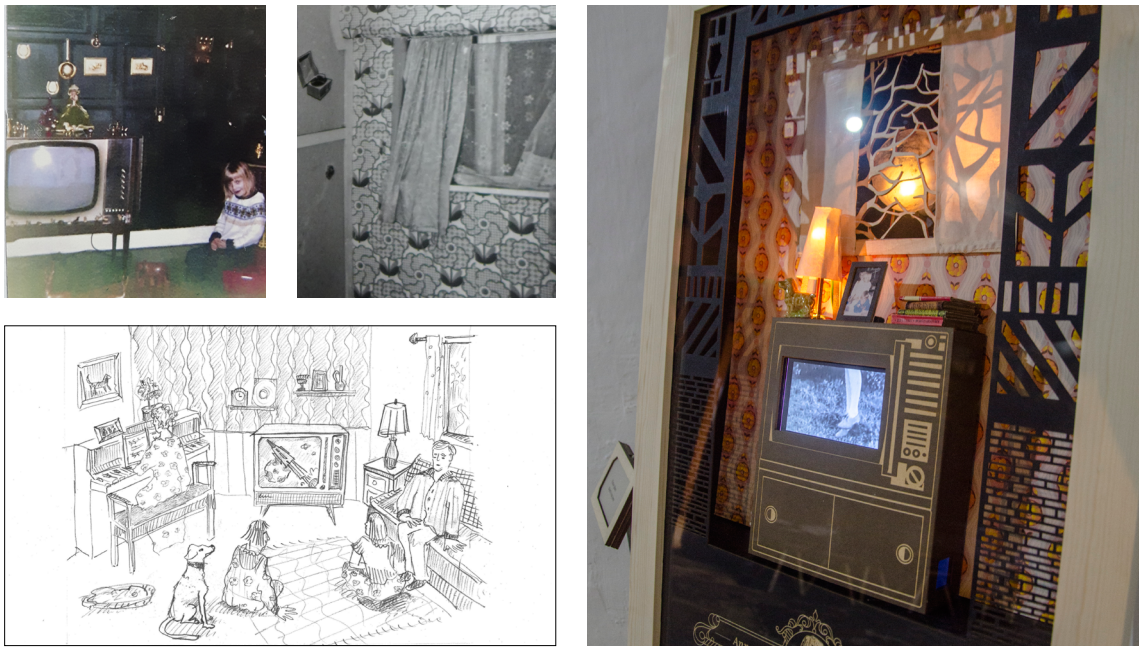

Figure 6–26 Inspiration from archive images of the House and storyboard that inspired Anne's tableau.

The way the tableaux were designed, as interiors scenes, aimed at bringing back a domestic feel into the House, something that was repeatedly singled out by the volunteers who wanted the House to feel more like a home rather than a museum. To do so, I built on the domestic nature of historic house (DP2) and researched what the interiors at the House might have looked like before it was turned into a museum. I used archives images together with the mood boards and storyboards to inform the design of the interior scenes (figure 6-26).

Those were useful in reminding me of the sensory qualities of home (see 5.1.1 and 6.2.1) e.g. the changes of light throughout the day and the crackling fire, which would have been significant for lighting the rooms at the House whilst keeping people warm; the floral smells and various noises from inside e.g. creaking floorboards at night, and also the sound of the surroundings e.g. the cockerel and train in the distant valley. All of these sensory features informed the final design: the light became an important element with colours and behaviour changing (e.g. pulsating or still) depending on characters' reactions. I used the light as a means to intensify the ambiance and feeling portrayed by the characters. Other sensory elements that I used to augment the experience were lavender smell re-

leased at Mistress Mary's tableau, audio-visual content played at Anne's station and an automated cockerel was featured in Tom's set.

Encouraging active exploration

As described in 6.3.1, the tableaux drew visitors' attention to significant details in and out the House: Joseph invited visitors to look through the window, which featured the smoke of the factories as it was in Joseph's time (figure 6-27). While characters referred to the wider context of the House, they also pushed visitors to look around the place. For example, when talking about her inspiration for the embroidery, Mary pointed visitors to floral ornaments: *Did you see the flower ornaments? Look up in the Parlour of Bishops' House! Two beautiful flowers are part of the decorative plaster [...].*



Figure 6–27 Detail of Joseph's tableau with the factory and smoke in the backdrop window.

When content was exhausted, the tableaux played noises such as fire crackling, cutlery clinking, and snoring. While those made the tableaux evocative of a domestic space, they also told visitors that characters were gone and, in some cases, encouraged them to come back another time. Joseph asked visitors to come back later as it was time for his nap, and then started snoring. Anne would reward visitors when they came back by playing them her favourite song and then, her TV would play video noise (figure 6-28, 4). In doing so, I intended to design for extended interaction whilst encouraging an active exploration of the place.

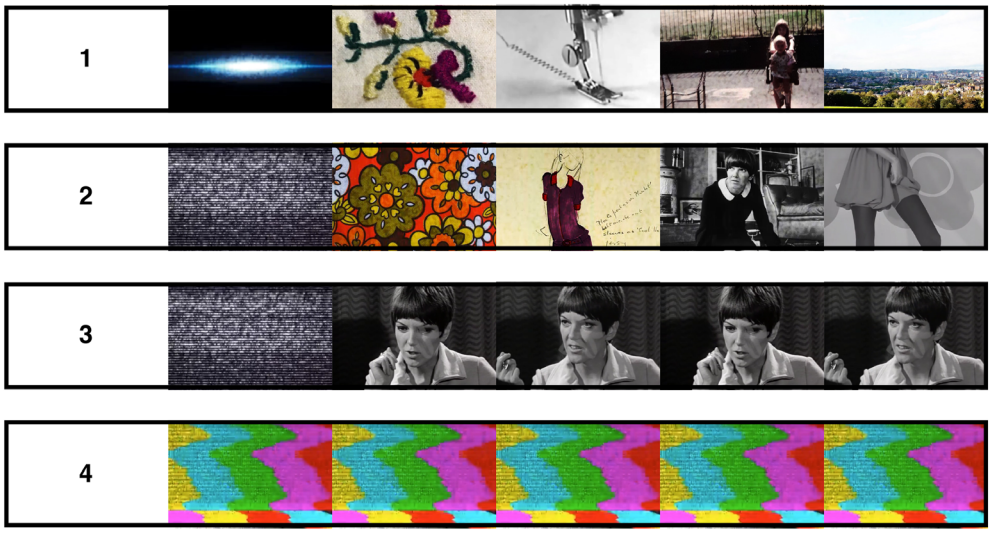

Figure 6–28 Storyboard showing content played by the TV in Anne's tableau.

6.3.3 Crafting a conversation in and with the Bishops' House

Bringing characters to life

Key to the co-creation process was to build on the role volunteers have in weaving the story together for visitors by mixing fact, speculation and anecdotes. In order to tell stories about, for and by people (DP3), I was inspired by the 24 hours' project (described in 4.1.3). I used role play activities during the co-creation session for volunteers to step in the shoes of their imagined characters at the House. Those were then materialised through design and became the inhabitants of the tableaux. Initially, I included the silhouette of the character in each tableau but removed it so the miniature sets were presented as if someone has just stepped out. Characters were absent from the scene and came to life when activated by the object (figure 6-29).



Figure 6–29 Mary's tableau prototype (left) final design (right)

From individual to an ensemble

Developing the content for the tableaux was less straight forward than for Containers of Stories. Rather than being displayed as individual and autonomous stations, the Interactive Tableaux were designed as an ensemble where the characters relied on each other. After a few iterations, I took into consideration the potential for repeated visits: I re-thought characters' discourse not in isolation but as a conversation and in relation to other characters. This development can be seen with the table in Appendix 6-F, which shows the difference of content between one prototype and the final tableau.

I developed the content generated by the volunteers to give visitors the illusion of a conversation: characters referred to each other to invite visitors to show their object to other characters at their respective tableaux and to get different perspectives and reactions. When visitors showed Mistress Mary her embroidery, for example, she told them about her skills first, then mentioned Anne, the character from the Sixties: *[…] Go and see Anne, at another station and show her the embroidery. I bet she won't believe you when you'll say it's made by hand! Don't forget to come back later! I have more to tell you!*. The 1960s character acknowledged Mary's talent for embroidery,

then provoked visitors by mentioning the modern way of doing things: *Woow! That's a beautiful flower! I really cannot believe it was made by hand. Why would you spend so much time embroidering when you can use a sewing machine? […].*

The objects acted as prompts for conversation and presented characters with themes (e.g. fashion) that would resonate with their era or personal story. When faced with Mary's embroidery, Anne shared her personal taste in fashion, which she displayed on her TV set before referring to her favourite designer Mary Quant (see final script in Appendix 6-G). Content progressed from general to specific: the more time people came back, the more they learned or got to know the character. The third time the embroidery was shown to Anne, a clip of an interview with Mary Quant played on her TV (figure 6-28, 3).

Prompting visitors' curiosity

Like the volunteers, the characters were inquisitive and encouraged visitors' curiosity by inviting them to consider the object they held in their hands. They would first attempt to identify it by prompting visitors directly: *What do you have here? That's my old shoe last!* (Tom when shown the shoe last), *Oh! Is that heavy?* (Mary when shown the train token), *Wow is that embroidered flowers?* (Tom when shown the embroidery). Open-ended questions aimed to make visitors think from their own perspective e.g. "What about you?". When in some cases characters would not know much about an object, they would direct visitors to the right character or person to encourage further interaction: *I wish I could have time to learn about history! If you go see Anne, one of the characters from the 20th century, she will tell you about the Tudors, she said she was learning it at school! Lucky her!* (John & Jamie, when shown the embroidery). In this case, the flower featured on Mary's embroidery prompted John and Jamie to talk about Tudor roses – an iconic symbol resonating with their time period (17th century). For more information, they sent visitors to Anne, the character from the 1970s who has studied the Tudors at school.

Other characters would also direct visitors to volunteers for more explanation: *I think you should ask one of the 21st century people in this house, they know more than I do about shoes!* (Mary, when shown the shoe last).

Provoking visitors' thoughts

As described with the concept of the Interactive Tableaux, characters would be more familiar with some objects than others. Objects from the future could scare them, such as Anne's magazine featuring an astronaut on the front cover: *So how is this book made? I am very confused! I don't know what it is and it frightens me! Please take it away from me!* (Mary); *Ahh! This frightens me! Are you not scared? A suit of armour with no face! Is it some sort of witchcraft?* (Tom). Other characters would joke about it: *That newspaper is The Sunday Times! Ah! That's what posh people read… I'd like to go to the moon and have a cheese sandwich! And why not meet the man who lives up there! Sorry, I am not taking this very seriously, but it has been a long day at the farm […]* (Joseph, when shown the magazine).

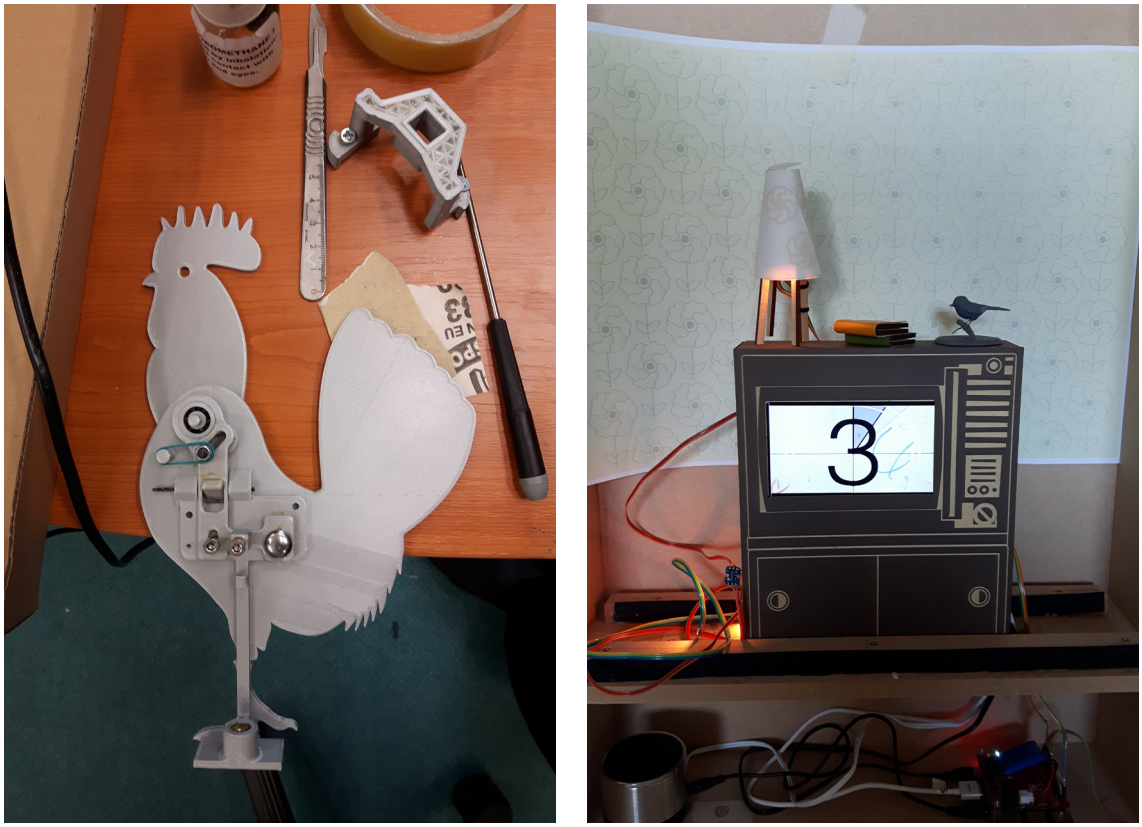

Figure 6–30 Moving parts and audio-visual content integrated in the tableaux.

6.3.4 Creating an aesthetic experience with technology-enhanced design

Embedded technology

As described in 4.1.4, technology can create barriers for visitors to engage with the actual place and hinder social interaction. I addressed museums' concerns (see 4.1) by using embedded technology to design for seamless experience of technology (DP4). I worked in collaboration with Dr Mark Marshall (Cultural Communication and Computing Research Institute, Sheffield Hallam University), who brought his technical and programming expertise in implementing interaction concepts. The technology[3] was simple to use yet robust: as part of the co-creation process; it was important for volunteers to be able to manage and use the installation independently. The five tableaux were each composed of one raspberry pi, a speaker and an NFC reader. Three of them featured additional parts: an extra servo motor to control an on/off switch that allowed us to activate a chicken automata (Tom) and to release smell (Mary). For Anne, a small screen was embedded in a miniature TV set to display audio-visual materials (figure 6-30).

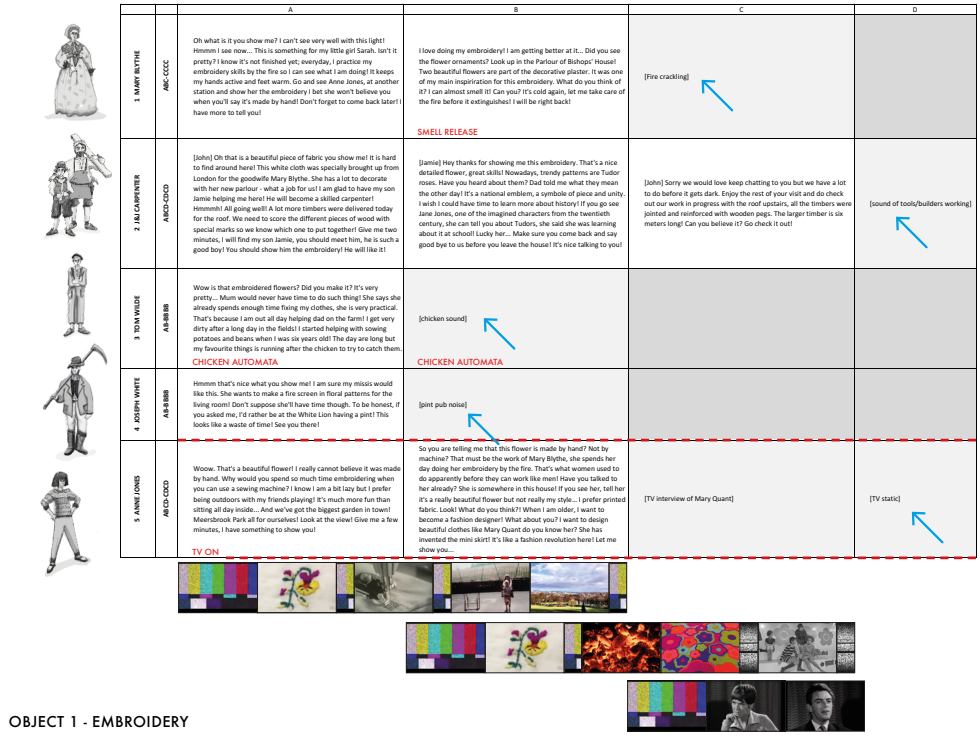

Figure 6–31 All snipets of content for the embroidery, one of 5 objects that triggered characters' reactions.

3 For the tableaux, we adapted the meSch technology.
See more here www.mesch-project.eu [website last accessed 1st September 2018].

Developing technology to serve the design

Key to the interaction concept was to allow people coming back several times to one tableau to trigger additional content. For this, two options were implemented: when a character finished his/her sequence of storytelling, (1) only the last sound was played over and over again. For example, after playing snippets A, B, C, D, only D was repeated; (2) two snippets were alternated – first playing all snippets A, B, C, D once, and then, alternatively only B and D (see second column, figure 6-30). With this strategy, the intention was to subtly invite visitors to move to another station, which was also facilitated by using sensory prompts (e.g. light and noises, see blue arrow figure 6-31). At the end of their visit, visitors were invited to hand in their object to be “checked out” so others could start a new session using the same object. The check-out station allowed us to keep track of the interaction logs for the evaluation (see Implementation, chapter 7).

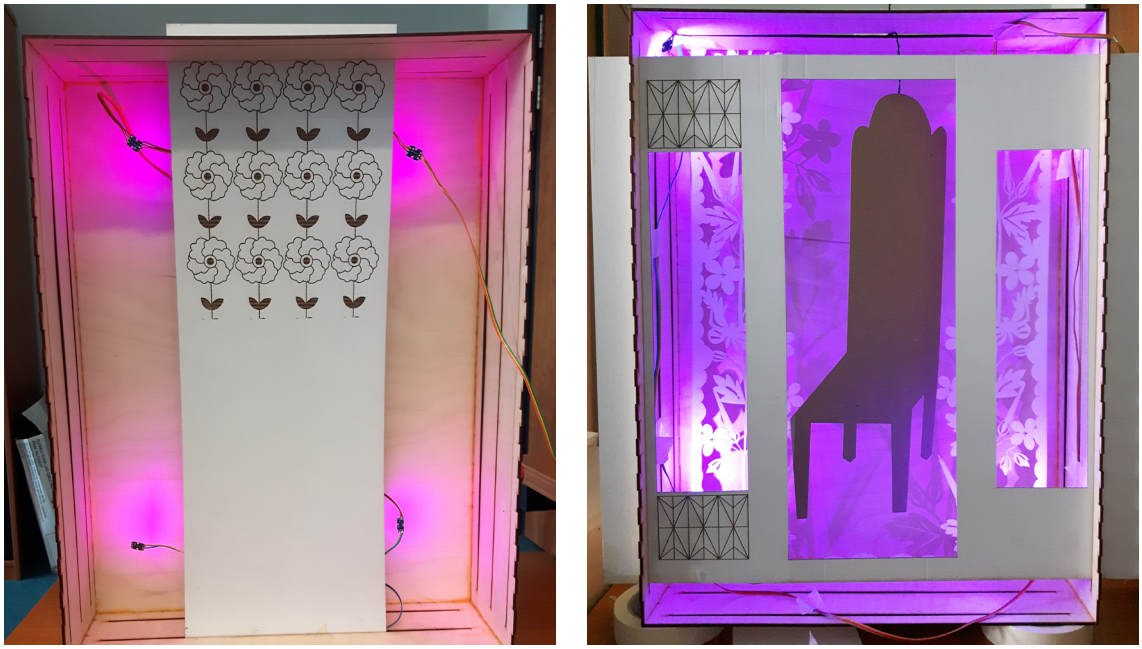

Figure 6–32 NFC tags triggering LEDs lights. Different colours were activated depending on characters’ reaction.

Iterative design

Reliability was important as the tableaux had to work for over two months at the museum without technical support. We started by prototyping one single tableau to test the main interaction: NFC tags triggering light and content (figure

6-32). We evaluated if there was any potential issue and fixed it through iteration, which allowed us to make the system more reliable before designing more parts. Once a tableau was working, we built a second station to test two tableaux together and observed if there were talking back to the check-out. We then built the rest of the tableaux in the studio and connected them to a Wi-Fi network. This allowed us to test the log system as if it was implemented in the museum. We tested them over a few days and once working, the tableaux were deployed in the museum.



Figure 6–33 Objects' tags with NFC tags.



Figure 6–34 Prototyping: placement of the NFC reader.

I designed labels to be tied to the objects within which an NFC tag was inserted (figure 6-33). In this way, the design was consistent so visitors quickly identified, which part was to be placed on the reader. The action of showing the object to a character was suggested by inviting visitors to “place the tag here” on a small stand by the tableaux (figure 6-34). Initially, we envisioned visitors “tapping” the tableaux directly but after prototyping and acting it out, we noticed that this action would damage and potentially, destabilise the tableaux. Thus, the design was refined and a small platform was added next to each tableau, making it clear to visitors what and where the tag should be placed.



Figure 6–35 Take-away message printed when objects are checked out.

Beyond the visit

A small thermal printer was initially part of the system for generating a take-away message when objects were checked out (figure 6-35). The messages were printed from the perspective of the characters and changed depending on which object was checked out. The aim was to engage people beyond their visit e.g. by sharing a poem (Mary, embroidery), a song (Anne, magazine) or advising

them to go check a location in the city (Joseph, token). While the printer worked as a prototype in the studio, once installed, we faced communication issues so we decided not to include it.

Summary and reflection

In the Development phase, I addressed RQ2 by including a larger group of volunteers in co-creation and over a longer period of time. It was important to integrate volunteers' contributions throughout; firstly, by collectively assessing ideas (6.1), then through generative design methods (6.2), and finally, when prototyping the tableaux (6.3). Like with Containers of Stories, museums' concerns were addressed through design; by means of translating DPs into practice (RQ1). By using them as guidelines, the design built on the properties of historic houses to enhance the visiting experience: by *maintaining within the spirit of the house* (DP1), I emphasised significant details that were meaningful to volunteers, by *building on the domestic nature of history houses* (DP2), I brought back domesticity in the Bishops' House, by *telling stories about, for and by people* (DP3), I crafted a conversation in and with the place, and by *designing for seamless experience of technology* (DP4), I created an aesthetic experience that was bespoke to the House. In the next chapter, I report on the evaluation of the Interactive Tableaux to show how they revealed the temporality of the Bishops' House (RQ3, RQ4).

7 Implementation Phase: Engaging with tangible interaction

In this chapter, I report on the evaluation of the Interactive Tableaux exhibited during *Curious House* (2017). In section 7.1, I describe the exhibition setting (see Appendix 7-A for photographs of the show) and use the framework for tangible interaction (reviewed in 2.3) to reflect on how the tableaux brought the House to life while increasing audience engagement. Then, section 7.2 reports on findings from thematic analysis of visitors' questionnaires to show how the visiting experience was augmented through tangible interaction. Finally, in section 7.3, I reflect on the value of co-creating an interactive experience at the Bishops' House by showing how it strengthened the community while fulfilling the goals of the museum.



Figure 7-1 Flyer for the *Curious House* Exhibition (2017) © Caroline Claisse.

7.1 Bringing Bishops' House to life through tangible interaction

7.1.1 Curious House II

With the help of volunteers, I organised a second exhibition at the Bishops' House entitled "Curious House: Meet characters who bring Bishops' House to life" (October 28th – December 10th 2017) (figure 7-1). Five interactive tableaux were installed across the two floors of the House (see photographs in Appendix 7-A) and the digitally-augmented objects were displayed by the reception desk, where volunteers invited visitors to choose an object for their visit. The choice of placing objects by the entrance was informed by the Immersion phase where the reception was identified as a key spot for the visiting experience (figure 7-2). It was a way to build on volunteers' habits of welcoming visitors and introducing them to the House. During the exhibition, the museum was open as usual: on weekends only. Volunteers recorded visitors' numbers for the two-month exhibition: compared with the same period of the previous year, the numbers of visitors doubled from 380 to over 800. Because of the popularity of the tableaux, the House Committee decided to extend the exhibition up to five months.



Figure 7-2 One visitor selecting an object for activating the tableaux in the exhibition.

During the exhibition, I was motivated by my research questions, particularly RQ3 and RQ4, to investigate how tangible interaction can engage visitors with the temporal aspect of the Bishops' House. In the first few weeks, I collected 120 post-visit questionnaires where (1) I asked visitors about their favourite characters, (2) to say if the objects reminded them of anything, (3) to rate and describe their experience, (4) to say if there was anything unexpected, and finally, (5) if they would come back to the House to meet more characters and hear new stories (see details in Appendix 7-B). During the two-month exhibition, I was present every weekend at the House to conduct observations. Feedback was also collected from volunteers who wrote diary entries each time they volunteered during the exhibition. The logs showed 577 unique sessions of visitors' interaction with the tableaux. By using multiple methods and the triangulation of the different data sources, I gained a comprehensive understanding of people's experience at the museum. Figure 7-3 shows how data was analysed, through thematic analysis (Braun & Clarke, 2006). Following, I use the themes (in ***italic bold***) from the framework for tangible interaction (Hornecker & Buur, 2006) to reflect on the way the tableaux increased visitors' engagement.

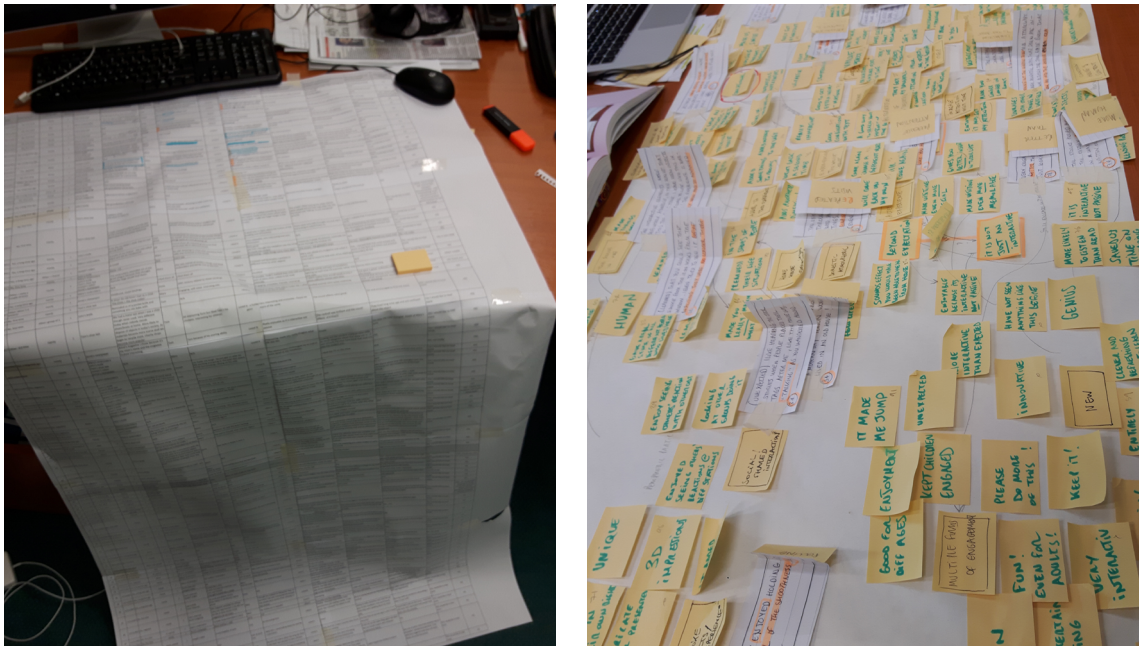

Figure 7-3 Hands-on thematic analysis in progress.

Tangible Interaction to increase visitors' engagement

Visitors seemed to select objects for their tactile qualities and three-dimensional form: for example, enjoying the weight of an object in their hands, or being attracted by its shine. One visitor who picked Tom's shoe last wrote after the visit: *I really enjoyed holding it and the feel of the smoothness as I walked around* (visitor34[1]). Like with the cabinet, ***tangible manipulation*** engaged visitors through touch, which increased closeness with heritage by means of personal engagement. Insights from the questionnaires showed that visitors liked objects because they were evocative of personal memories. For example, many who chose the embroidery said it reminded them of their hobbies, while others recalled childhood memories of learning such craft at school or seeing others practising it: *Actually, of my mother – she was called Mary and did do needle work* (visitor36); *My mum, this is something she sat doing when I was younger* (visitor55). A few visitors who selected the magazine remembered the moon landing: *The 1960s! It made us think of where we were when the moon landing happened* (visitor109).

The interaction logs showed that an object was most used at its corresponding tableau, that is to say the object belonging to one character (e.g. Mary's embroidery) was the most used at the tableau of its owner (e.g. Mary's Tableau). This is interesting because I believe it shows the importance to design for ***expressive representation***, which refers to the interrelation of physical and digital elements (see details in 2.2). This was achieved with the tableau where the characters, their objects and the stories they told were purposefully created as intertwined. As such, they augmented one another: I *really liked exploring and discovering the stories. The way the characters relate their experiences of the objects to their respective time periods is fascinating* (visitor31).

With the tableau, visitors engaged in an experience that was not limited to a single room but unfolded throughout the whole House. In contrast to Containers of Stories (see section 5.2.2), ***spatial interaction*** was increased as movement

1 Numbers in brackets identify different respondents

in space was encouraged: visitors came back to the tableaux several times and also, went up and down the stairs to select additional objects. According to volunteers, visitors spent much more time in the House than average. Some stayed up to one hour and many visitors came back another day to try a different object; often bringing friends and family with them. Also, the interaction logs showed that 2/3 of visitors interacted with 4 (31%) or 5 (38%) tableaux and 5% of visitors listened to all available snippets of content for their chosen object. This clearly indicates an active attitude of making the most of the visit.



Figure 7-4 One visitor activating Tom's tableau a second time, making the cockerel move.

When visitors exhausted all characters' reactions, content repeated whether by alternating two snippets of content or by playing the same snippet over and over again (see details in 6.3.4). For example, when showing the embroidery to Mary a third time, visitors would only hear the noise of fire crackling, which suggested to move on to another character. Children were the sources of repeated activation of noises: I observed how in many cases they presented Joseph with the same object many times to hear the sound of the train over and over again, or how they kept activating the moving cockerel in Tom's tableau, which generated a

lot of laughter and excitement (figure 7-4). The log data confirms this observation with visitors triggering the cockerel up to 14 consecutive times in one visit. Those features were described as *hidden twists* (visitor74), which were highly enjoyed by visitors: *I enjoyed seeing people's reactions in different times to other objects* (visitor39). This shows the advantage to design for embodied facilitation where some parts were kept hidden to arouse curiosity and reward extended engagement (see literature, 2.3). But also, the advantage to design for multiple access points and visibility as by seeing others interacting with the tableaux, I observed how visitors who at first did not want to engage with the installation, changed their mind: they came back to the reception and selected an object to experience the tableaux by themselves.

7.2 Augmenting the experience of the Bishops' House museum

Here, findings from evaluation with visitors are organised according to the 4 design principles (DPs, see in *italics*), which were instrumentals in the Development phase (see 6.3). I show that by using them as guidelines, I incorporated the embodied, sensory, social and aesthetic qualities of the place into the design. In doing so, I went beyond designing an experience that fitted in the environment of historic houses, I used design to enhance the museum experience and to broaden existing strategies for interpretation in house museums.

7.2.1 DP1: Maintaining the spirit of the House to increase the physical presence of "being there"

For the tableaux, I found inspiration in the way exhibition designers use scenography to create theatrical experience. I took a creative approach to popular forms of display in house museums (e.g. period rooms) and designed miniature interior scenes (see 6.3.1). The tableaux were designed to encourage a feeling of immersion, which one visitor described as: *Great as it is very interactive and makes you feel like you are really there* (visitor11); *Really immersive*

it was lovely that they [the characters] revealed the histories of the house (visitor34). I used theatrical techniques (e.g. light, layers), which drew visitors in: *so much delightful detail that drew me in – it was actually the Jane Eyre book that took me into the modern era* (visitor47) (figure 7-5).



Figure 7-5 Detail of Anne's tableaux with TV set and books.

I built on previous research that stressed the need of designing for emplaced interaction (Ciolfi, 2015). As a result, I focused on drawing meaningful connections to the actual place and its broader context (see 6.3.1). The physical design together with the digital content succeeded in drawing visitors' attention to significant details in the miniature sets and around the House: *[I learned] that you could see the smoke from the iron works from the window. I even tried to see it before realising it was no longer there* (visitor32); *[I learned] the use of marks to discourage witches* (visitor102); *I liked John and Jamie talking about witches and superstition* (visitor90); [I liked Anne] *she told us to look out for things – roses* (visitor97). Those were initially described by volunteers as meaningful features that became part of characters' stories. As intended in 6.3.1, through interacting with the characters, visitors also engaged with the broader context of the House:

Sheffield's steel industry. Everyday life through ages (visitor111); *A good way to learn about the history of the building and Sheffield history* (visitor35); *I enjoyed the linkages with other things going on in Sheffield at the time* (visitor60).

7.2.2 DP2: Building on the domestic nature of historic houses to encourage exploration and dynamic trajectories

As described previously (see 6.1), I aimed to bring back a feeling of home into the museum. This was achieved through design, by using sensory means (see 6.3.2) to enhance visitors' experience: *The smells, movements and sounds coming together from the interactive – Super* (visitor32); *Wonderful, unexpected, especially the lavender smell. Made the rooms seem more lived in* (visitor33). *Multisensory design encouraged their imagination; I was able to imagine the rooms with other people living in* (visitor33); *Interesting, made you really imagine what life was like* (visitor46); *Like a look into the past* (visitor82). According to visitors, the tableaux brought the House to life, which created an authentic experience: *very life-like* (visitor69); *Just gave a great, authentic atmosphere to the house* (visitor42).

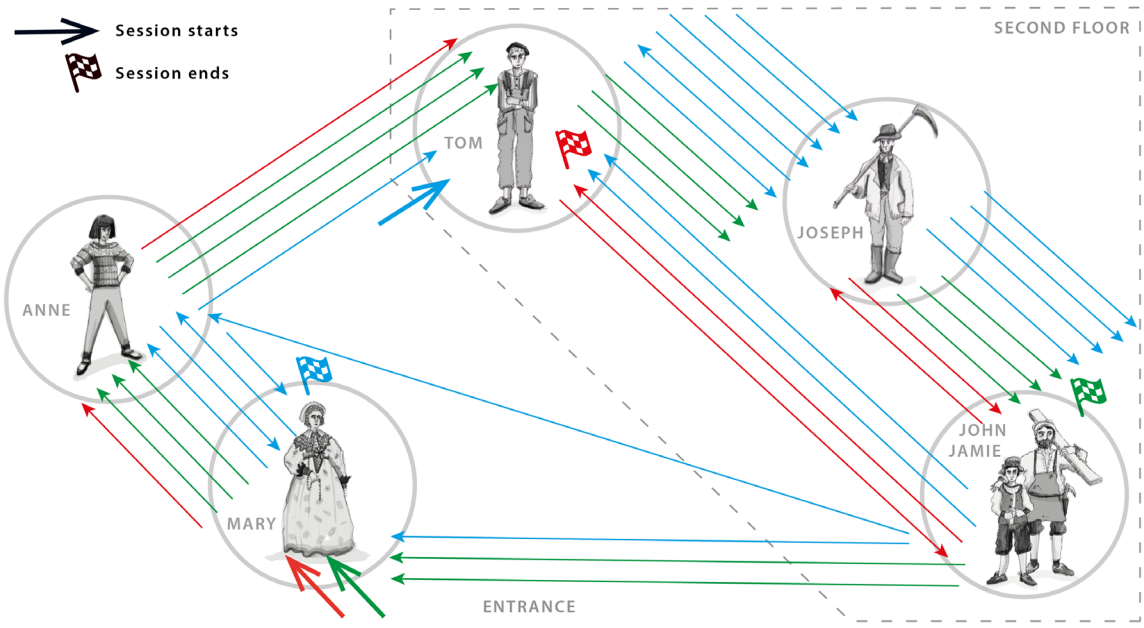

Figure 7-6 Paths taken by 3 objects that consumed all content.

By building on the domestic nature of historic houses, as if visiting someone's home, the installation challenged linear visiting experiences and encouraged spatial interaction. Figure 7-6 illustrates how articulated the movements in the house were in the case of three sessions: one group of visitors with the magazine (see red arrow e.g. Mary>Anne>Tom>J&J>Joseph>J&J>Tom) first completed Mary and Anne downstairs before moving on to Tom who sent them on a mission to find out what the magazine was about: […] *Please come back with something to reassure me so I don't have nightmares tonight!* They then went to the Bedchamber to see John & Jamie who told them a bit more before sending them off, asking them to come back later. The magazine was then taken into the next room to Joseph, who joked about the cover before falling asleep. They listened to Joseph snoring twice, then went back to John & Jamie first, to listen to the rest of what they had to say and, finally, back to Tom who was reassured by seeing them again. In summary, these visitors followed the suggestions of the characters to move on and come back, and were rewarded by carefully prepared acknowledgements of their actions. In some cases, the tableaux pushed visitors to go up and down the stairs several times and some did it (see blue and green arrows; Figure 7-6).

The questionnaires also confirmed that the visitors who followed the characters' advice enjoyed exploring around the house before coming back for more: *I love how you needed to keep re-visiting them to build up the story* (visitor24); *having to look around the rooms and then go back to the installation once you'd found what they [the characters] were speaking about for more info* (visitor90). Overall, the tableaux succeeded in promoting an active exploration of the Bishops' House where visitors were not forced into any pre-defined paths and were not talked at. Instead, visitors described their experience as *exploring and discovering the stories* (visitor31); *Interesting and revealing! Very intriguing and easy to keep exploring more* (visitor26). They found it engaging because the characters invited them to do things or read things at; indeed, they enjoyed it because *it was interactive not passive* (visitor46).

7.2.3 DP3: Telling stories about, for and by people to give the illusion of a conversation with the House

Stories were imagined by the volunteers and told through the perspective of characters who brought the House to life: *They brought the rooms + history to life* (visitor93); *It adds another dimension to our visit, bringing Bishops' House to life* (visitor5); *The exhibition gives life to the house through the voices of characters who might have lived there in different times* (visitor6). The characters and their discourse were conceived as an ensemble (see 6.3.3), giving the illusion of a conversation: *I like how characters referred to each other* (visitor96). A feeling of conversation was facilitated by the way I used technology: *How the installation knew, which object I had and how often I had visited that portrait – I hope to come again and choose a different objec*t (visitor52); *It did not say the same thing again and again like you usually expect with computer-programmed objects* (visitor92). Overall, both content and technology contributed to an inclusive experience; as if the characters were talking to visitors: *The display is good because it talks to you* (visitor1); *I didn't realise they would speak to you + share different stories each time* (visitor42); *I really liked the way they had conversations together. Felt like you were part of the conversation* (visitor93). Content was progressive from general to more specific, which increased visitors' curiosity and motivation to come back and hear more from the characters: *it was somehow addictive – we wanted to make them talk again and again, and we went around a second time with a second object* (visitor84). Their conversation extended to the whole place: *I liked hearing the other stories when people placed their tags after me, like the house was 'talking' as you wandered around* (visitor34).

Using objects together with the characters fostered the creation of more personal and, in some case, humorous and emotional content reflecting the volunteers' personal interests in the House (as described in 6.2). Visitors liked some characters more than others because they could identify with them: *I liked Anne best because she had a history so close I can relate to it as if it were one of*

my parents talking (visitor74); *Tom because he seemed to like similar things to myself. Anne because it reminded me how things were as I was growing up* (visitor35). Instead of telling the story from a historical and singular perspective, stories were told from the perspectives of ordinary people. Visitors could see the house *through the eyes of the characters* (visitor6); from the views of people who represented different eras and status (middle class, working class). This made it *very life-like* (visitor69) and *more human* (visitor74). Indeed, visitors also enjoyed the characters for their human qualities and temperament: *Mary had a dry sense of humour!* (visitor84); *Tom seemed like a nice Sheffield lad* (visitor27).

Characters were also described as *inquisitive and cheeky* (visitor109); *interesting and accessible* (visitor92); *thought-provoking* (visitor80), with *a range of voices and accents*, which gave visitors *a real sense of all the different people who [might] have lived here* (visitor82). In this way, visitors gained *a broader perspective of life across various centuries* (visitor61). Indeed, using characters from different times simultaneously *demonstrated the total age and use of the house* (visitor102). Visitors were able to *sense generations of people living within these walls* (visitor71). This strategy contrasted with the current interpretation at the Bishops' House. Indeed, the human characteristics embodied by the characters spread to the place; *[the characters] made the house come alive, added personality to the objects on display as well as the spaces within the house* (visitor60). Telling stories about, for and by people encouraged an emotional and personal experience: *Not sure of what I learnt but certainly had an enjoyable + emotional experience. They [the characters] definitely triggered memories and ideas. Really personal interaction* (visitor93).

7.2.4 DP4: Designing for seamless experience of technology to provide visitors with an aesthetic experience

By designing for seamless experience of technology, I designed an experience that was aesthetically engaging and bespoke to the particular setting of the

Bishops' House. Rather than a distraction or barrier to the place, *the technology was invisible. Creating the feeling of history using technology* (visitor108). Iteration contributed to design for reliability (see in 6.3.4), which encouraged a positive experience of technology that was described as *easy and informative* (visitor97); *easy and intriguing* (visitor104). Visitors described *the hidden twists* (visitor74) and innovative aspects of the tableaux: *The interactive elements were definitely a surprise, in the sense that this is the first time I see objects from the past come to life like this in a museum! The experience is something entirely new and so advanced* (visitor59).

An important aspect of my process was the efforts I put towards creating detailed and intricate designs. This was noticed by visitors who described the tableaux in terms of aesthetic experience: *The portraits were works of art in their own right* (visitor71); *They are so exquisitely crafted with an appealing aesthetic* (visitor105). Also, they described the *3D impressions* (visitor96) and how the tableaux *added a lot of texture* (visitor60), adding another dimension to their visit: *I enjoyed it as it added something more to the rooms* (visitor34). The design also contributed to a more special and memorable experience: *Surprising and very impressive! Beautifully made boxes. Made visiting even more special and memorable* (visitor72). And finally, by being visually engaging, the tableaux caught visitors' attention: *My daughter enjoyed them and they got her attention* (visitor55).

As described in 6.3.4, technology was developed to serve the design of an experience; for instance, as a means of encouraging repeated visits and extended engagement with a place: *it made you linger longer in the rooms* (visitor34). Overall, using technology-enhanced design was seen as a good alternative to traditional display; *Very engaging! I liked it a lot. Much better than reading static text and just looking at the objects* (visitor28). It was successful because it encouraged multiple forms of engagement: *More likely to listen than read* (visitor76); *Saved us time on reading every detail on display* (visitor97); *This gave me a better understanding of its history than just reading text panel*s (visitor6).

Finally, visitors' comment clearly expressed the potential for tangible interaction to bring the museum to life: *Nice to have history experiences alive through the voices of other – rather than a dry written description* (visitor7); *I think this type of interaction is necessary for viewers to be interested and drawn into the museum objects* (visitor59).

7.3 The values of co-creating interactive experience

Previously with Containers of Stories, I showed how a small group of volunteers may be included in the process of designing interactive experience for house museums (see 5.2). Tangible interaction together with co-creation proved to be valuable means to channel volunteers' voices through design (see details in 5.3.2). With the Interactive Tableaux, I deepened my investigation by co-creating with a larger group of volunteers and over a longer period time. Here, I address my research questions (RQs 2 & 3) by reflecting on the values of co-creating an interactive experience at the House and observe how it strengthened the community (7.3.1) while fulfilling the goals of the museum (7.3.2).

7.3.1 Strengthening the community of volunteers

In this section, I use feedback from the volunteers and the Head of the Bishops' House Committee (HBHC) to reflect and support my arguments. By using a participatory approach to exhibition design, I included the volunteers in my design process (RQ2), bringing their ideas and expertise together, which in turn strengthened the resilience of the community. This was done through design; by means of generative design and design synthesis, where my role was instrumental. To achieve my aims of including volunteers in the design process, it was important to be flexible and responsive: *What I found really interesting is how volunteers' ideas were determining the format and outcome of the project* (Nick, HBHC). Thus my role in the participatory process was instrumental; *You did this, you made the connections, which brought it to life* (Helen). I made connections

explicit and brought the different ideas together through design synthesis (e.g. creation of storyboards, see 6.2). As a result, participants' contribution and insights that were meaningful to the community were integrated into the design research outcome. This was noticed by the volunteers who identified how the tableaux reflected their personal interests: *they [the volunteers] can really see the contributions they have made in the end result* (Nick, HBHC); *The fictional characters created reflected what the individual members of our group were interested in* (Pete).

Participation in the design process had to be carefully considered: V*olunteers have different needs, interests, ambitions. Some are happy to have little involvement* (Nick, HBHC). I addressed this by inviting volunteers to participate in different ways (e.g. focus group, co-creation workshops): *Especially with your project you went in great pain to make sure that the volunteers had opportunities to contribute* (Nick, HBHC). This was appreciated by volunteers who described the way they felt closely and carefully included in the process: *It's lovely the way you [the designer] have involved the volunteers, used our ideas and made us part of it* (Marta); *I don't think you could have been more inclusive. I think it was extremely inclusive* (Nick, HBHC).

As previously with Containers of Stories (see 5.3.2), taking part in co-creation impacted volunteers' practices by pushing them towards more creative and curatorial roles: *The lasting impact it had on me was a greater insight into the lives of the people who lived there* (Pete); *It has changed how I see the house… It helped me and others make sense of the house* (Helen). By using co-creation, I included volunteers in the process and made them think more deeply about their experience – in ways that could not have been possible through more traditional means (e.g. interviews): *I am sure that most volunteers would not have gone through those thoughts process or would not have considered those issues so deeply otherwise* (Nick, HBHC). Volunteers also felt empowered because they had a direct impact on the visiting experience: I*t has been great in that respect,*

to help the volunteers feel they are making a difference (Nick, HBHC). *Facebook posts and newsletters are easily forgettable but the trick of getting us to be involved in creating something was inspirational* (Helen). According to Nick, (HBHC), the volunteers felt a great sense of pride and involvement in the project, which enabled them to shape visitor experience more directly and subtly than they can during the usual interactions with visitors. Also this process facilitated volunteers' understanding and reflection on the potential of tangible interaction for places like Bishops' House: *One of the thing that you have enabled people to think about is the potential for technology […] I think seeing your displays has really helped people access some of the thoughts about that* (Nick, HBHC).

Overall, inclusion and empowerment through design contributed to strengthen the resilience of the community. It provided the volunteers with a new focus; *It gave us something new to focus on. Stopped us getting stale and gave us new things to talk about with the visitors* (Eileen). It also attracted new members while reinvigorating the community: *A few volunteers who have been around quite a while and who perhaps don't volunteer as much as they used to; got quite invigorated and interested with it* (Liz). Indeed, the Committee reflected on the values of co-creating an interaction: *Involving the volunteers in the project, making people feel part of it and owning part of it, is I think, a really good way of retaining volunteers as well.*

7.3.2 Tangible interaction to fulfil the goals of the museum

In section 7.3.1, I addressed RQ2 by discussing the the values of co-creating interactive experience from the volunteers' perspective. Here, I show how using tangible interaction fulfilled the museum's aspiration (identified in section 6.1.1) by encouraging relevance, depth and breadth, and repeated visits. These aspects are not mutually exclusive, rather, they should be considered as interdependent.

Relevance

By using digital augmentation, I designed for relevance and created an experience that invited people to identify and empathise with the House. Including volunteers in the process was key to generate content that was more personal and evocative. As a result, not only visitors but the volunteers also engaged with the place on a personal level. During the co-creation workshops, they generated stories that were meaningful to them and with the final installation, they experienced these coming alive through tangible interaction. At the exhibition, personal engagement was also encouraged by tangible aspect of experience e.g. tangible manipulation. This was combined with the characters' stories, which prompted visitors to reminisce about their own memories but also to share collective memories of past events (e.g. moon landing). The tableaux realised the museum's aspirations of engaging people at a deeper level with the House, which fostered personal and emotional connections with the place.

Depth and breadth

With the tableaux, I was motivated by revealing temporal aspect of the place (RQ4). Digital augmentation was used as an overlapping tool to simultaneously provide visitors with different perspectives of the place, taking them back in time. As a result, they were able to meet with the many (imagined) residents of the House and experienced it from multiple perspectives. Indeed, they learned about the place from the eyes of the characters, and to some extent from the perspective of the volunteers. From evaluation, it was clear that visitors engaged with the history of the House and beyond. By using multiple interpretations of a place, I addressed the desire the museum had in presenting the House beyond an individual era, for visitors to become aware of its depth, the many families who lived there; and its breadth, the many connections the House had with its broader context e.g. social history of Sheffield and beyond.

Repeated visits

The interactive system was developed to encourage repeated visits (e.g. by giving the illusion of a conversation, see in 7.2.3). The system delivered a large amount of content, which could be experienced in full by coming back to the stations and using different objects. Findings from the logs and observations at the museum showed that visitors clearly made the most of their visits. They tried different objects to get the full experience, came back several times to each station and in some cases, exhausted all the content. Not only the tableaux encouraged repeated visits during each session (e.g. visitors going back and forth between the stations), they also encouraged visitors to come back to the House over time, to try another object or to bring people who have not yet tried it. Moreover, a large majority of visitors said in the questionnaire that if there were new stories, they would come back to experience more. Alongside fulfilling the museum's wish to see visitors coming back, this points to the potential of tangible interaction to transform visitors' pattern from occasional to frequent visitors, and eventually, to potential volunteers (Holmes, 2003).

8 Conclusions

8.1 Investigating my research questions through practice: Summary of contributions

Central to my doctoral study was for design to lead the process, and for my research questions (RQs) to be investigated through practice – by means of co-creating interactive experiences with museum volunteers at the Bishops' House. To achieve this, I developed my own approach to Research through Design (RtD) and adopted co-creation at the heart of my process (see details in 3.2). In doing so, I aimed to broaden current practice in the fields of exhibition and interaction design. My contributions were three-fold: first, I identified design principles to guide the design of interactive experiences in house museums; then, I demonstrated the ways to include underrepresented actors such as museum volunteers into the exhibition design process, and finally, I co-created interactive experiences of heritage, which demonstrated the potential to design for tangible interaction in the particular setting of historic houses. Next, I reflect on these contributions in more detail in relation to my three research questions.

8.1.1 RQ1: Opportunities for designing interactive experiences in house museums

As described in the literature, house museums as cultural institutions have recognised the potential of digital technology. However, experimentations in exhibition design are still limited, and, early on in my research, I identified a gap between the museums' aspiration and their exhibition practice. Moreover, interviews conducted with museum staff emphasised these museums' concerns about the use of technology in historic houses (see 4.1). With my research, I demonstrated that interactive design could be used to enhance experiences in house museums and create magical encounters with heritage where technology was invisible. This was achieved through design and immersion: by visiting many sites and

volunteering at one such museum, I developed my understanding and sensibility as a designer. Indeed, spending time in context allowed me to absorb what is so peculiar to house museums. As a result, I was able to identify critical points that make historic houses different from other museums. This motivated me to use embedded computing as a means of concealing technology so it did not distract from the actual place but rather, it encouraged an embodied experience that focused on materiality and presence.

My experience in the field led to the generation of four design principles (DPs), which synthesised the distinctiveness of house museums: *Maintaining the spirit of the House* (DP1); *Building on the domestic nature of historic houses* (DP2); *Telling stories about, for and by people* (DP3); *Designing for seamless experience of technology* (DP4). These are key contributions as while the design research outcomes were particular to the context of Bishops' House, I see the principles generated from the Immersion phase as transferrable to other projects, especially for exhibition design in historic houses where designers have limited time to understand the sensitivities of such domestic setting. In this case, I argue that the DPs I propose can be used by other practitioners as a starting point and act as guidance or points of reflection, particularly when wanting to implement technology-enhanced exhibits in house museums. In the context of my research, I used them as "soft guidelines" to inspire my creative process (Hornecker, 2005) and to create interactive experiences that were sensitive to the particular setting of Bishops' House. I found that the DPs allowed me to turn challenges into opportunities for design by building on the sensory properties of house museums in a way that was not restrictive.

With my practice-based enquiry, I contribute to the lack of experimentation in house museums by showing, through design, how practitioners can address museums' concerns about technology. I believe that we need more practice-based examples that focus on the material and sensory aspects of places where technology is seen as distractive and unwelcomed. In this way,

we can work towards changing perceptions about technology and show that it can be envisioned as an opportunity rather than a distraction or disruptive element. This was demonstrated in my case by designing for tangible interaction where embedded technologies allowed me to design for seamless experiences of technology. As a result, I showed how to deploy technology so it can build on the communicative, cognitive and emotional connotations of house museums (Pavoni, 2001). An important aspect of my design was the level of craftsmanship and attention to detail: in my case, designing for tangible interaction shows the possibilities of reconciling both craft and technology, which are often thought of as polar opposite. Indeed, I showed the importance of considering bespoke qualities and craft in interaction, and exhibition design to create an aesthetic experience, one where technology was invisible and did not override the visiting experience, but rather, enhanced it (see findings from evaluation in 7.2).

8.1.2 RQ2: Including volunteers in designing interactive experiences for their museum

By bringing together co-creation and tangible interaction design, I contributed to the field of exhibition design and broadened current practice and I showed ways to include volunteers in the creative process to give them a voice and magnify it in space through digital augmentation. I was motivated by both my personal experience and by literature that documents the lack of inclusive approaches in exhibition design. Key to my research was to let my experience from the field inform my process and yet to remain open to change. Early on, I learned from the field that volunteers were experts of the museum in their own right and key actors for maintaining the house open to the public. I shifted my attention and included them as co-creators in my design process. This was also motivated by the literature (see 4.2) that emphasises the role of volunteers and the need to engage them more actively in looking after their heritage. With my

research, I addressed the existing gap in the state of the art through practice, by reinvigorating the community through co-creation and tangible interaction. At first, I did not realise the impact that the participatory process had on the volunteer community. By involving volunteers as co-creators, I gave them an opportunity to directly contribute to the goals of the museum so they could make a real difference. I now realised the value of researching through design and with people. By seeing the design-in-use at the museum, volunteers saw their ideas coming to life through visitors' interactions. Here I want to emphasise my role as a designer and facilitator that was instrumental for engaging and empowering research participants.

By adopting a participatory approach, I took exhibition design to another level, one that went beyond interpretation of heritage for the public, and towards promoting value and empowerment for the community of volunteers. For me, participatory practice in RtD meant going well beyond the one-off participatory events that often occur in pre-design or generative stages of research. In my case, I was determined to place the volunteers at the heart of my process, as experts of their own experience (Sanders and Stappers, 2008). To achieve this, I considered time, craft and care as key elements in my process. Firstly, co-creation meant that I was responsible for volunteers to feel included from the start to the end of my research process. Then, I adopted a bricolage approach (see 3.3) and crafted my own tools to harvest participants' creativity throughout my research. Finally, I performed design synthesis in a visible manner to make more explicit the in-between steps of co-creation. Insights generated from fieldwork and participatory sessions were synthesised, rearranged and transformed into provisional and inspirational resources for design. Synthesising creative inputs through design (see examples in 5.1 & 6.2) also enabled me to handle participants' inputs, making sure that these were carefully incorporated in my creative process. All considering, time, craft and care was critical for participants to feel valued and acknowledged.

8.1.3 RQ3: Tangible interaction for enhancing the visiting experience

Inspired by literature such as (Dudley, 2010), I focused on material engagement to create powerful experiences of heritage at the Bishops' House. I placed a lot of efforts on designing for tangible encounters with heritage. Materiality and touch played an important role in connecting people on more personal and emotional levels with the place. I see the value of using materiality in exhibition and interactive design as I believe that the more people connect with a place on a personal level, the more they are likely to care about it. The evaluation at the museum showed that visitors empathised with the stories in ways that other media, such as textual interpretations used on their own, do not. They described the interactive experiences as good and necessary means for engagement (see 7.2.4). Insights from both evaluations showed that the interactive experiences provided visitors with an alternative to traditional displays, one that promoted active and multiple forms of engagement whilst encouraging repeated visits. Overall, it demonstrated that tangible interaction is a valuable means for engaging visitors in house museums, particularly with regards to controlling and personalising their visiting experience (see 7.2.3).

I used the Tangible Interaction Framework (Hornecker and Buur, 2006) as a reference for my research. To the best of my knowledge, the framework has not yet been applied to designing for tangible interaction in the context of exhibition design for house museums. I found the framework useful to help me consider, evaluate and reflect upon key parameters that were relevant to designing for historic houses (*tangible manipulation*, *expressive representation*, *spatial interaction* and *embodied facilitation*). The examples reviewed in 2.3 also provided me with a solid ground to explore new forms of storytelling that were relevant to the context of house museums. For example, I used tangible interaction to magnify the voice of volunteers, to explore the temporal aspect of the house and to create the illusion of a conversation in and with the place. I now reflect on how my work added to Hornecker & Buur's framework by highlighting additional considerations when designing for tangible interaction in house museums:

- In relation to the theme of *tangible manipulation,* I think there is a need to consider tangibility in exhibition design beyond physical objects, to encompass qualities that are less tangible and more multisensory (e.g. smell, see development in 6.3).

- Both Containers of Stories and The Interactive Tableaux were informed by the theme of *expressive representation* where digital and physical content were carefully intertwined together. In addition to this, I believe that designers need to draw their attention to how hybrid physical-digital designs are orchestrated as a whole and in relation to a particular place. In my case, this was illustrated with the Interactive Tableaux that were developed as an ensemble and where connections were explicitely made between the design and the actual place (e.g. the characters showing visitors where to look and go).

- By considering the theme of *spatial interaction,* I developed embodied experiences where visitors took on the role of explorers. Here I emphasise an opportunity for thinking about the dynamics of interaction and ways to influence visitors' trajectories to maximise engagement in an exhibition space.

- I believe that designers should experiment more with the theme of *embodied facilitation* to think of exhibition design beyond guiding and easing visitors' interactions, and to explore techniques that lead to more ambiguous and unexpected encounters of heritage. In my case, such exploration led to experiences that were surprising and open-ended, which encouraged different levels of engagement.

As described in section 2.1, exhibition design in house museums is not a case of "one size fits all" (Bugler, 2015), and historic houses present curators with spatial and aesthetic constraints. In my research, I showed that by designing for tangible interaction, house museums can present multiple narratives and showcase their temporality. This contribution is relevant beyond the context of the Bishops' House. For instance, I can imagine a similar use of technology in other historic houses to engage visitors with the many people

who lived in a place across time. Indeed, I argue for the potential of using tangible interaction to create bespoke exhibitions and encourage practitioners to experiment with digital augmentation to present heritage in a less static and linear manner. I believe that this is a new area of research, which offers a good alternative to current practice. So far, house museums have focused on inviting artists to present alternative readings of their space through the creation of an artwork. These are often created from an individual and exhibited as a detached and static piece of work. With tangible interaction and especially digital augmentation, I see the potential to develop a more adaptable and sustainable strategy for exhibition design in house museums. In my case, both the cabinets and the tableaux showed the potential to defreeze interpretation models and to bring the house to life by overlapping interpretation that was meaningful to the community.

The voices of volunteers and the narratives of the place were brought together through designing augmented artefacts that encouraged material dialogue. Designing for tangible interaction helped fulfil the goal of the museum and community under study. The augmented artefacts were designed in terms of relevance, depth and breadth, which succeeded in raising awareness and interest about the museum (see 7.3.2). One immediate impact was the interactive nature of the work exhibited, which significantly increased visitor footfall at the House. This was important as I framed my approach within participatory and co-creative practices, and positioned it at a societal level (Stappers and Sanders, 2012), meaning that together with volunteers, we aspired for a longer-term and more sustainable future. On the short term, the museum felt inspired by the innovative approach to interpretation and redesigned their information panels so they represented the broader history of the House and its multi-layered history. On the longer term, they understood the opportunities of tangible interaction and saw the potential of editable content to encourage repeated visits and bring more people to the museum as well as sustaining volunteers' engagement and active participation at the House.

8.2 Reflections on my practice

8.2.1 Contributions to the RtD community

Through my doctoral study, I built on my interests in exploring new forms of storytelling and facilitating participatory experiences in gallery settings. I reconsidered my own approach in light of researching with people and including them in my design process. RtD fostered my ambition as a practitioner and allowed me to address the limitations previously identified when working as an exhibition designer. This thesis gave me the means to share my discoveries, which I believe broadened the current state of interaction and exhibition design for heritage sites like the Bishops' House.

During the PhD, I substantially developed my own practice and broadened my role as a designer. I believe that an important contribution I made was on a methodological level. In design-led research, I showed the value of using artistic practice early on in the process as a means for opening up the design space. With Curious House (2016), the exhibition and site-specific interventions were valuable beyond engaging visitors with the museum. Inviting the artists in the exhibition process enabled me to gain a new perspective on the house and to see it through an artistic lense. Their artworks acted as a catalyst for inspiration while engaging a conversation in and with the place.

In the methodology chapter, I defined my personal take on RtD and identified the four threads of my research (see 3.2). In doing so, I clarified my process while showing through practice the benefits of considering the four interdependent elements: setting, artefacts, documentation and participation. Next, I reflect on these to highlight challenging aspects and future directions for design practice.

Firstly, in relation to the *setting* of my research, I developed my own practice by adapting methods to conduct research in the field. I found that immersion was a necessary step; by visiting many sites and volunteering at one museum, I developed my understanding and sensibility as a designer. Spending time in the field fulfilled my need as a practitioner to understand through being

and doing. It also impacted my process and informed key decisions in my research (e.g. co-creating with museum volunteers). This raises a challenge for current exhibition practice, which does not allow time for designers to develop such understanding of place and communities. This is critical because without access to the site, building relationships of trust and generating inspirational insights are limited.

Secondly, I experimented with the type of *artefacts* generated from design practice. More specially, by creating design research artefacts (see examples in 5.1 and 6.2), I explored new forms of sense making during co-creation. This informed a new approach to *documentation* in my design process – one more personal and bespoke to the needs of my research. Rather than doing it retrospectively, documenting became an ongoing and necessary action for reflecting and progressing throughout my research. It manifested through making artefacts that represented a trail of thoughts (e.g. the scale model). Documentation became a means to develop my own tools to scaffold my creative process. It helped me perform a process that is usually not shared and practiced implicitly in the head of designers (Kolko, 2010). I see the potential for other practitioners to experiment with design synthesis to find their own way to deal with the messy realities of participatory and creative processes. I also believe that by making the in-between steps of the creative process more visible, designers can show the value of exploration, particularly in exhibition design where exploratory stages have been omitted in favour of production time (see 1.2). Thus, I argue that one way to claim back time for exploration is through the creation of design research artefacts – a type of artefact currently underestimated in RtD (Pierce, 2014).

Finally, through making, I externalised my thoughts and gave forms to ideas so they could be shared and discussed. This was critical to fulfil the *participatory* ethos of my research where I aimed to demonstrate the benefits for more inclusive and dialogical process in exhibition design. I showed that this can happen through design, where co-creators felt empowered through active, explicit and collective sense making of the in-between steps of the process. Key

to this was my role as a designer, which was instrumental in scaffolding such an inclusive and dialogical process. During co-creation, I argue that designers have the responsibility to include participants and incorporate their contributions within their creative process so that the resulting designs reflect the aspiration of participants. To me, this is true co-creation and I believe that my thesis has contributed to show the value of adopting an inclusive approach to exhibition design for creating empowering and rich experiences. Finally, I strongly believe that such experience can be facilitated if designers build on their creative skills and craft practice in order to generate innovative ways for engaging and dealing with the richness of co-creation.

8.2.2 Limitations and future work

My practice-based enquiry was limited to one house museum. By focusing on the Bishops' House, I went in depth and concentrated my efforts to build a strong relationship with one community. With more time and resources and as a follow-up project, I would like to approach other museums to conduct similar research with their staff and volunteers. In this way, I would be able to test the transferability of my approach and assess my design principles in other contexts.

From the beginning of my research, the Bishops' House gave me a lot of freedom with regards to designing and deploying interactive experiences. This might not always be the case and, for future work, it would be interesting to work with museums who are more reluctant towards the use of technology in their space (see 4.1). In this case, I would expect the work to be more challenging, but with my approach and skills gained in my PhD, I am confident I would be able to address these challenges.

In relation to designing for participation and inclusion, I was concerned with the moment of ending my involvement as a volunteer at the museum after my PhD: how to leave the community after three years of commitment at the museum became an important concern. One way I dealt with this was to contin-



Figure 8-1 Opening of my PhD exhibition at Sheffield Institute of Arts.

ue volunteering after the Implementation phase and once my research ended, I organised an exhibition about my PhD where I invited the volunteers to celebrate and reflect on the work conducted at the Bishops' House (figures 8-1, 8-2). However, I still feel unsure on how to best follow-up with communities in a post-design phase. Moreover, in real world practice, I am aware that time and budget constraints do not encourage longitudinal studies and post-design follow-ups. In the future, I would be interested in conducting participatory work across different timescales, particularly for assessing to what extent co-creation can be deployed, and to investigate what are the best ways to step away from a community once the funding or project has ended, also to ensure the legacy of the work.

Finally, findings from my research showed the potential for tangible interaction to sustain audience engagement (both visitors and volunteers) over time with the house. When thinking about the legacy of my work, I would like to plan additional research to see how the community would appropriate the creative methods and interactive installations over time. In fact, this is something they have already done: following from my research, the volunteers have experimented with



Figure 8-2 PhD exhibition at Sheffield Institute of Arts.

creative methods to rethink interpretation at the House and they decided to keep both interactive experiences for longer than planned. Overall, they demonstrated a strong interest in wanting to do more and envisioned different scenarios to keep the cabinets and the tableaux at the museum. It would be interesting to plan a follow-up study to research ways to implement work on a permanent basis, where volunteers would be able to fully appropriate it by changing and uploading new content themselves.

8.2.3 Concluding statement

I started this thesis by outlining three key aspects of my work: storytelling, participation and craft. I would like to conclude by emphasising the third aspect, as I feel that my thesis demonstrated the benefits of a high level of craftmanship in exhibition design practice. While a craft perspective has been brought into other domains of interaction design (e.g. digital jewellery), there is no account of such a trend in exhibition design. I believe that by bringing aspects of craft at the centre of their practice, exhibition designers will be able to overcome muse-

ums' concerns about technology-mediated experiences. More specially, I argue that craft-based approaches will help designers address the spatial and aesthetic challenges of designing for sensitive places like house museums. Properties of craft should not only be limited to the actual exhibits: they should also be incorporated throughout, as a means of crafting meaningful stories and with regard to co-creation. I therefore stress the importance of craft to promote care and value in such participatory process.

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Claisse, C. (2019). Re-Interpreting Historic Interiors to Bring the House to Life. In Graeme Brooker, Kevin Walker, and Harriet Harris (Eds), *Interior Futures*, Crucible Press.

Claisse, C., Petrelli, D., & Dulake, N. (2019). Design synthesis: an act of Research through Design. In *Proceedings of the 2019 Research Through Design Conference*.

Claisse, C., Ciolfi, L., & Petrelli, D., Marshall M., & Dulake, N. (2018). Multisensory Interactive Storytelling to Augment the Visit of a Historical House Museum. In *Proceedings of the 3rd International Congress & Expo Digital Heritage, IEEE*.

Claisse, C., Ciolfi, L., & Petrelli, D. (2017). Containers of Stories: using co-design and digital augmentation to empower the museum community and create novel experiences of heritage at a house museum. *The Design Journal, 20*(sup1), S2906-S2918. https://doi.org/10.1080/14606925.2017.1352801

Claisse, C. (2017). The Augmented House Museum: Co-exploring tangible interaction to increase engagement with heritage in House Museums (Doctoral Consortium). In *Proceedings of the 2017 ACM Conference Companion Publication on Designing Interactive Systems*, 380-381. ACM. https://doi.org/10.1145/3064857.3079162

Claisse, C. (2016). Crafting Tangible Interaction to Prompt Visitors' Engagement in House Museums (Doctoral Consortium). In *Proceedings of the TEI'16: Tenth International Conference on Tangible, Embedded, and Embodied Interaction*, 681-684). ACM.

PhD talks

2018

> Paper presentation at the *Zip-Scene Conference - Analogue and Digital Immersive Environments* (Budapest, Hungary). http://mome.hu/hu/h%C3%ADrek/1704-zip-scene-conference-analogue-and-digital-immersive-environments-call-for-papers

> Paper presentation at the *Digital HERITAGE 2018 Conference* (San Francisco, USA). http://www.digitalheritage2018.org

> PhD presentation, *Impact 2018: C3RI Doctoral Conference*, Sheffield Hallam University (Sheffield, UK). https://blogs.shu.ac.uk/doctoralschool/c3ri-doctoral-conference-impact-2018/?doing_wp_cron=1555261780.0651409626007080078125

> PhD presentation at the Creating Knowledge Conference, Sheffield Hallam University (UK).

2017

> PhD presentation at the Three Minute Thesis Competition.

* Winner of the Three Minute Thesis Competition, Sheffield Hallam University (Sheffield, UK).

> Guest speaker at *Design Informatics seminar*, the School of Design, The University of Edinburgh (Edinburgh, UK).

> Speaker at the *C3RI Lunchtime Seminar*, the Cultural, Communication and Computing Research Institute, Sheffield Hallam University (Sheffield, UK).

> Paper Presentation at *Researching Digital Cultural Heritage - International Conference* (Manchester, UK). https://digitalheritageresearch.wordpress.com

> Poster Presentation at the *Relevance Conference, Historic Royal Palaces, DEMHIST and CECA* (London, UK). https://blog.hrp.org.uk/relevance-conference-2017-trying-hard-enough/

> Doctoral Consortium Presentation at the *Designing Interactive Systems (DIS)* (Edinburgh, UK). https://dis2017.org

> Paper Presentation at the *European Academy of Design (EAD): Design for Next* (Rome, Italy). http://www.designfornext.org

> PhD Presentation at *PhD by Design*. Contributions to the Instant Journal - Idea of “Self” in practice-based research. University of Sheffield (Sheffield, UK). https://www.phdbydesign.com/2017-sheffield-instant-journal

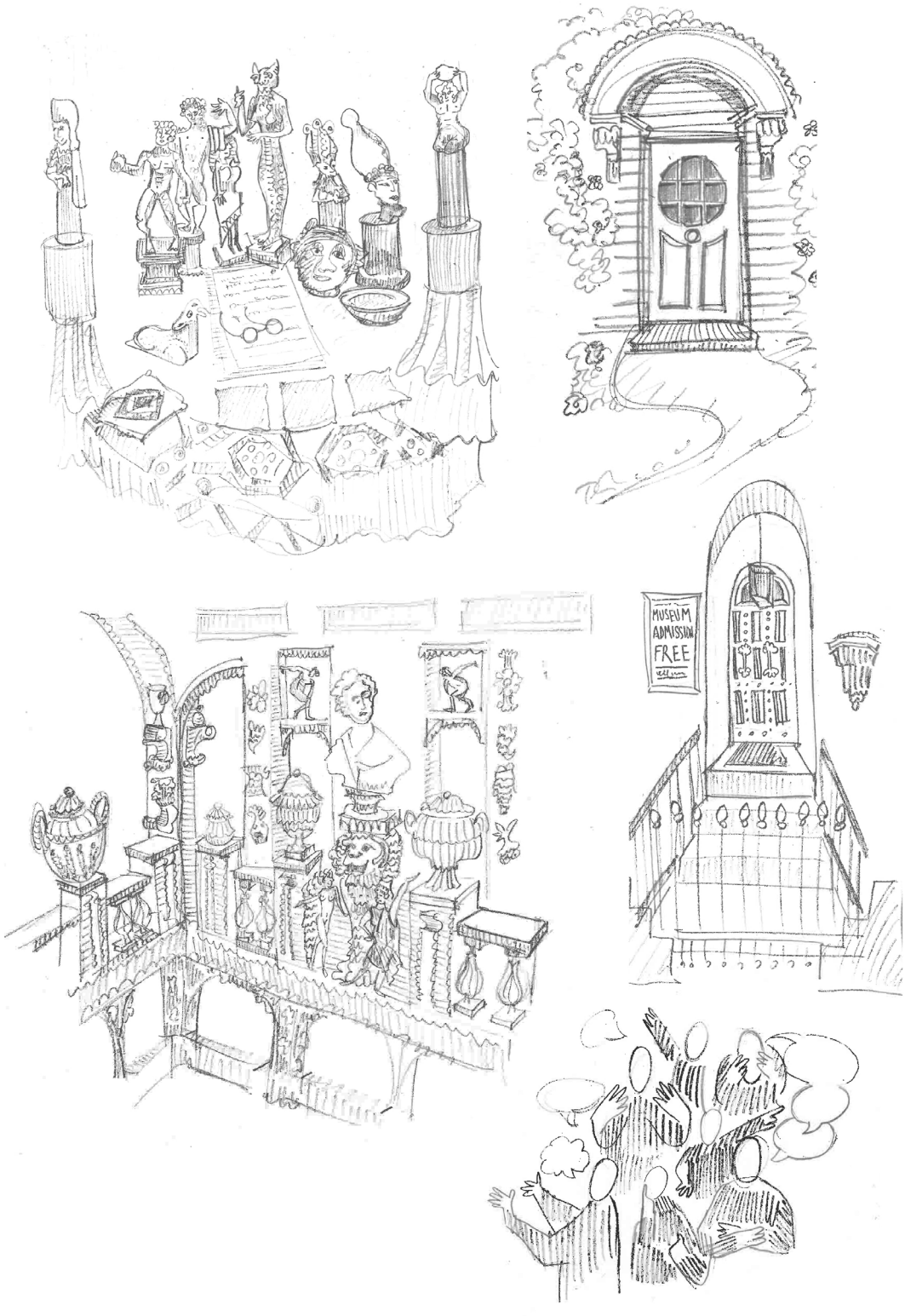
2016

> Doctoral Consortium Presentation at the *Tangible, Embedded, and Embodied Interaction (TEI)* (Eindhoven, Netherlands). http://tei.acm.org/2016/

> PhD presentation at the *Methods Conference*, Sheffield Hallam University (Sheffield, UK).

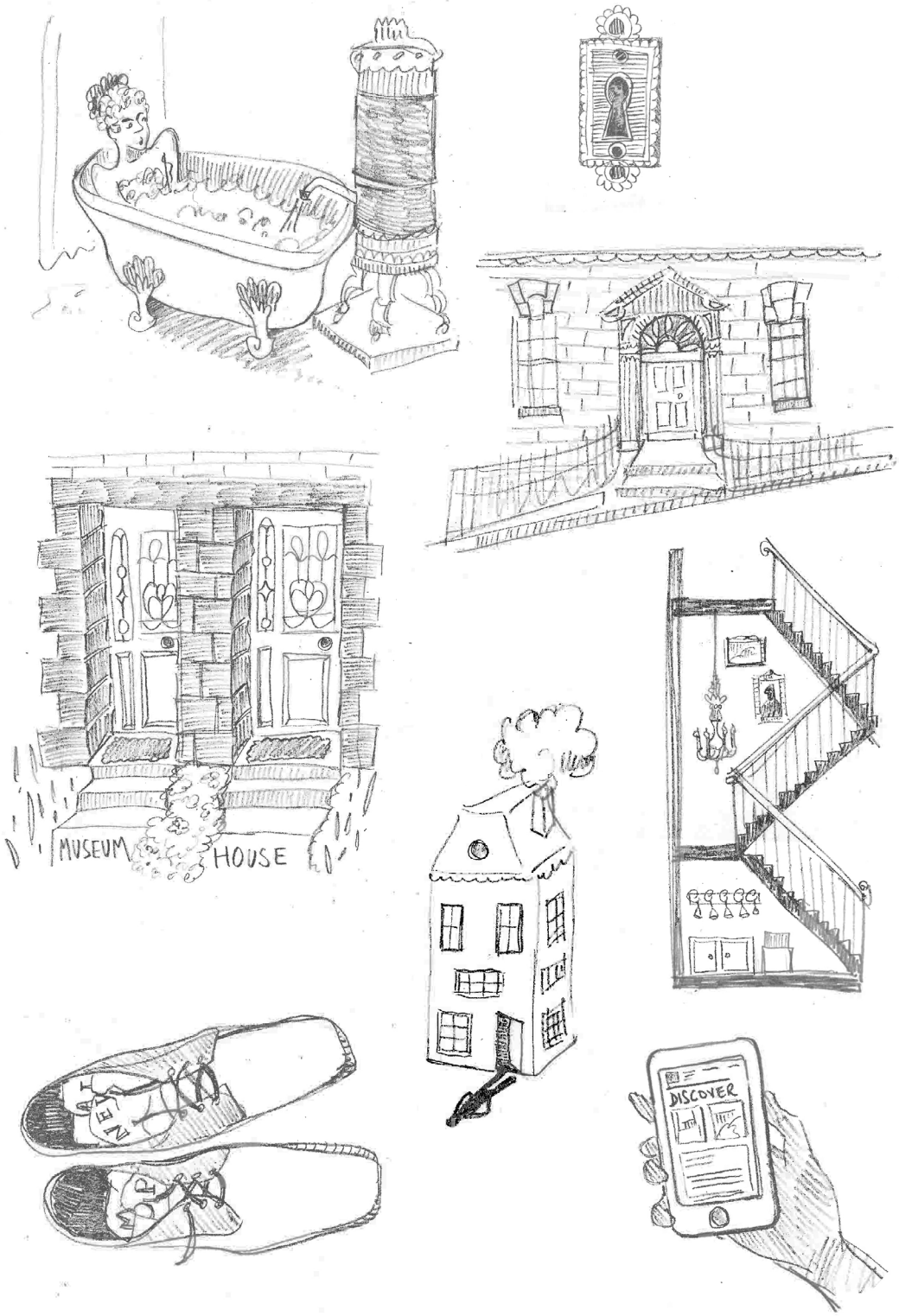
2015

> PhD Presentation at *PhD by Design*. Contributions to the Instant Journal - Researching across difference. Goldsmiths University (London, UK). https://www.phdbydesign.com/2015-goldsmiths-instant-journal



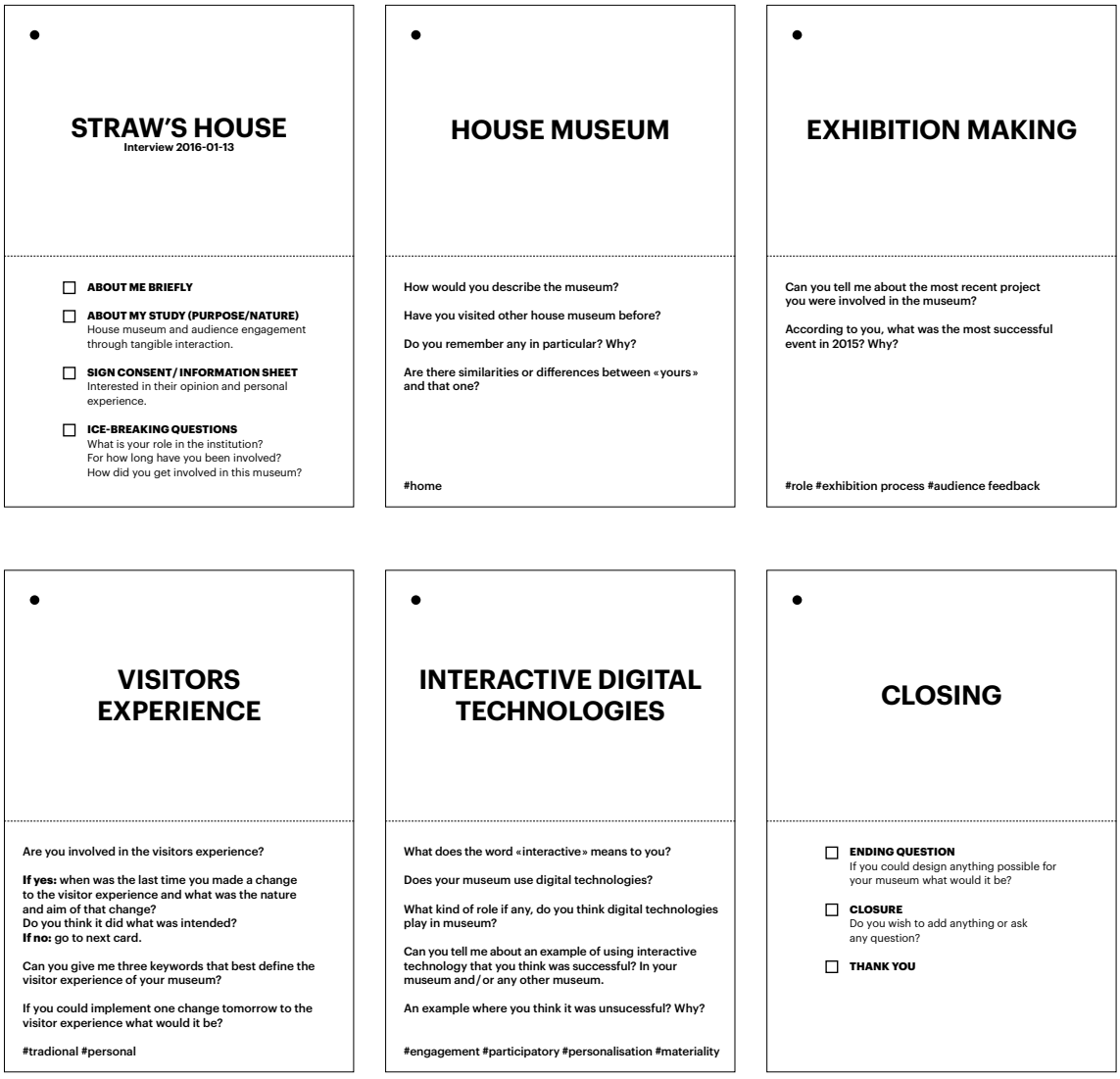
4-A Fieldwork sketchbook

An example of sketches from field visits 1/2.



4-A Fieldwork sketchbook

An example of sketches from field visits 2/2.



STRAW'S HOUSE
Interview 2016-01-13

- ☐ **ABOUT ME BRIEFLY**
- ☐ **ABOUT MY STUDY (PURPOSE/NATURE)**
  House museum and audience engagement through tangible interaction.
- ☐ **SIGN CONSENT/ INFORMATION SHEET**
  Interested in their opinion and personal experience.
- ☐ **ICE-BREAKING QUESTIONS**
  What is your role in the institution?
  For how long have you been involved?
  How did you get involved in this museum?

HOUSE MUSEUM

How would you describe the museum?

Have you visited other house museum before?

Do you remember any in particular? Why?

Are there similarities or differences between «yours» and that one?

#home

EXHIBITION MAKING

Can you tell me about the most recent project you were involved in the museum?

According to you, what was the most successful event in 2015? Why?

#role #exhibition process #audience feedback

VISITORS EXPERIENCE

Are you involved in the visitors experience?

If yes: when was the last time you made a change to the visitor experience and what was the nature and aim of that change?
Do you think it did what was intended?
If no: go to next card.

Can you give me three keywords that best define the visitor experience of your museum?

If you could implement one change tomorrow to the visitor experience what would it be?

#tradional #personal

INTERACTIVE DIGITAL TECHNOLOGIES

What does the word «interactive» means to you?

Does your museum use digital technologies?

What kind of role if any, do you think digital technologies play in museum?

Can you tell me about an example of using interactive technology that you think was successful? In your museum and/or any other museum.

An example where you think it was unsucessful? Why?

#engagement #participatory #personalisation #materiality

CLOSING

- ☐ **ENDING QUESTION**
  If you could design anything possible for your museum what would it be?
- ☐ **CLOSURE**
  Do you wish to add anything or ask any question?
- ☐ **THANK YOU**

4-B Semi-structured interviews

Interview guide cards.

PARTICIPANT CONSENT FORM

Interview at Mr Straw's House

TO BE COMPLETED BY THE PARTICIPANT *Please answer the following questions by ticking the response that applies*	**YES**	**NO**
I have read the Information Sheet for this study and have had details of the study explained to me.	☐	☐
My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point.	☐	☐
I understand that I am free to withdraw from the study within the time limits outlined in the Information Sheet, without giving a reason for my withdrawal or to decline to answer any particular questions in the study without any consequences to my future treatment by the researcher.	☐	☐
I agree to provide information to the researchers under the conditions of confidentiality set out in the Information Sheet.	☐	☐
I wish to participate in the study under the conditions set out in the Information Sheet.	☐	☐
I consent to the information collected for the purposes of this research study to be used for any other research purposes.	☐	☐
Personal data protection I agree for the researcher to use my real name. I understand that in this case I will be identified as a participant in the research.	☐	☐
OR I agree for the researcher to use a pseudonym when refering to the information I provide. I understand that in this case I won't be identified in the research.	☐	☐

SIGNATURE OF PARTICIPANT

DATE / / _____

SIGNATURE OF RESEARCHER

DATE / / _____

Sheffield Hallam University

The study has been reviewed and received a favourable opinion from Sheffield Hallam University

RESEARCHER Caroline Claisse / Caroline.Claisse@student.shu.ac.uk / 07 547 341886
@carolineclaisse / Sheffield Hallam University C3RI / Art and Design Research Centre
DIRECTOR OF STUDIES Prof. Daniela Petrelli / d.petrelli@shu.ac.uk / 0114 225 6946

4-B Semi-structured interviews

Participant consent form for an interview at Mr Straw's House.

PARTICIPANT INFORMATION SHEET

Interview at Mr Straw's House

WHO IS THE RESEARCH FOR?
My name is Caroline Claisse and I am a PhD student in Art and Design at Sheffield Hallam University (2015-2018). The research study you are invited to participate in is part of my research on: *Crafting tangible interaction to prompt visitors' engagement at House Museums*.

WHAT IS THE RESEARCH ABOUT?
My research looks at audience engagement and storytelling in house museums. House museums are a particular type of heritage site where visitors are immersed in the life of historically notable people or family. I aim to show how digital technology properly designed for the place can promote personal and multi-sensory engagement with the stories of the house museum.

WHY HAVE I BEEN SELECTED?
Taking part in the study is completely voluntary. You have been approached to participate in my research because you are involved in working at Mr Straw's House. If you accept, you will participate in one interview to help me to gain insight about the challenges and opportunities to design interactive exhibit for house museums.

WHAT DO I HAVE TO DO IF I TAKE PART?
To answer a few questions about your experience of working at Mr Straw's House.

WHAT WILL HAPPEN TO THE INFORMATION I PROVIDE?
To assist the transcription process, audio recordings will be made during the interview and a written transcript will be produced. Your answers will be used in the writing of my PhD thesis. Findings will further be written up for internal reports and as papers for publication in academic journals, and for presentation at academic conferences and publication in conference proceedings. If you do not want me to use your name, data will be anonymised (using pseudonyms) and you will not be identified in any report or publication. All research will be carried out with your prior and informed consent (see Participant Consent Form) and all data will be held and processed in accordance with the Data Protection Act (1998). Data will be kept digitally through the data management system of Sheffield Hallam University.

WHY SHOULD I TAKE PART?
Your experience can really help to inspire my work as a designer.

WHAT TO DO IF I WANT TO WITHDRAW?
You are free to withdraw from the study at any time without needing to justify your decision and without any negative implications. You can tell me at any point during the interview if you do not wish to continue further, and we will end the interview.

CONCERNS AND COMPLAINTS?
Any concern or complaint about any aspects of the way you have been dealt with during the interview should be addressed; please contact Caroline Claisse (principal researcher) or Professor Daniela Petrelli (Director of Studies), whose details are provided on the back.

4-B Semi-structured interviews

Participant information sheet for an interview at Mr Straw's House.

Visitors' experience of the Bishops' House

- Is this your first visit to the Bishop's House?
  If yes, when was the first time? How often do you come, how many times have you visited?
- Why did you come to the Bishops' House today?
- Did you have expectations?
- How was your experience of visiting the house today?
- What did you like the most and why?
- Do you have any suggestion for improvement, change?
- How would you define your experience in 3 words?

Visitors' experience of house museums

- How does this kind of museum compare to other types of museum?
- Have you visited other house museums before?
  If yes, how does this compare?

4-C Informal conversation with visitors, questions

PARTICIPANT CONSENT FORM

Interview at Bishops' House with staff

TO BE COMPLETED BY THE PARTICIPANT *Please answer the following questions by ticking the response that applies*	**YES**	**NO**
I have read the Information Sheet for this study and have had details of the study explained to me.	☐	☐
My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point.	☐	☐
I understand that I am free to withdraw from the study within the time limits outlined in the Information Sheet, without giving a reason for my withdrawal or to decline to answer any particular questions in the study without any consequences to my future treatment by the researcher.	☐	☐
I agree to provide information to the researchers under the conditions of confidentiality set out in the Information Sheet.	☐	☐
I wish to participate in the study under the conditions set out in the Information Sheet.	☐	☐
I consent to the information collected for the purposes of this research study to be used for any other research purposes.	☐	☐
Personal data protection I agree for the researcher to use my real name. I understand that in this case I will be identified as a participant in the research.	☐	☐
OR I agree for the researcher to use a pseudonym when refering to the information I provide. I understand that in this case I won't be identified in the research.	☐	☐

SIGNATURE OF PARTICIPANT

DATE / / _____

SIGNATURE OF RESEARCHER

DATE / / _____

Sheffield Hallam University

The study has been reviewed and received a favourable opinion from Sheffield Hallam University

RESEARCHER Caroline Claisse / Caroline.Claisse@student.shu.ac.uk / 07 547 341886
@carolineclaisse / Sheffield Hallam University C3RI / Art and Design Research Centre
DIRECTOR OF STUDIES Prof. Daniela Petrelli / d.petrelli@shu.ac.uk / 0114 225 6946

4-D The Creative Package

Participant consent form for museum volunteers.

PARTICIPANT INFORMATION SHEET

Interview at Bishops' House with staff

WHO IS THE RESEARCH FOR?
My name is Caroline Claisse and I am a PhD student in Art and Design at Sheffield Hallam University (2015-2018). The research study you are invited to participate in is part of my research on: *Crafting tangible interaction to prompt visitors' engagement at House Museums*.

WHAT IS THE RESEARCH ABOUT?
My research looks at audience engagement and storytelling in house museums. House museums such as the Bishops' House are a particular type of heritage site where visitors are immersed in the life of historically notable people or family. I aim to show how digital technology properly designed for the place can promote personal and multi-sensory engagement with the stories of the house museum.

WHY HAVE I BEEN SELECTED?
Taking part in the study is completely voluntary. You have been approached to participate in my research because you are involved in looking after the Bishops' House, for example through volunteering, or by your experience and knowledge about the house (e.g. curating, surveying etc.). If you accept, you will participate in one interview and one small hands-on activity. It will help me to gain insight about the challenges and opportunities to design interactive exhibit for a house museum such as the Bishops' House.

WHAT DO I HAVE TO DO IF I TAKE PART?
To discuss your thoughts generated from the 'toolkit package'. The interview will last for approximately 45 minutes and it will help me to identify opportunities and challenge for the design of interactive exhibits at the Bishops' House. The interview will be audio recorded and the materials generated from the 'toolkit package' will be kept for analysis purposes. I would also like to take photos of the material generated from the package. You will not be photographed in any way that would disclose your identity.

WHAT WILL HAPPEN TO THE INFORMATION I PROVIDE?
To assist the transcription process, audio recordings will be made during the interview and a written transcript will be produced. Your answers will be used in the writing of my PhD thesis. Findings will further be written up for internal reports and as papers for publication in academic journals, and for presentation at academic conferences and publication in conference proceedings. If you do not want me to use your name, data will be anonymised (using pseudonyms) and you will not be identified in any report or publication. All research will be carried out with your prior and informed consent (see Participant Consent Form) and all data will be held and processed in accordance with the Data Protection Act (1998). Data will be kept digitally through the data management system of Sheffield Hallam University.

WHY SHOULD I TAKE PART?
The interviews and activity provide an opportunity to think creatively about the space. The Bishops' House will also be the main case study of my research. I believe the museum will greatly benefit from this research, as it will offer innovative design thinking and opportunities. I aim for the research to be published and it will contribute to raise awareness about the place and foster interest from the museum community.

4-D The Creative Package

Participant information sheet for museum volunteers 1/2.

As a volunteer myself at the Bishops' House, I am committed to help with looking after the house monthly for the upcoming year.

WHAT TO DO IF I WANT TO WITHDRAW?
You are free to withdraw from the study at any time without needing to justify your decision and without any negative implications. You can tell me at any point during the interview if you do not wish to continue further, and we will end the interview.

CONCERNS AND COMPLAINTS?
Any concern or complaint about any aspects of the way you have been dealt with during the interview should be addressed; please contact Caroline Claisse (principal researcher) or Professor Daniela Petrelli (Director of Studies), whose details are provided on the back.

The study has been reviewed and received a favourable opinion from Sheffield Hallam University
RESEARCHER Caroline Claisse / Caroline.Claisse@student.shu.ac.uk / 07 547 341886
@carolineclaisse / Sheffield Hallam University C3RI / Art and Design Research Centre
DIRECTOR OF STUDIES Prof. Daniela Petrelli / d.petrelli@shu.ac.uk / 0114 225 6946

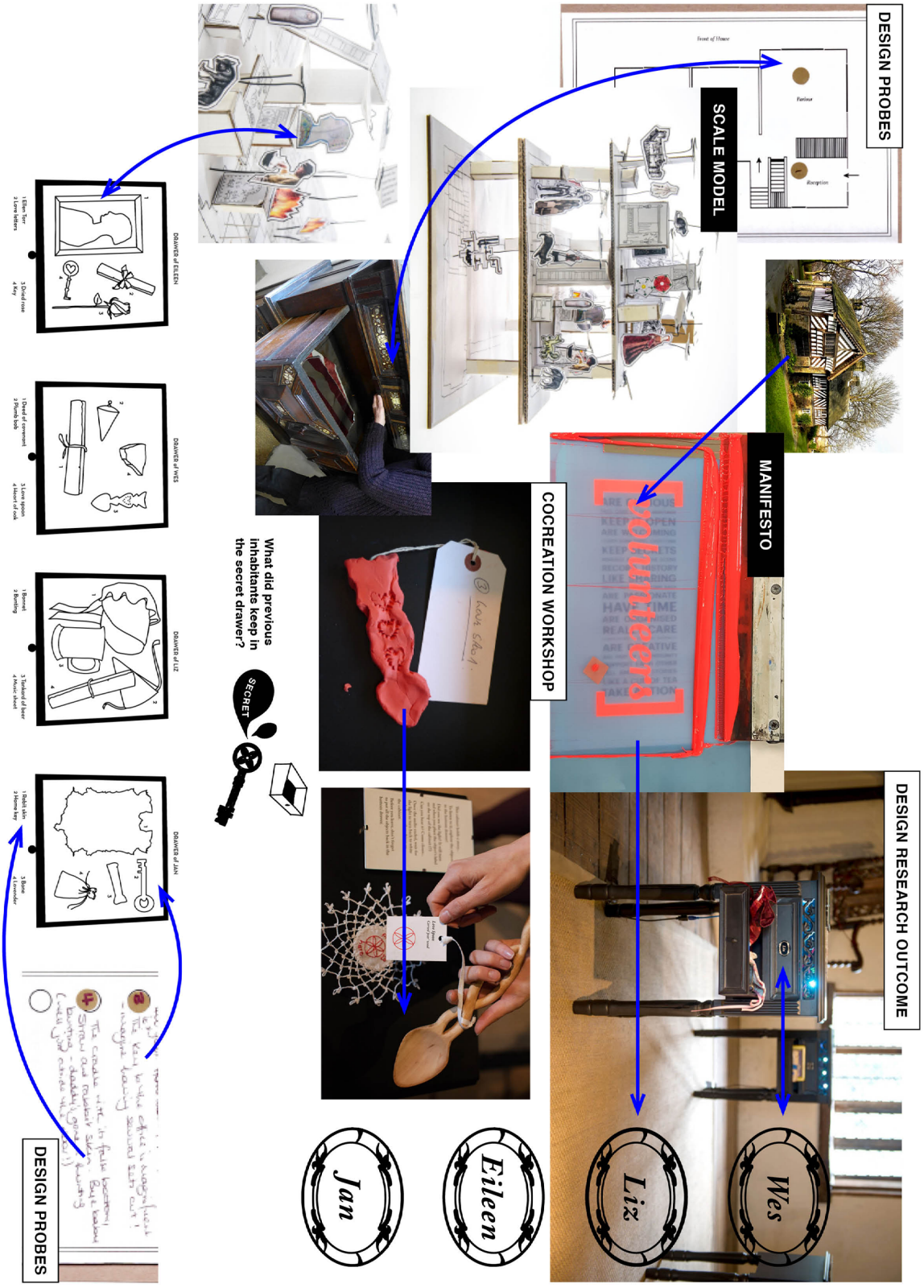
4-D The Creative Package

Participant information sheet for museum volunteers 2/2.

	PROBE NAME	MATERIALS	THEMES	QUESTIONS
1	*Best wishes*	Museum postcard pre-stamped envelop	Motivations for volunteering	*What does volunteering at the museum mean to you?*
2	*House is not a home*	Bespoke house wooden kit	Home	*What makes a house a home?*
3	*My dream exhibition*	Map and personalized sketchbook	Key artefacts Storytelling Visitor experience	*What would your dream exhibition look like?*
4	*House of cards*	Interlocking cards	Skills and assets Complementary	*What are the skills and assets of volunteers?*
5	*Seed wish*	Pack of seeds and hand-drawn labels	Future Growth Hope	*Turn your wishes for the museum into seeds, imagine: what would they blossom into?*
6	*Drawers are a place of secrets*	Drawer's key	Personal belongings Memories Intimacy	*What would the owner keep inside the chest? What would you keep inside?*

4-E The Creative Package

Details about the probes, materials and questions.

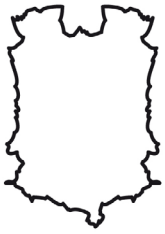


5-A Design synthesis

Examples of connections between design research artefacts and design research outcomes.

Objects in drawer - audio transcript

Bye Baby Bunting



Bye baby bunting, daddy's gone a hunting, gone to catch a rabbit skin to wrap his baby bunting in.

Can you imagine? No babygrows, no nappies – just a rabbit skin – soft, flexible and gentle. Look in the cradles in Bishops House. Can you see the padding of straw? Daddy has brought a rabbit home to keep his baby warm and protect it from the prickly straw beneath.

Old Mother Hubbard



Old Mother Hubbard, went to the cupboard to fetch her poor doggie a bone. But when she got there, the cupboard was bare and so her poor doggie had none.

Can you imagine? The cupboards would only hold what you could grow or make – no cans, no packets. The floors would have no carpets – just threshings from the fields, with maybe some meadowgrass to keep it sweet. And the dog? Well, he would have to snuffle through the straw to see what the diners had dropped!

Wee Willie Winkie



Wee Willie Winkie runs through the town, upstairs and downstairs in his nightgown. Rapping at the windows, crying through the locks – are all your children in their beds – it's past eight o'clock.

Can you imagine carrying a key this size in your pocket? There were no burglar alarms, no security lights. Houses like this depended on big locks and big keys to keep them secure.

Lavender's Blue



Lavender's blue, dilly, dilly, lavender's green
When I am king, dilly, dilly, You shall be queen
Who told you so, dilly, dilly, who told you so? (...)

Can you imagine? No deoderants or air fresheners. If you didn't want to smell the muck of every day life – bearing in mind that you would have a bath maybe once a year – you would need a nosegay – a lavender bag to hold to your nose and keep the smells out.

5-B Containers of Stories

Content for each cabinet, Jan's cabinet.

Objects in drawer - audio transcript



Portrait of Ellen Torr
Here is a portrait of Ellen Torr, just 18 years old. Look at her! She is wearing a beautiful dress but does she look happy? Poor Ellen. The wedding chest had been made especially for her with her name carved on the front. It now stands in the parlour at Bishops' House. Do take a look. In 1671, it stood at the foot of her curtained bed in the chamber she had slept in all her life.



Love Letters
The bottom drawer held letters from Ellen's childhood sweetheart, Thomas Blythe, tied with a blue ribbon and read over and over again. On her eighteenth birthday, Ellen was told she must marry James Wilson, a widower of 40 and a suitable match according to Ellen's father. She wept and threatened to run away but the marriage contract had been sealed. Young Thomas was sent away and Ellen, weeping, burned his letters.



Dried Red Rose
On Ellen's wedding day, her chest was put on a cart and taken to James Wilson's fine house. The secret drawer was empty, except for a single dried red rose.



Drawer's Key
It was just as well, for Ellen's new husband stood before her and eyed her coldly. Clicking his fingers impatiently he held out his hand, 'The key to the chest if you please Madam'. With downcast eyes and shaking hands, Helen surrendered the key. And with it, her youth.

5-B Containers of Stories

Content for each cabinet, Eileen's cabinet.

Objects in drawer – audio transcript



Bonnet
I just got my new red bonnet. I am looking forward to putting it on and joining the mayday fun. Can you hear the music it is starting to play. There is the fiddler and squeeze box, look in the drawer and see the music…



The Mayday Song
[music playing]



Bunting
Everyone has got their house decorated and we made some bunting to hang outside. What do you think of it? We all sat around the fire in the winter to make some new bunting so that our house will be the best decorated in the village.



Tankard
We will go out and watch the maypole dancing, and the may queen being crowned, it is little Elizabeth Shore this year and then, the fun and games will begin. And of course to finish off there will be a lot of eating and drinking. And the singing will go on all night!

5-B Containers of Stories

Content for each cabinet, Liz's cabinet.

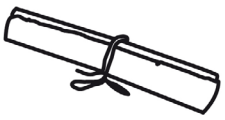
Objects in drawer - audio transcript



Plumb Bob
A good craftsman has good tools that are costly – I made my own tool chest for safety and to be able to carry them, and to store them securely its made out of oak. One of my essential tools, much used in the building of my house is the plum bob – without it nothing would be square.



Heart of Oak
I built my house of good old english oak, loads of it on my farm, readily available, it takes a lot of effort to cut but once felled, cleft and planed into beams the jointing begins. Look at it, hold the oak – it shows its age – can you count the rings – one for every year.



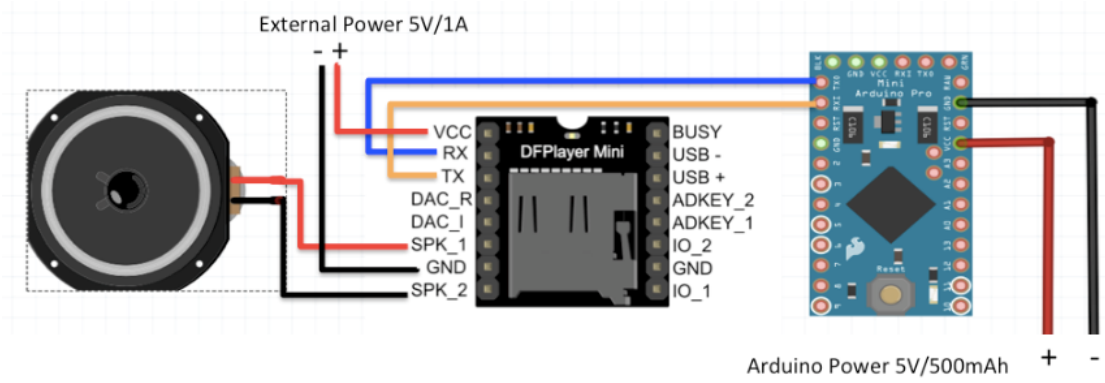
Deed of Covenant
It took a lot of effort and saving to purchase the land but the day arrived when I was presented with my deeds – the proof that I own it. Signed, sealed and delivered to me.

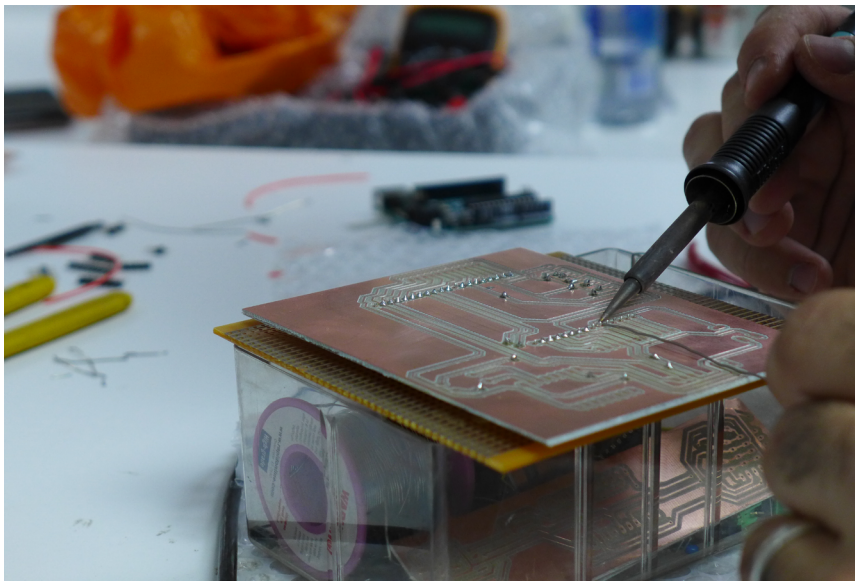


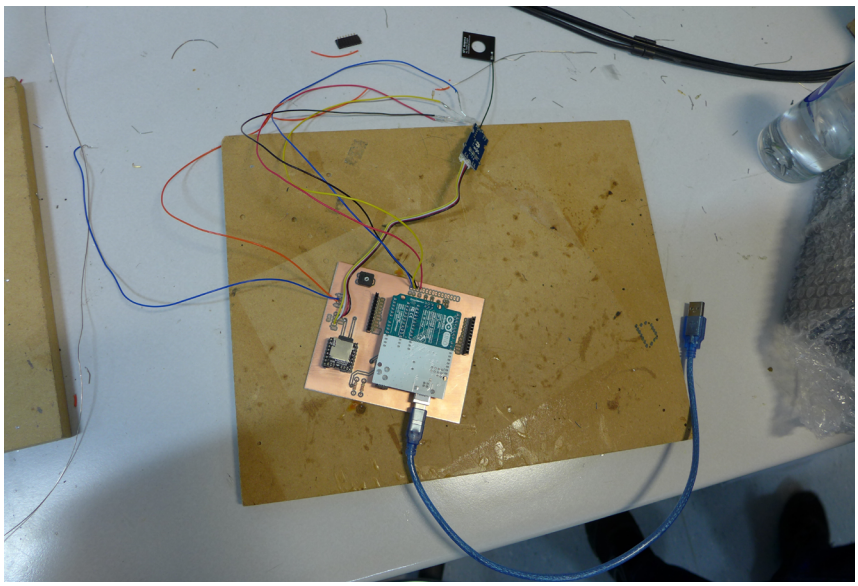
Love Spoon
Well I finished my house but it needs my wife to make it into a home. What better to give my true love, Elizabeth, than a love spoon, crafted by my own hand – a symbol of my love and loyalty, carved from a branch of my pear tree.

5-B Containers of Stories

Content for each cabinet, Wes' cabinet.

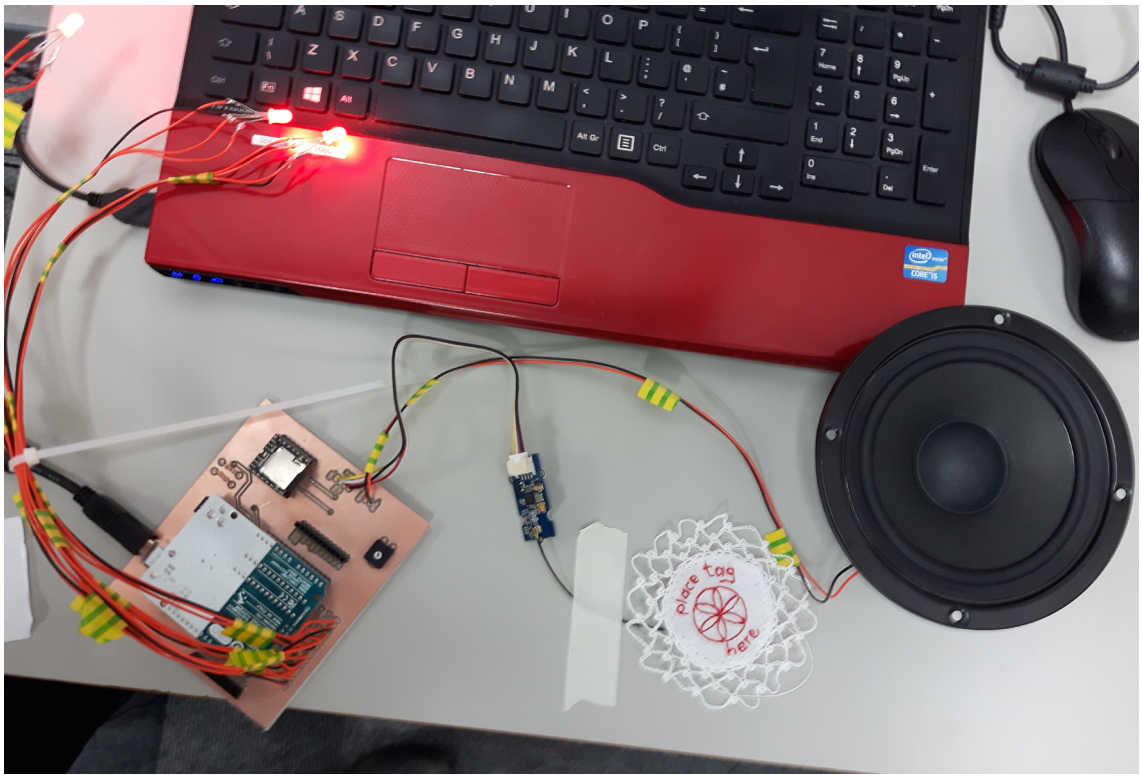


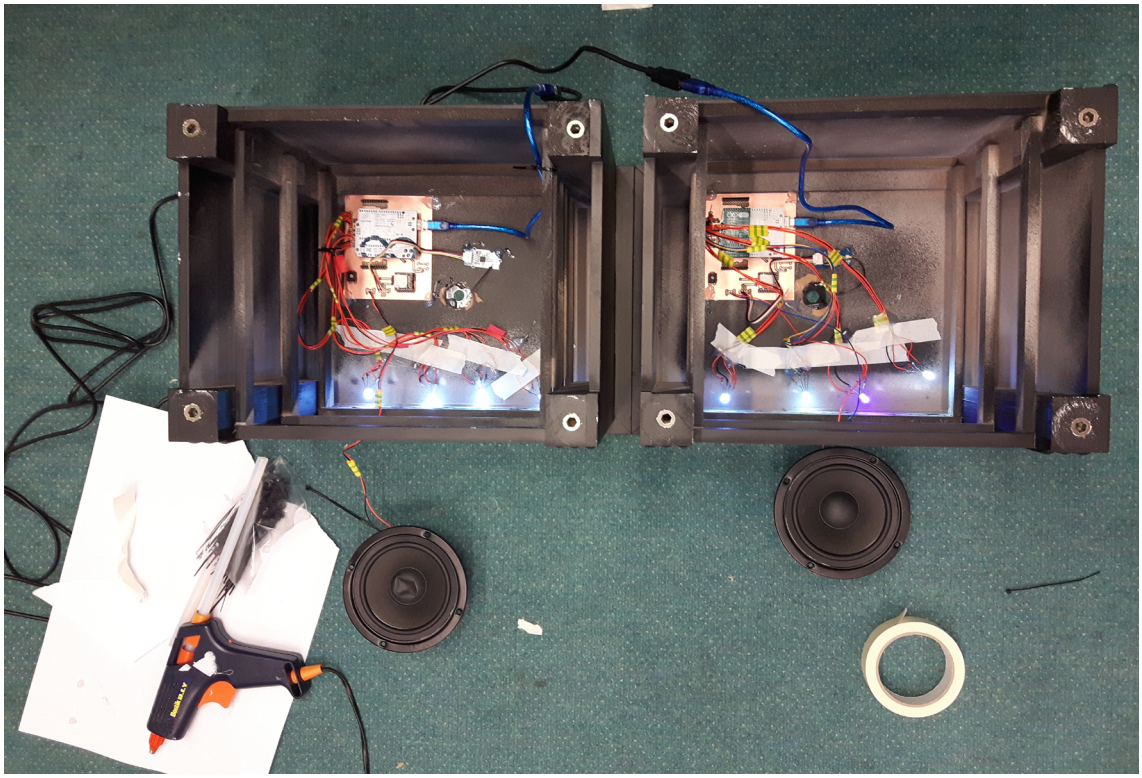




5-C Containers of Stories

Initial Arduino sketch and prototyping.



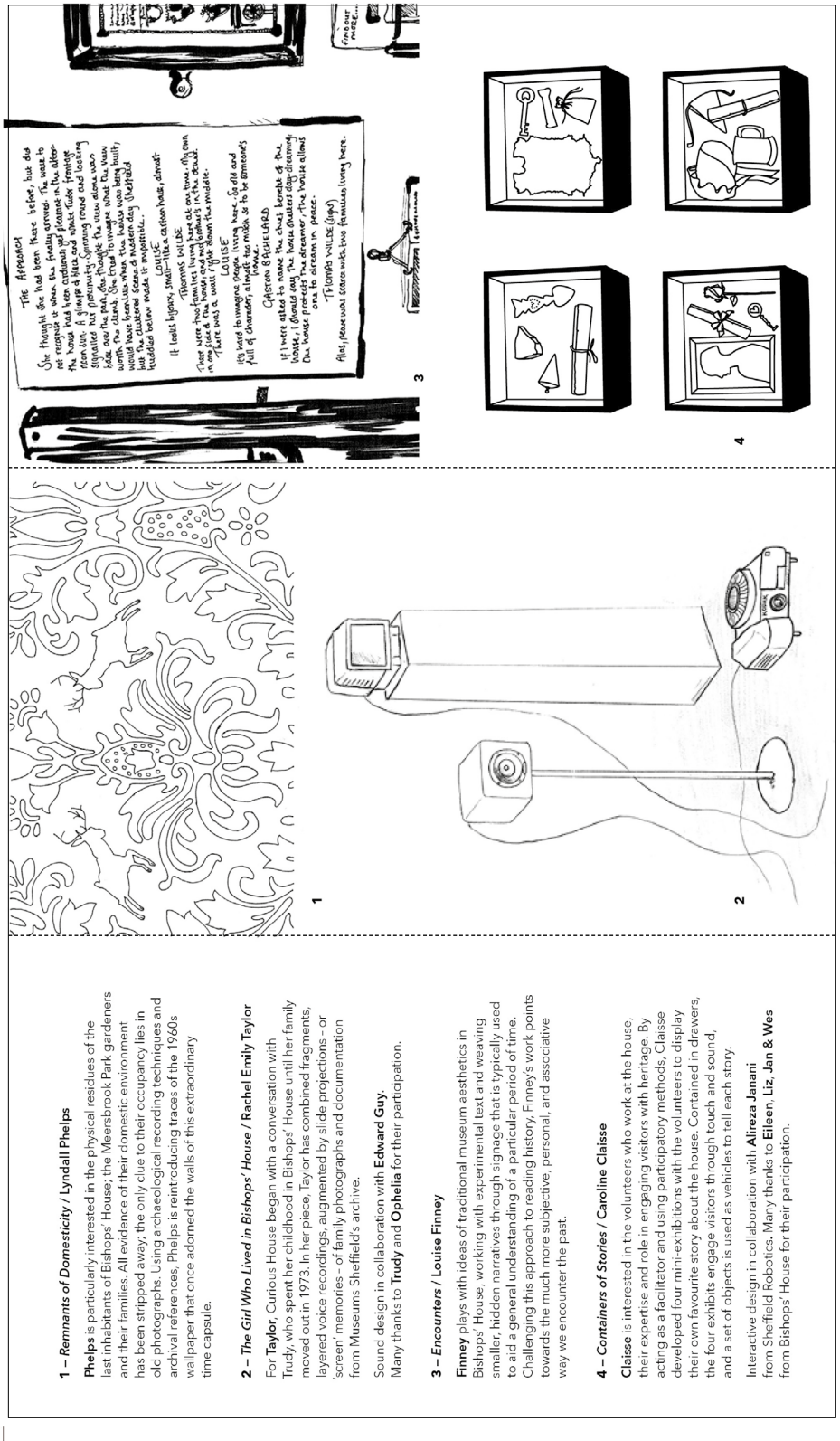


5-C Containers of Stories

Testing the NFC reader and hiding the technology in the cabinet.

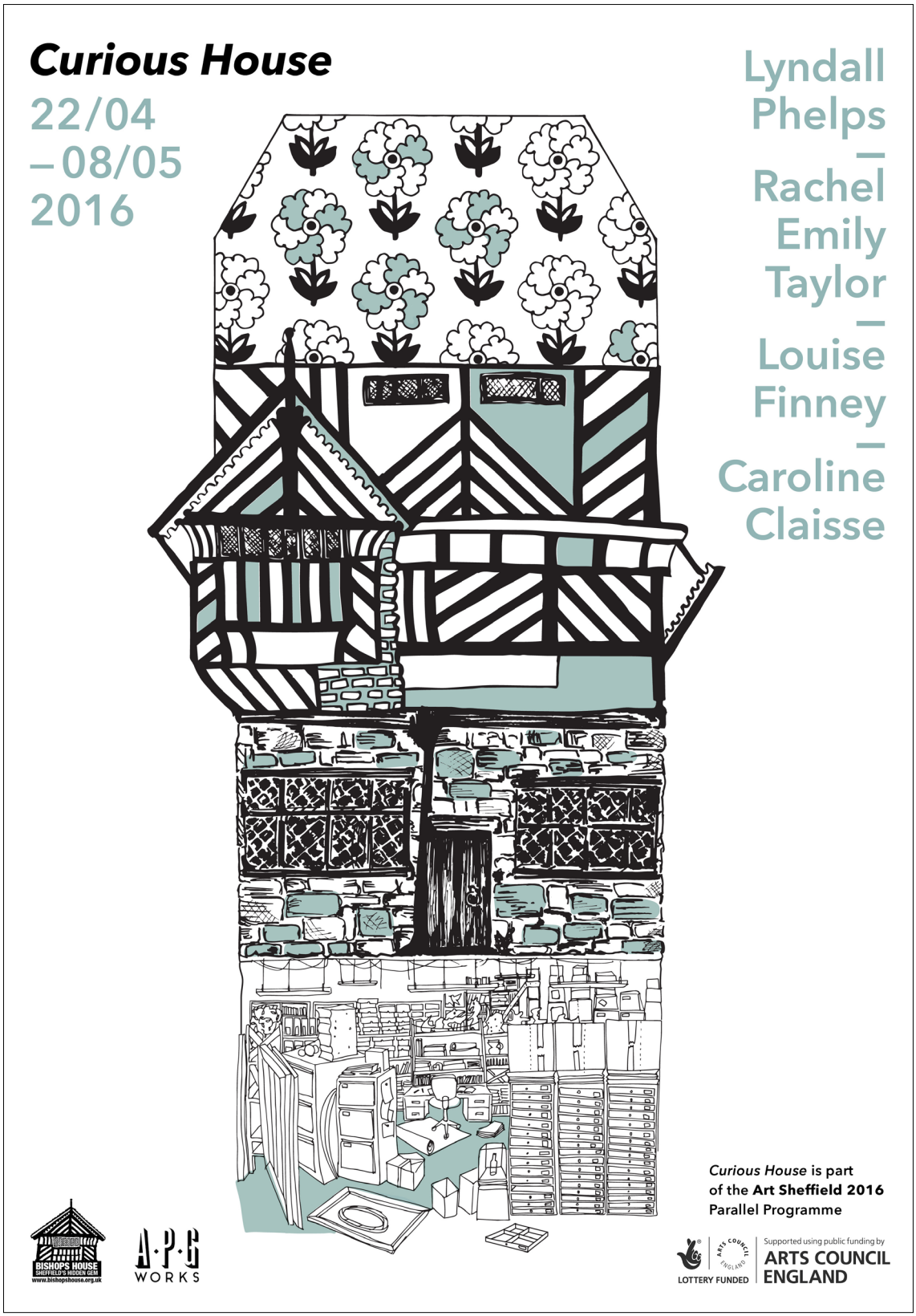
5-D Curious House

Exhibition booklet designed by Caroline Claisse featuring drawings of installations from the four artists 1 / 2.



5-D Curious House

Exhibition booklet designed by Caroline Claisse featuring drawings of installations from the four artists 2/2.



5-D Curious House

Exhibition poster designed by Caroline Claisse featuring drawings from the four artists.



Lyndall Phelps
Remnants of Domesticity / 2016

Curious House

Phelps is particularly interested in the physical residues of the last inhabitants of Bishops' House; the Meersbrook Park gardeners and their families. All evidence of their domestic environment has been stripped away; the only clue to their occupancy lies in old photographs. Using archaeological recording techniques and archival references, Phelps is reintroducing traces of the 1960s wallpaper that once adorned the walls of this extraordinary time capsule.

Photograph by Amanda Evans

LOTTERY FUNDED
Supported using public funding by
ARTS COUNCIL ENGLAND

5-D Curious House

Exhibition publication designed by Caroline Claisse.



Rachel Emily Taylor
***The Girl Who Lived in Bishops' House* / 2016**



Curious House

For Taylor, Curious House began with a conversation with Trudy, who spent her childhood in Bishops' House until her family moved out in 1973. In her piece, Taylor has combined fragments, layered voice recordings, augmented by slide projections – or 'screen' memories – of family photographs and documentation from Museums Sheffield's archive.

Photograph by Amanda Evans

LOTTERY FUNDED
Supported using public funding by
ARTS COUNCIL ENGLAND

5-D Curious House

Exhibition publication designed by Caroline Claisse.



Louise Finney
***Encounters* / 2016**



Curious House

Finney plays with ideas of traditional museum aesthetics in Bishops' House, working with experimental text and weaving smaller, hidden narratives through signage that is typically used to aid a general understanding of a particular period of time. Challenging this approach to reading history, Finney's work points towards the much more subjective, personal, and associative way we encounter the past.

Photograph by Gemma Thorpe

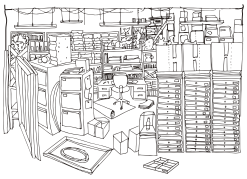
LOTTERY FUNDED
Supported using public funding by
ARTS COUNCIL ENGLAND

5-D Curious House

Exhibition publication designed by Caroline Claisse.



Caroline Claisse
Containers of Stories / 2016



Curious House

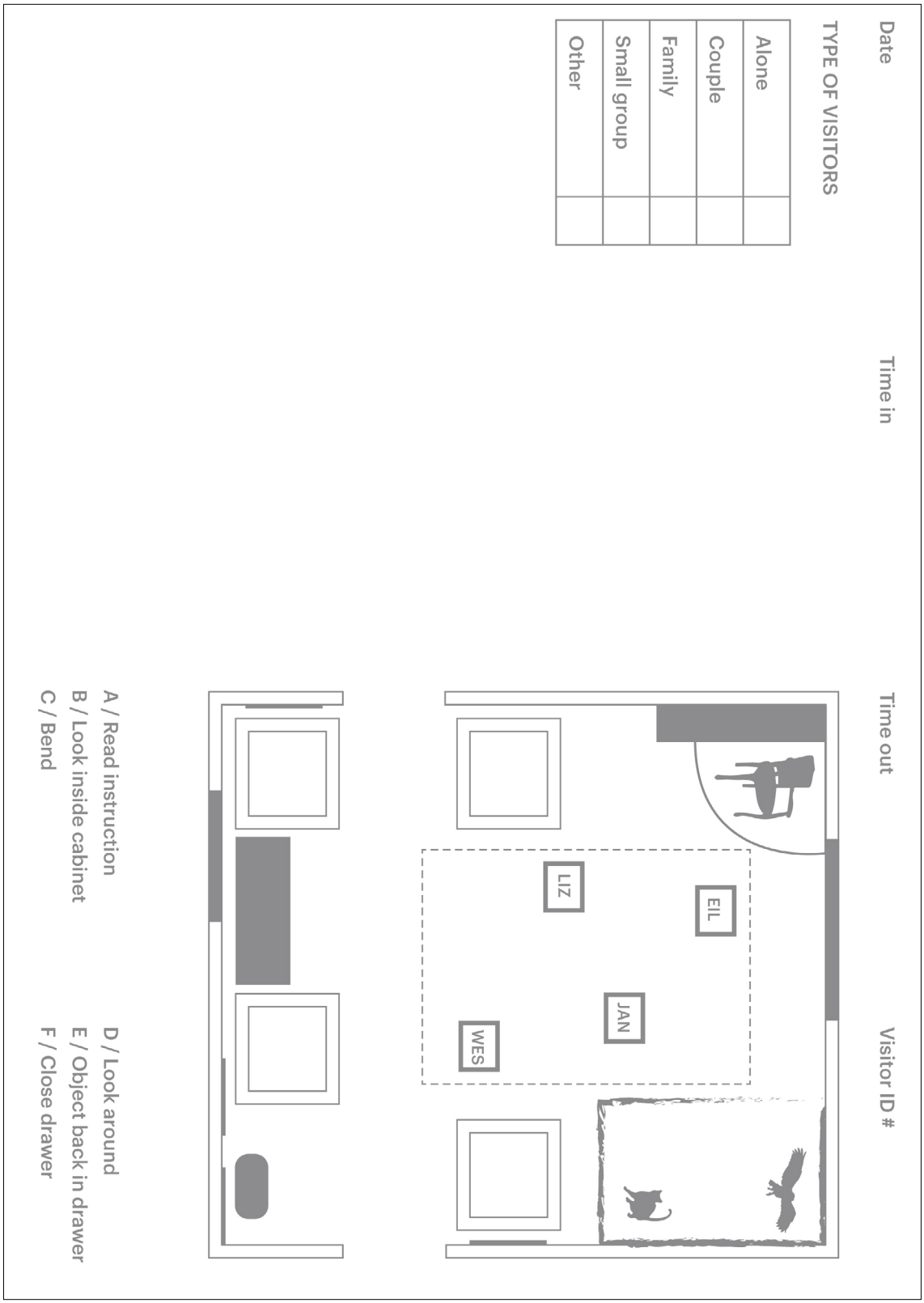
Claisse is interested in the volunteers who work at the house, their expertise and role in engaging visitors with heritage. By acting as a facilitator and using participatory methods, Claisse developed four mini-exhibitions with the volunteers to display their own favourite story about the house. Contained in drawers, the four exhibits engage visitors through touch and sound, and a set of objects is used as vehicles to tell each story.

Photograph by Amanda Evans

LOTTERY FUNDED | Supported using public funding by ARTS COUNCIL ENGLAND

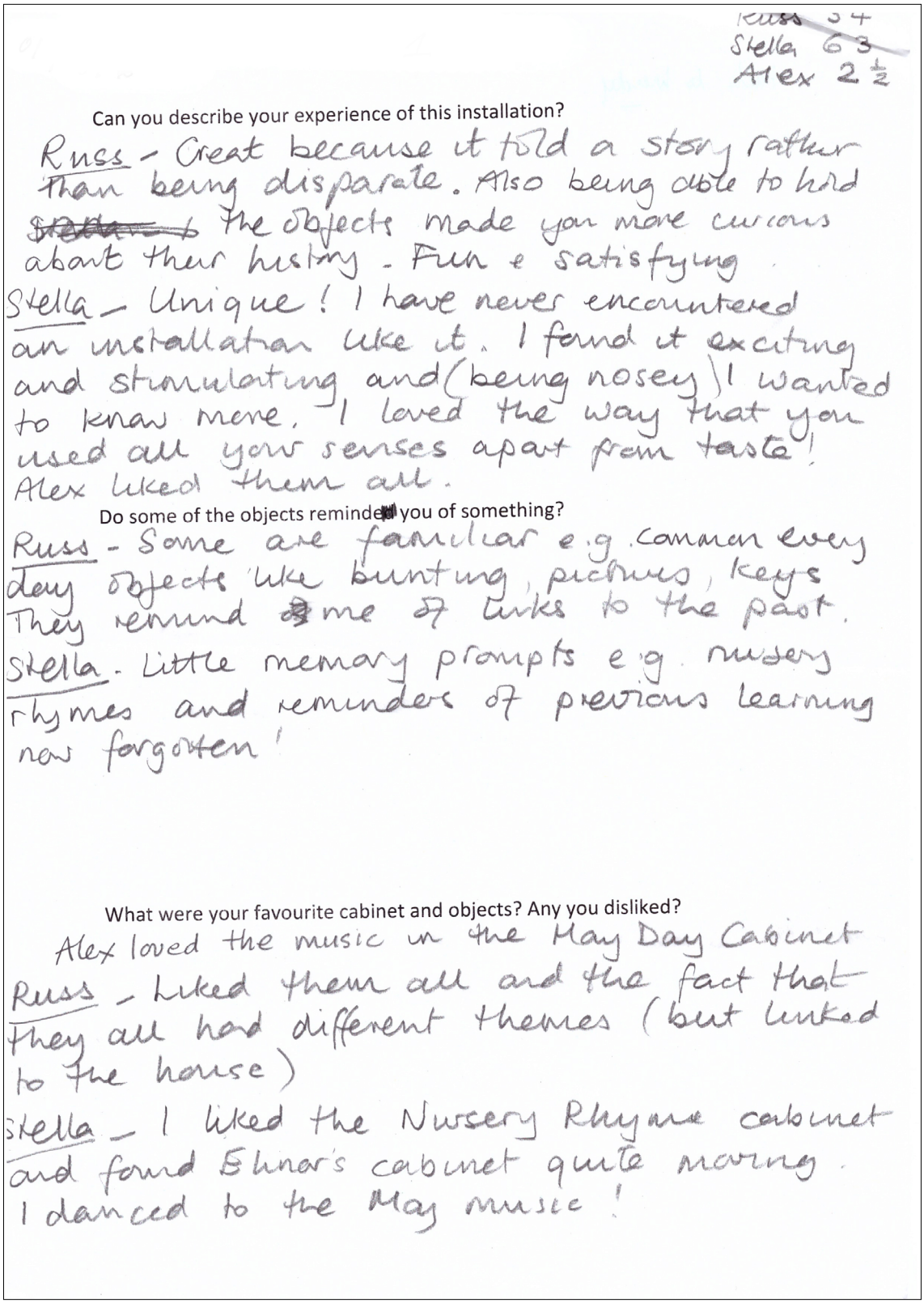
5-D Curious House

Exhibition publication designed by Caroline Claisse.



5-E Containers of Stories

Evaluation materials, blanck observation sheet.



Stella 6 3
Alex 2 ½

Can you describe your experience of this installation?

Russ - Great because it told a story rather than being disparate. Also being able to hold ~~[illegible]~~ the objects made you more curious about their history. Fun & satisfying

Stella - Unique! I have never encountered an installation like it. I found it exciting and stimulating and (being nosey) I wanted to know more. I loved the way that you used all your senses apart from taste! Alex liked them all.

Do some of the objects remind you of something?

Russ - Some are familiar e.g. common every day objects like bunting, pictures, keys They remind me of links to the past.

Stella - Little memory prompts e.g. nursery rhymes and reminders of previous learning now forgotten!

What were your favourite cabinet and objects? Any you disliked?

Alex loved the music in the May Day Cabinet

Russ - Liked them all and the fact that they all had different themes (but linked to the house)

Stella - I liked the Nursery Rhyme cabinet and found Elnar's cabinet quite moving. I danced to the May music!

5-E Containers of Stories

Evaluation materials, questionnaire completed by a group of visitors.

5-F Curious House

Example of visitors' feedback about Curious House 2016.



5-F Curious House

Example of visitors' feedback about Curious House 2016.



FEB
11

Creative Workshop 11/02 - How to bring Bishops' House to life?

by Caroline Claisse

Free

Sales Ended | DETAILS

DESCRIPTION

This creative workshop* is about ***thinking together in place*** at the Bishops' House. During the two-hours workshop, the museum volunteers will work together and use the space of the museum in creative ways to explore potential exhibition themes and a selection of objects from the handling collection. The workshop will feature activities such as creative writing, mind mapping, collage and group discussion. By the end of the session, we will come up with a series of characters and objects to use for our next interactive installation, which will take place in the summer at the Bishops' House. The outcome of this session will be developed in another workshop in March. Participation is flexible and you don't have to take part in all sessions.

We need you to co-develop the work with us! Building on the success of "Curious House" exhibition (2016), we see this new project as an opportunity to co-create something together that will **bring the house to life** and influence future thinking, projects and funding for the museum.

Please book a free ticket so we know how many participants to expect! If you are not available for this workshop or would like to know more about the project, please contact Caroline Claisse (caroline.claisse@student.shu.ac.uk). There will be more opportunities in the upcoming months to take part in more creative sessions.

Thank you to all the volunteers for their interest and help with the project!

*Please note that this workshop is reserved to volunteers at the Bishops' House.

DATE AND TIME

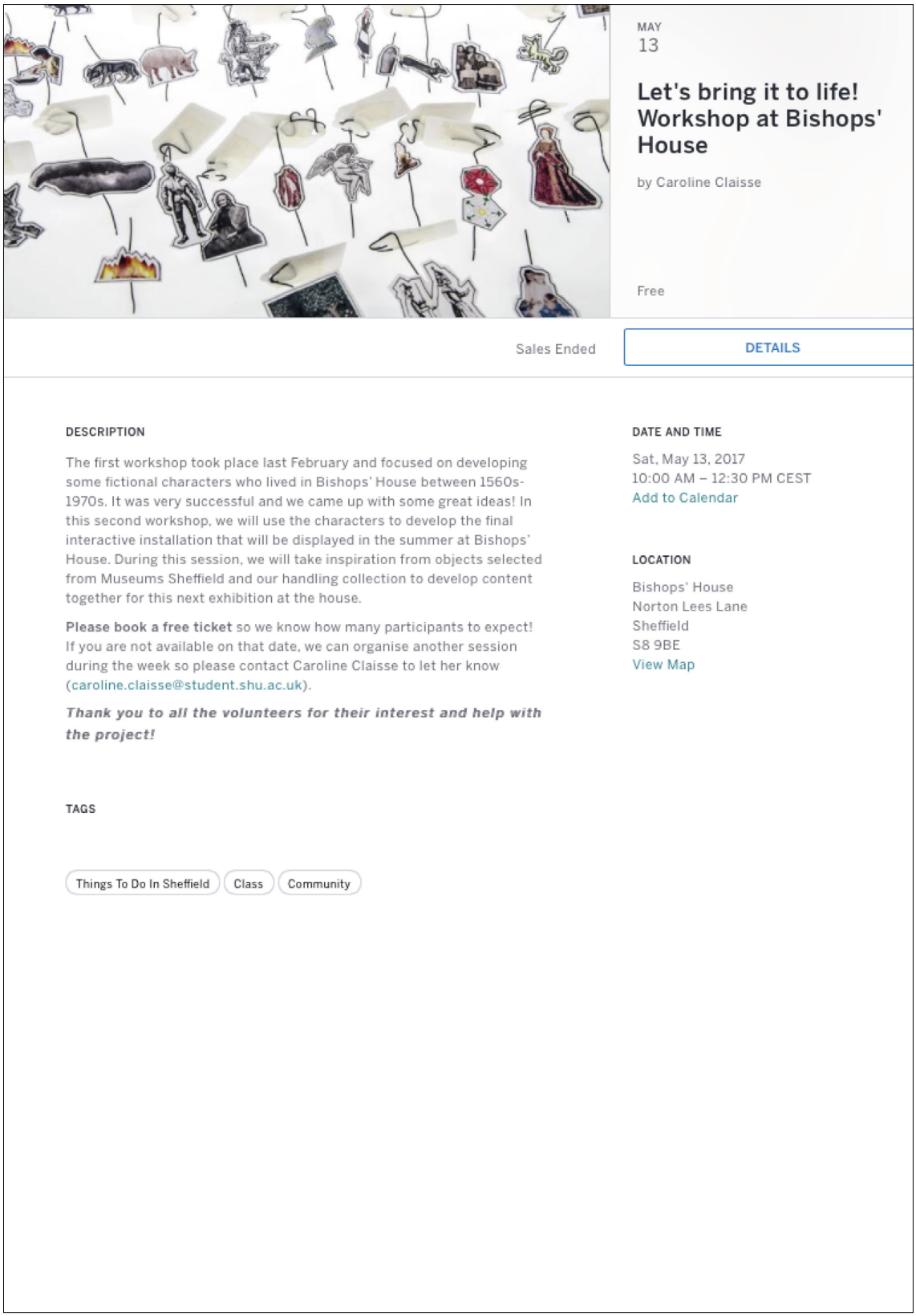
Sat, February 11, 2017
10:30 AM – 12:30 PM GMT
Add to Calendar

LOCATION

Bishops' House
Norton Lees Lane
Sheffield
S8 9BE
View Map

6-A Co-creation workshop 1

Advertised via Eventbrite.



MAY
13

Let's bring it to life! Workshop at Bishops' House

by Caroline Claisse

Free

Sales Ended DETAILS

DESCRIPTION

The first workshop took place last February and focused on developing some fictional characters who lived in Bishops' House between 1560s-1970s. It was very successful and we came up with some great ideas! In this second workshop, we will use the characters to develop the final interactive installation that will be displayed in the summer at Bishops' House. During this session, we will take inspiration from objects selected from Museums Sheffield and our handling collection to develop content together for this next exhibition at the house.

Please book a free ticket so we know how many participants to expect! If you are not available on that date, we can organise another session during the week so please contact Caroline Claisse to let her know (caroline.claisse@student.shu.ac.uk).

Thank you to all the volunteers for their interest and help with the project!

DATE AND TIME

Sat, May 13, 2017
10:00 AM – 12:30 PM CEST
Add to Calendar

LOCATION

Bishops' House
Norton Lees Lane
Sheffield
S8 9BE
View Map

TAGS

Things To Do In Sheffield | Class | Community

6-A Co-creation workshop 2

Advertised via Eventbrite.

PARTICIPANT CONSENT FORM 1/2

Workshop with volunteer at Bishops' House

TO BE COMPLETED BY THE PARTICIPANT *Please answer the following questions by ticking the response that applies.*	**YES**	**NO**
I have read the Information Sheet for this study and have had details of the study explained to me.	☐	☐
My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point.	☐	☐
I understand that I am free to withdraw from the study within the time limits outlined in the Information Sheet, without giving a reason for my withdrawal or to decline to answer any particular questions in the study without any consequences to my future treatment by the researcher.	☐	☐
I wish to participate in the project under the conditions set out in the Information Sheet.	☐	☐
I consent to the information collected for the purposes of this research study to be used for any other research purposes.	☐	☐
Personal data protection I agree for the researcher to use my real name. I understand that in this case I will be identified as a participant in the research.	☐	☐
OR I agree for the researcher to use a pseudonym when refering to the information I provide. I understand that in this case I won't be identified in the research.	☐	☐



6-A Co-creation workshops

Participant consent form for museum volunteers 1/2.

PARTICIPANT CONSENT FORM 2/2

Workshop with volunteer at Bishops' House

Photographs taken of you would be used to add interest and exemplify the research findings. For example, they may be used as illustrations for the PhD thesis, research reports, summary leaflets, blog post and/or conference presentations. They will not be used in any way that would show you in a bad light. Please note that most photographs taken will focus on the work produced during the workshop. ***You can still take part in the workshop if you do not give your consent for me to use any photograph of you.***

	YES	NO
I agree to have my photograph and video taken.	☐	☐
(If disagreed) I understand that photograph of my work created during the workshop will be taken but I won't be identified in them.	☐	☐
I give the researcher permission to:		
To use video recording of me to document the workshop	☐	☐
To put my photograph(s) taken during the workshop on websites (e.g. blog post)	☐	☐
To use my photograph(s) taken during the workshop in printed material (e.g. academic reports and articles, PhD thesis)	☐	☐
To use my photograph(s) and video of the workshop in presentations (e.g. at conferences or seminars)	☐	☐

SIGNATURE OF PARTICIPANT _____

DATE / /

SIGNATURE OF RESEARCHER _____

DATE / /

Sheffield Hallam University

The study has been reviewed and received a favourable opinion from Sheffield Hallam University

RESEARCHER Caroline Claisse / Caroline.Claisse@student.shu.ac.uk / 07 547 341886
@carolineclaisse / Sheffield Hallam University C3RI / Art and Design Research Centre
DIRECTOR OF STUDIES Prof. Daniela Petrelli / d.petrelli@shu.ac.uk / 0114 225 6946

6-A Co-creation workshops

Participant consent form for museum volunteers 2/2.

PARTICIPANT INFORMATION SHEET

Workshop with volunteer at Bishops' House

WHO IS THE RESEARCH FOR?

My name is Caroline Claisse and I am a PhD student in Art and Design at Sheffield Hallam University (2015-2018). The research study you are invited to participate in is part of my research on: *Crafting tangible interaction to prompt visitors' engagement at House Museums.*

WHAT IS THE RESEARCH ABOUT?

My research looks at audience engagement and storytelling in house museums. House museums such as the Bishop's House are a particular type of heritage site where visitors are immersed in the life of historically notable people or family. I aim to show how digital technology properly designed for the place can promote personal and multi-sensory engagement with the stories of the house museum.

WHY HAVE I BEEN SELECTED?

I will lead the project but it is very important for me to work in collaboration with the Bishops' House and especially with the volunteers as for me, they are the experts in terms of maintaining and communicating the heritage of the house to the visitors. If you accept to take part in the project, you will participate in a series of workshops between February and June 2017 to co-design an interactive installation for the Bishops' House museum. Participation is flexible; you don't have to take part in all workshops and you can leave the project at any moment.

WHAT DO I HAVE TO DO IF I TAKE PART?

We will meet at the Bishops' House and in groups; we will use the space of the museum in creative ways to explore ways ***to bring the house to life***. The activities during the workshop will be hands-on, open-ended and fun (e.g. creative writing, mind mapping, collage). The main aims of the workshop are to develop ideas and content together for an interactive installation that will be exhibited at Bishops' House in the summer.

WHAT WILL HAPPEN TO THE INFORMATION I PROVIDE?

Audio, video and photography will be used to record the workshops sessions. This audio-visual material will document our creative journey and be used in the writing of my PhD thesis. Findings will further be written up for internal reports and as papers for publication in academic journals, and for presentation at academic conferences and publication in conference proceedings. Blog posts will also be published on our project blog to share our insights and updates with the Bishops' House community.

Data can be anonymised (using pseudonyms) and photographs of you won't be taken if you don't want to. All research will be carried out with your prior and informed consent, and all data will be held and processed in accordance with the Data Protection Act (1998). Data will be kept digitally through the data management system of Sheffield Hallam University.

6-A Co-creation workshops

Participant information sheet for museum volunteers 1/2.

WHY SHOULD I TAKE PART?
Building on the success of *Curious House*, this second exhibition will involved a larger group of museum volunteers to co-design an interactive installation. The museum should greatly benefit from this project, as it will offer innovative design thinking and creative opportunities. It is also an opportunity for the volunteers to be actively involved in the future of the museum and to put their ideas for the house into practice. I aim for the research to be published so it will contribute to raise awareness about the museum both locally and internationally.

WHERE WILL THE WORKSHOP SESSIONS TAKE PLACE?
All workshop sessions will take place at the Bishop's House and further details will be communicated through newsletters, blog and social medias.

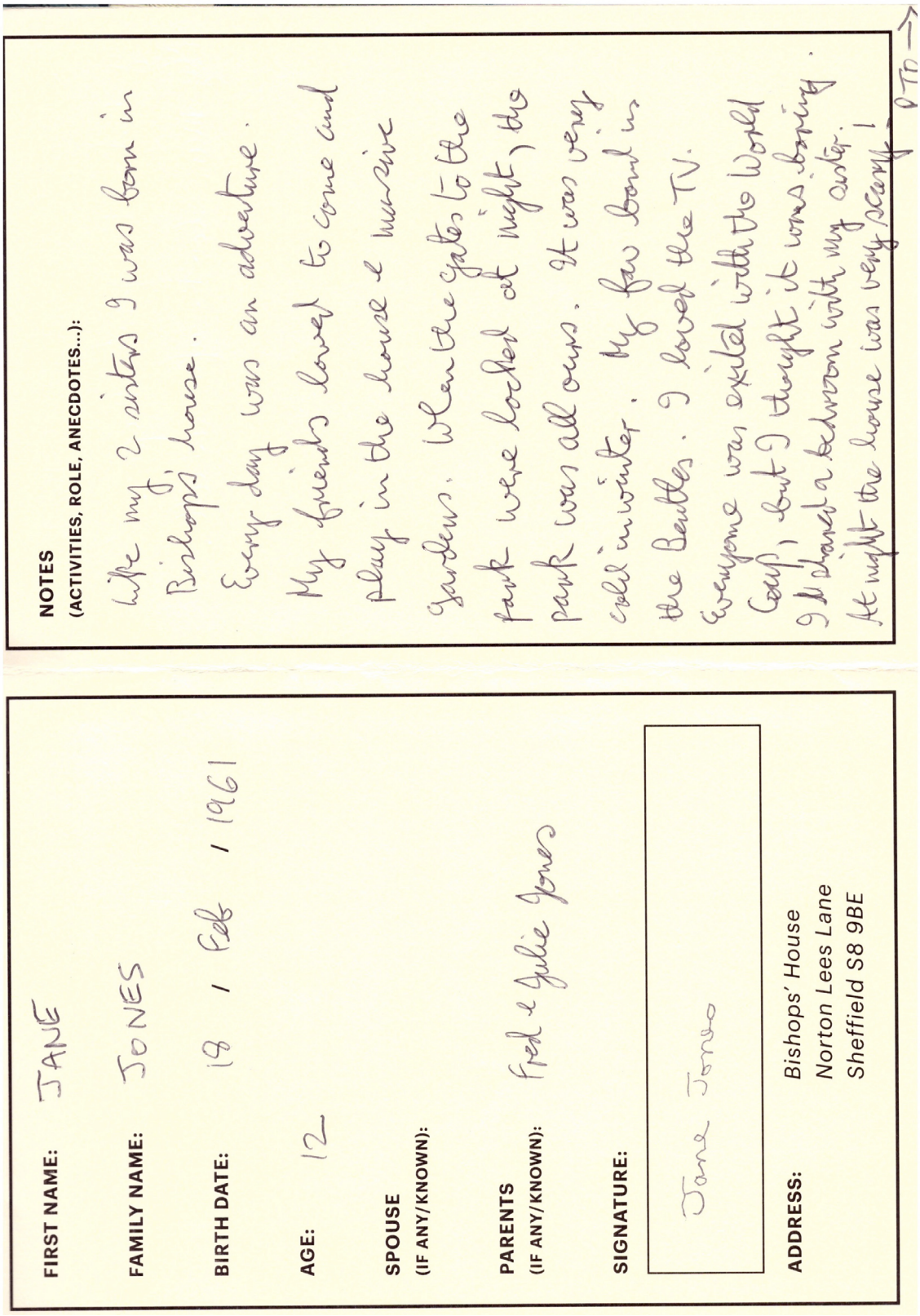
WHAT TO DO IF I WANT TO WITHDRAW?
You are free to withdraw from the project at any time without needing to justify your decision and without any negative implication. You can tell me at any point during the project if you do not wish to be involved anymore.

CONCERNS AND COMPLAINTS?
Any concern or complaint about any aspects of the way you have been dealt with during the interview should be addressed; please contact Caroline Claisse (principal researcher) or Professor Daniela Petrelli (Director of Studies), whose details are provided on the back.

The study has been reviewed and received a favourable opinion from Sheffield Hallam University
RESEARCHER Caroline Claisse / Caroline.Claisse@student.shu.ac.uk / 07 547 341886
@carolineclaisse / Sheffield Hallam University C3RI / Art and Design Research Centre
DIRECTOR OF STUDIES Prof. Daniela Petrelli / d.petrelli@shu.ac.uk / 0114 225 6946

6-A Co-creation workshops

Participant information sheet for museum volunteers 2/2.



FIRST NAME: JANE

FAMILY NAME: JONES

BIRTH DATE: 18 / Feb / 1961

AGE: 12

SPOUSE (IF ANY/KNOWN):

PARENTS (IF ANY/KNOWN): Fred & Julie Jones

SIGNATURE: Jane Jones

ADDRESS: Bishops' House
Norton Lees Lane
Sheffield S8 9BE

NOTES
(ACTIVITIES, ROLE, ANECDOTES...):

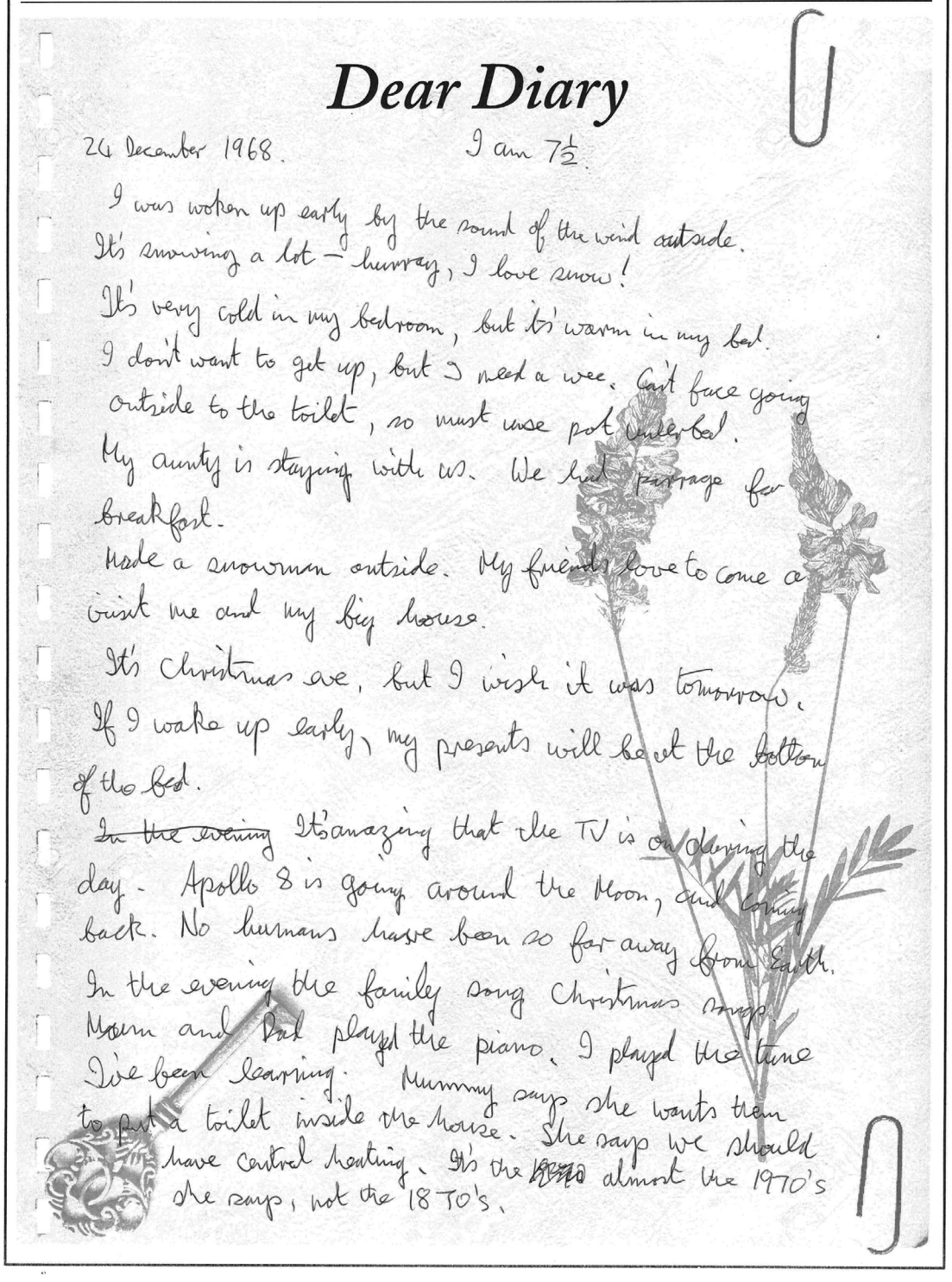
Like my 2 sisters I was born in Bishops' house.
Every day was an adventure.
My friends loved to come and play in the house & massive gardens. When the gates to the park were locked at night, the park was all ours. It was very cold in winter. My fav band in the Beatles. I loved the TV.
Everyone was excited with the World Cup, but I thought it was boring.
I'd shared a bedroom with my sister.
At night the house was very scary!

PTO →

6-B Co-creation workshop 1

Example of materials: passport for one character imagined by participants

Write a diary entry from your character's perspective.
Share stories, dreams, fears and feelings about your everyday in the house.



Dear Diary

26 December 1968. I am 7½.

I was woken up early by the sound of the wind outside. It's snowing a lot – hurray, I love snow!

It's very cold in my bedroom, but it's warm in my bed. I don't want to get up, but I need a wee. Can't face going outside to the toilet, so must use pot under bed.

My aunty is staying with us. We had porrage for breakfast.

Made a snowman outside. My friends love to come a visit me and my big house.

It's Christmas eve, but I wish it was tomorrow. If I wake up early, my presents will be at the bottom of the bed.

~~In the evening~~ It's amazing that the TV is on during the day. Apollo 8 is going around the Moon, and coming back. No humans have been so far away from Earth.

In the evening the family sang Christmas songs. Mom and Dad played the piano. I played the tune I've been learning. Mummy says she wants them to put a toilet inside the house. She says we should have central heating. It's the ~~1960's~~ almost the 1970's she says, not the 18 TO's.

6-B Co-creation workshop 1

Example of materials: diary for one character imagined by participants.

A MEER–LOOK

News from Meersbrook

Your title:

A DAY IN THE LIFE OF JANE JONES

Date: / / 1973

Your "feature story"

Write up your story for the newspaper about the character you just met at Bishops' House. It can be descriptive, imaginative or reflective. You can focus on one detail, a room or write about the "bigger picture"! You can write, draw or create a collage to tell your story.



JANE JONES WITH HER MOTHER, SISTERS + DOG CHIP.

CONTINUING WITH OUR THEME 'A DAY IN THE LIFE OF A MEERSBROOK RESIDENT', TODAY I MET WITH JANE JONES, A 12 YEAR OLD GIRL WHO LIVES IN BISHOPS' HOUSE IN MEERSBROOK PARK.

JANE LIVES IN THE HOUSE WITH HER MUMMY + DADDY, TWO SISTERS AND HER DOG, CHIP. SHE SHARES HER BEDROOM, WHICH HAS WALLS COVERED IN POSTERS OF HER FAVOURITE SINGERS THE BEATLES + CILLA BLACK, WITH HER SISTERS. SHE DESCRIBES HOW IT IS VERY DARK OUTSIDE HER HOUSE AT NIGHT AS THERE ARE NO LIGHTS. - IT CAN BE SCARY WHEN IT IS WINDY AND THE HOUSE CREAKS.

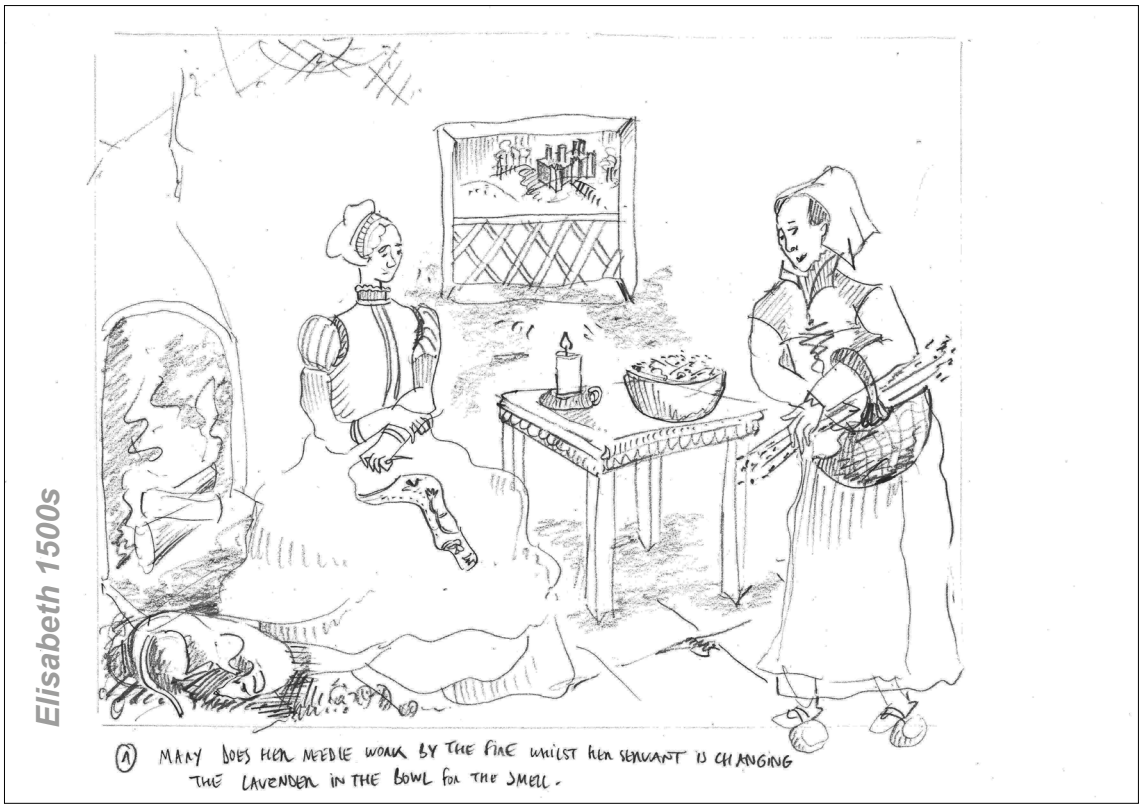
IT IS VERY COLD IN HER BEDROOM SO JANE WEARS THICK SOCKS IN BED + HAS A HOT WATER BOTTLE. IF SHE WANTS TO GO TO THE TOILET SHE HAS TO GO OUTSIDE - IN THE DARK AT NIGHT THIS IS TOO SCARY SO JANE USES A POT UNDER HER BED!

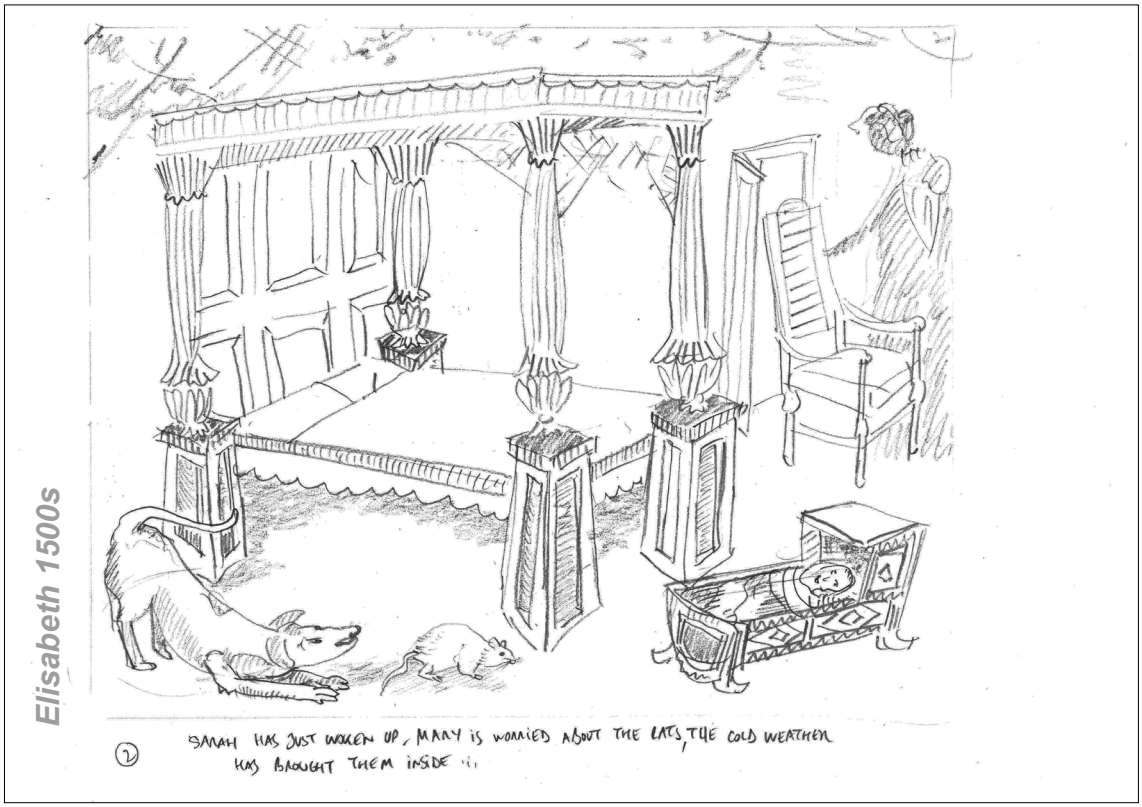
JANE GETS UP AT 8AM + HAS A BOWL OF PORRIDGE FOR BREAKFAST. THEN SHE WALKS TO SCHOOL WITH HER SISTERS. HER FAVOURITE SUBJECT IS HISTORY + SHE IS CURRENTLY LEARNING ~~AT~~ ABOUT HENRY 8TH + THE TUDORS. HER DADDY TELLS HER THAT WAS WHEN HER HOUSE WAS BUILT.

P.T.O.

6-B Co-creation workshop 1

Example of materials: article for one character imagined by participants.

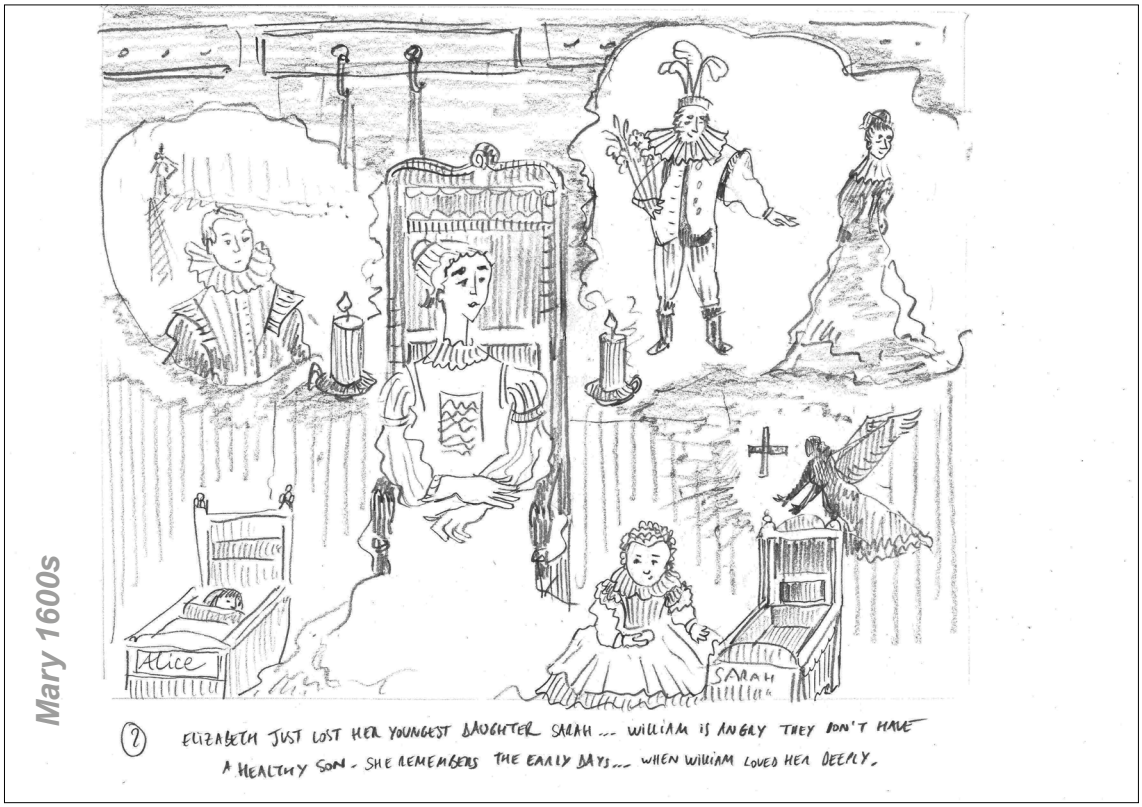




6-C Co-creation workshop 1

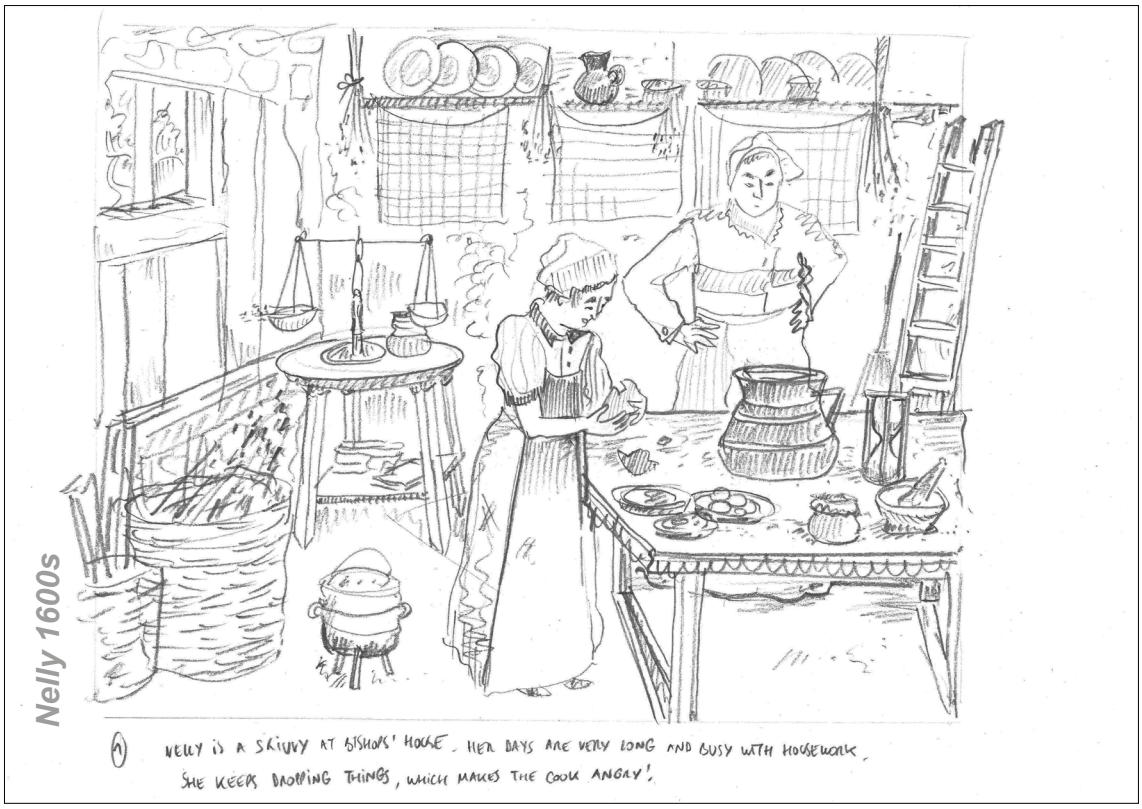
Design synthesis, storyboarding inspired by imagined characters.





6-C Co-creation workshop 1

Design synthesis, storyboarding inspired by imagined characters.





6-C Co-creation workshop 1

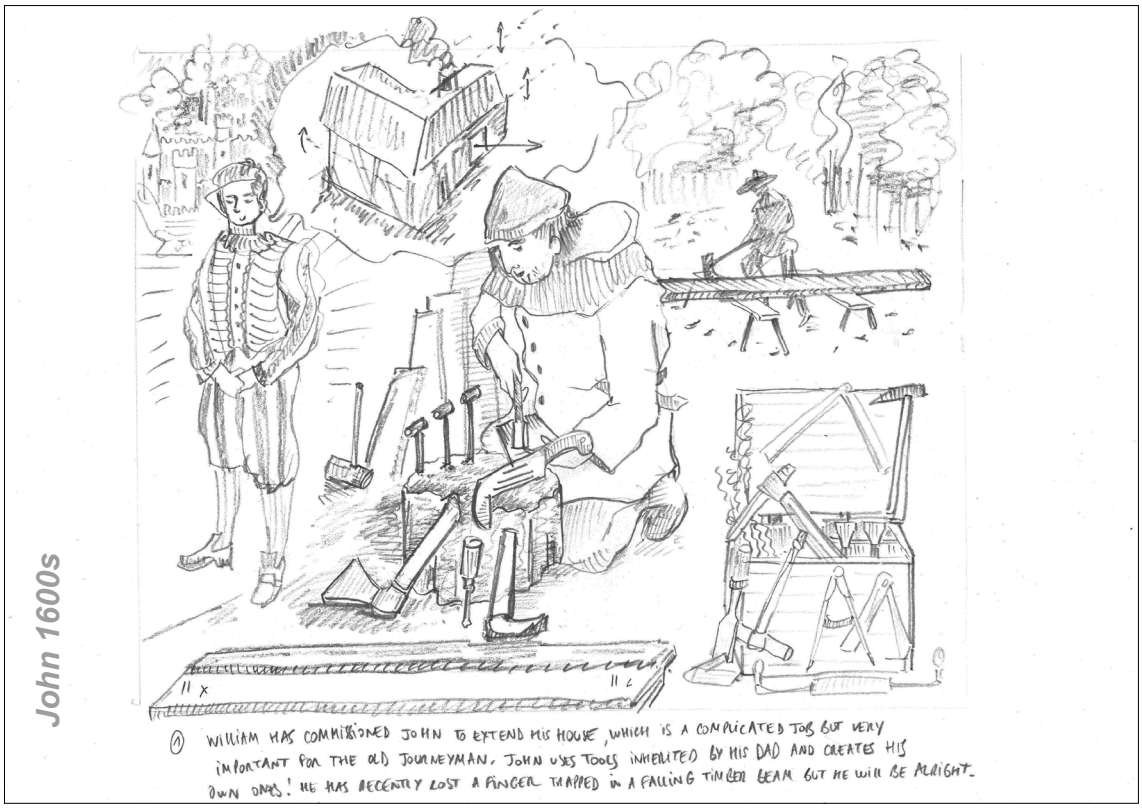
Design synthesis, storyboarding inspired by imagined characters.

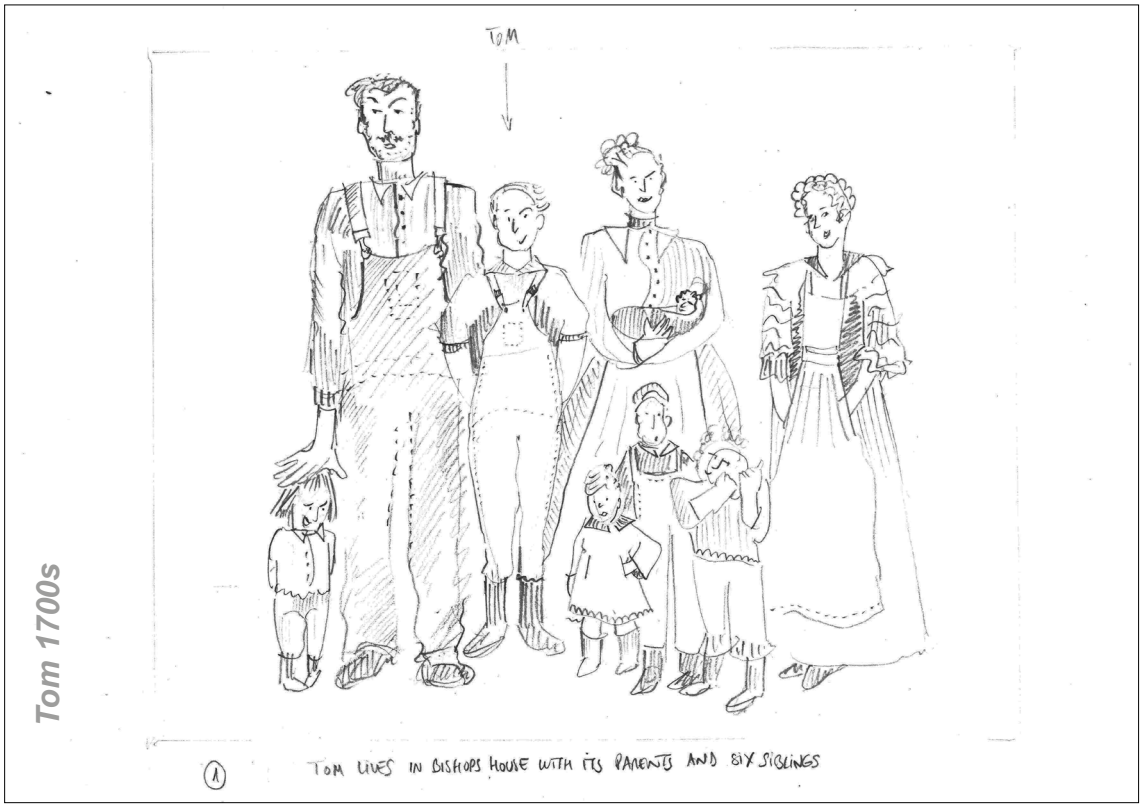




6-C Co-creation workshop 1

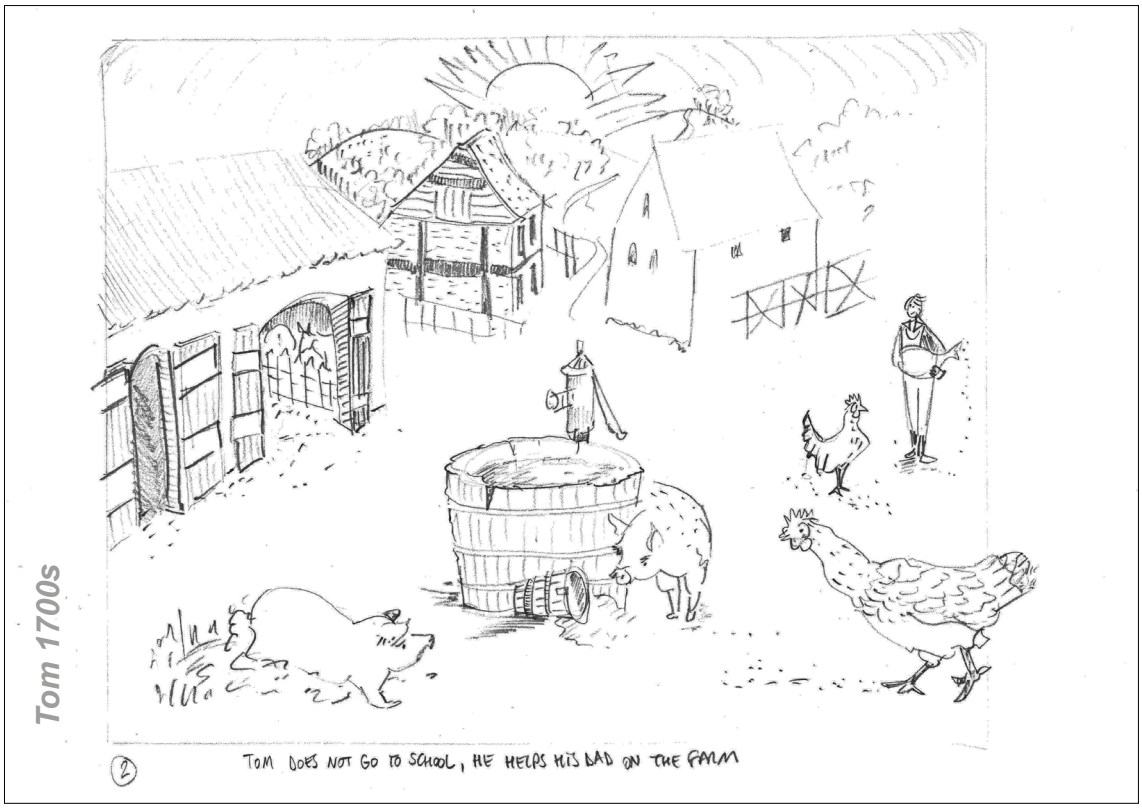
Design synthesis, storyboarding inspired by imagined characters.

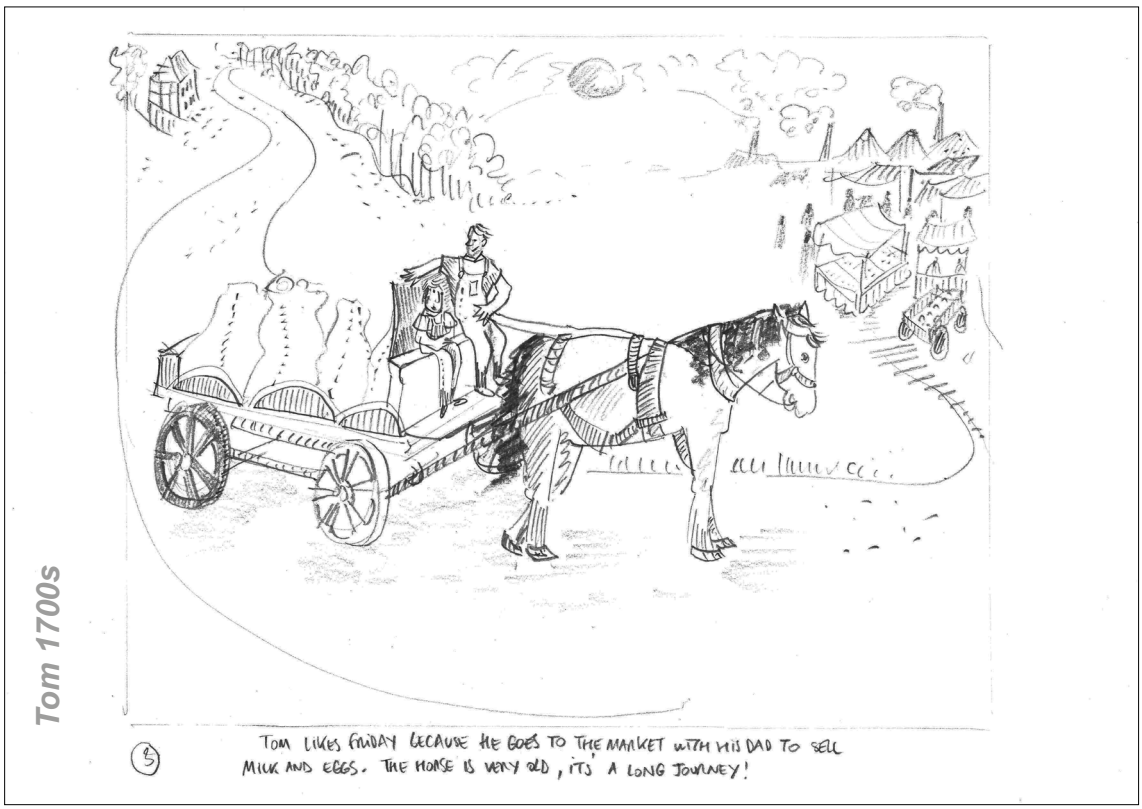




6-C Co-creation workshop 1

Design synthesis, storyboarding inspired by imagined characters.

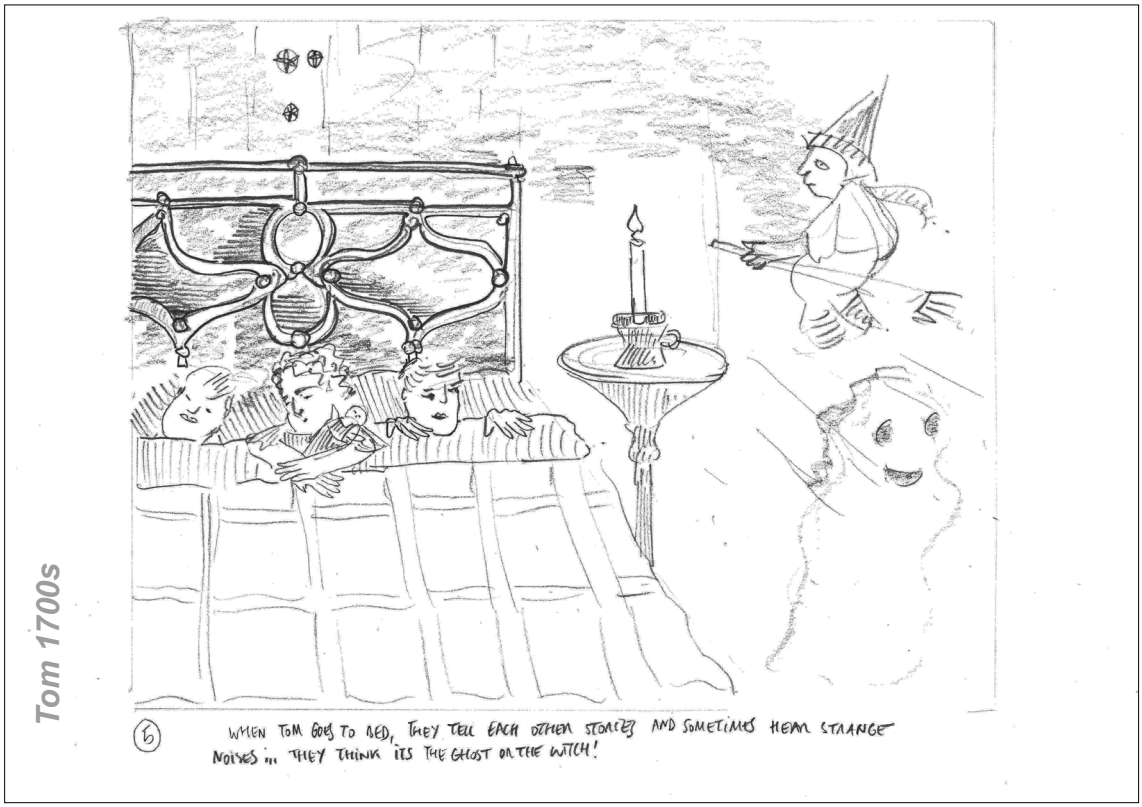




6-C Co-creation workshop 1

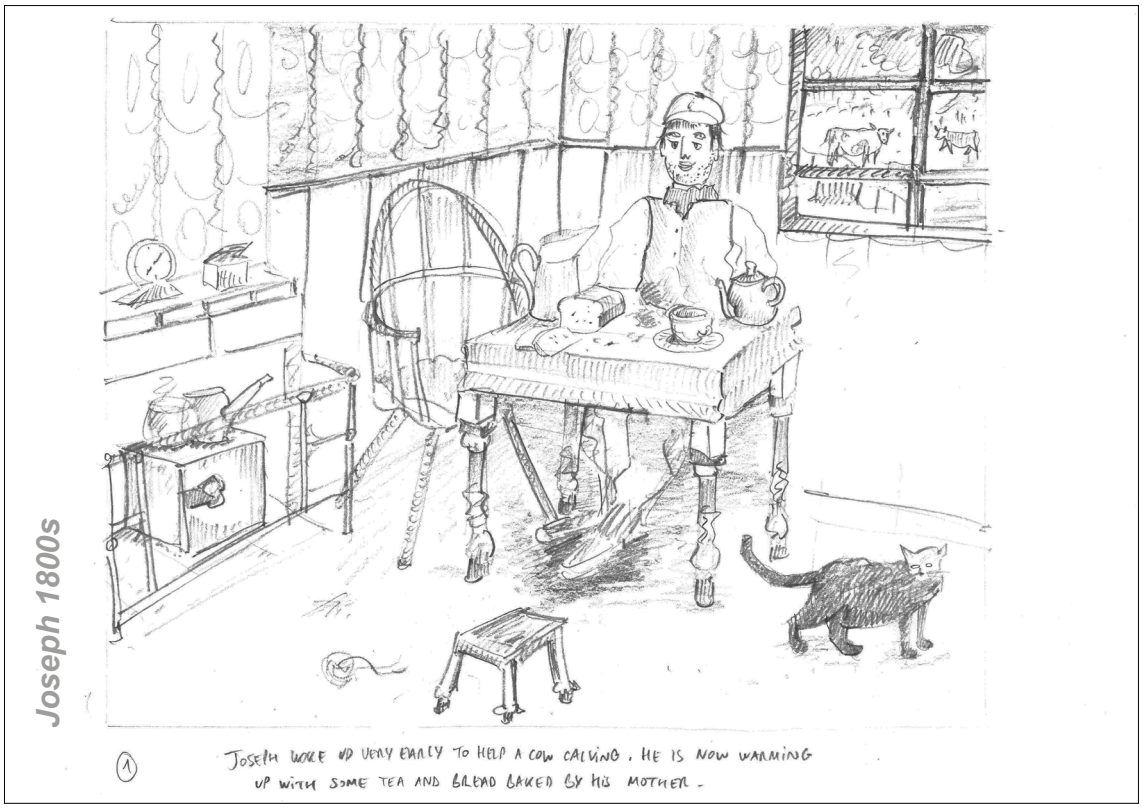
Design synthesis, storyboarding inspired by imagined characters.

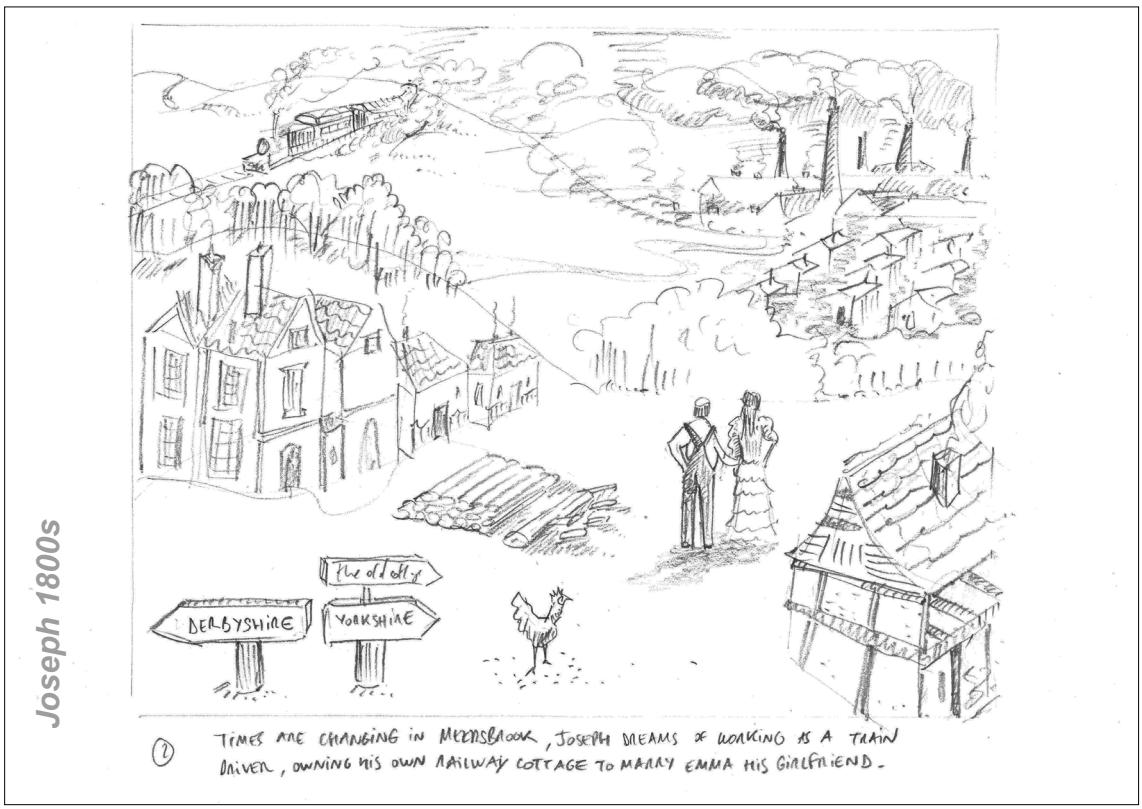




6-C Co-creation workshop 1

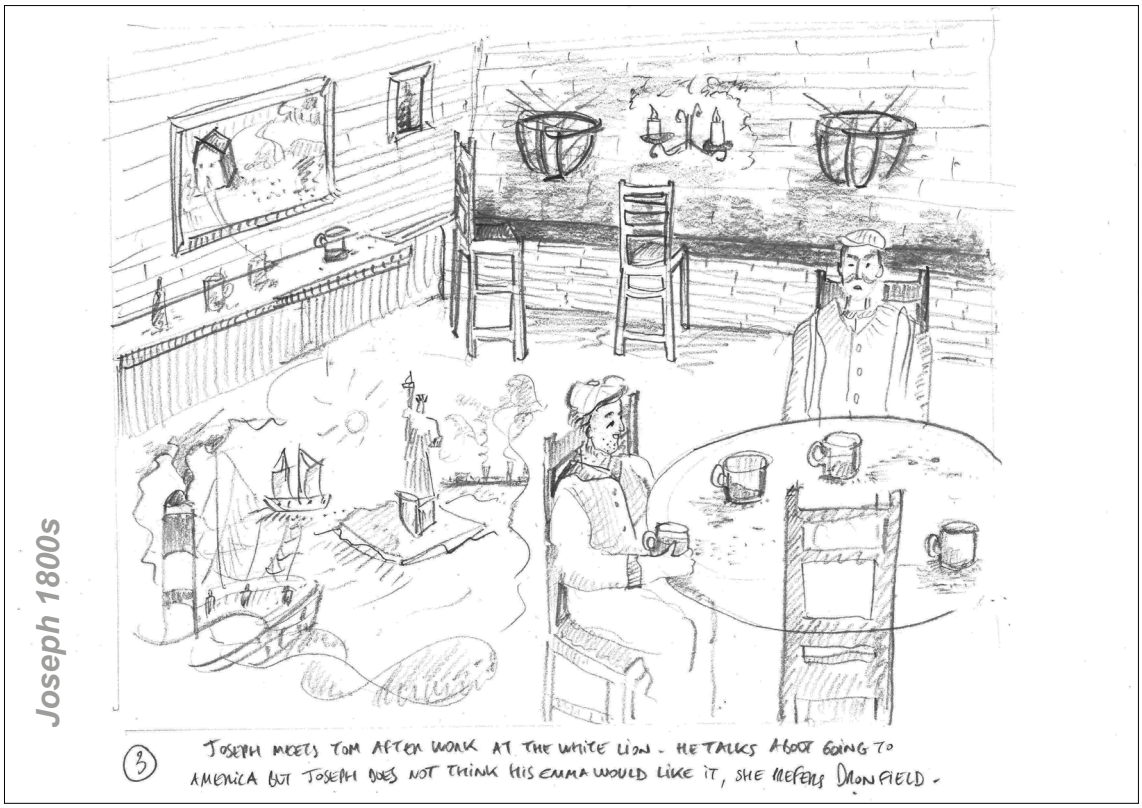
Design synthesis, storyboarding inspired by imagined characters.

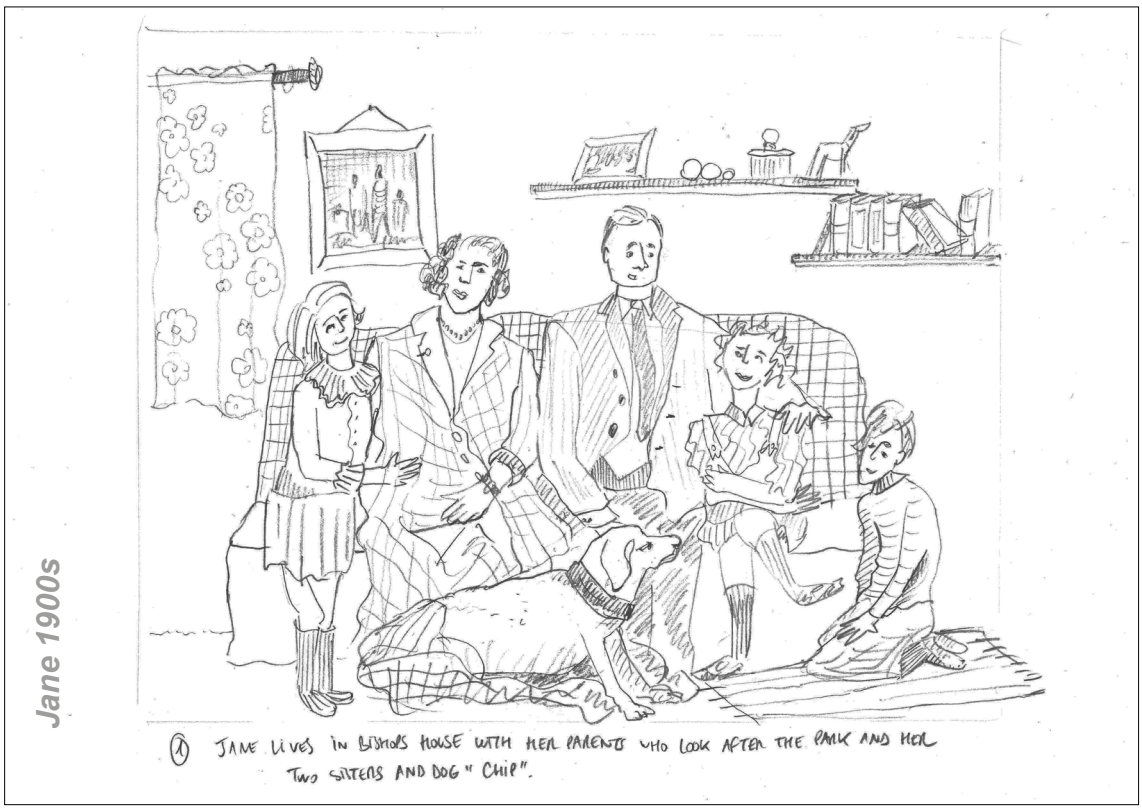




6-C Co-creation workshop 1

Design synthesis, storyboarding inspired by imagined characters.





6-C Co-creation workshop 1

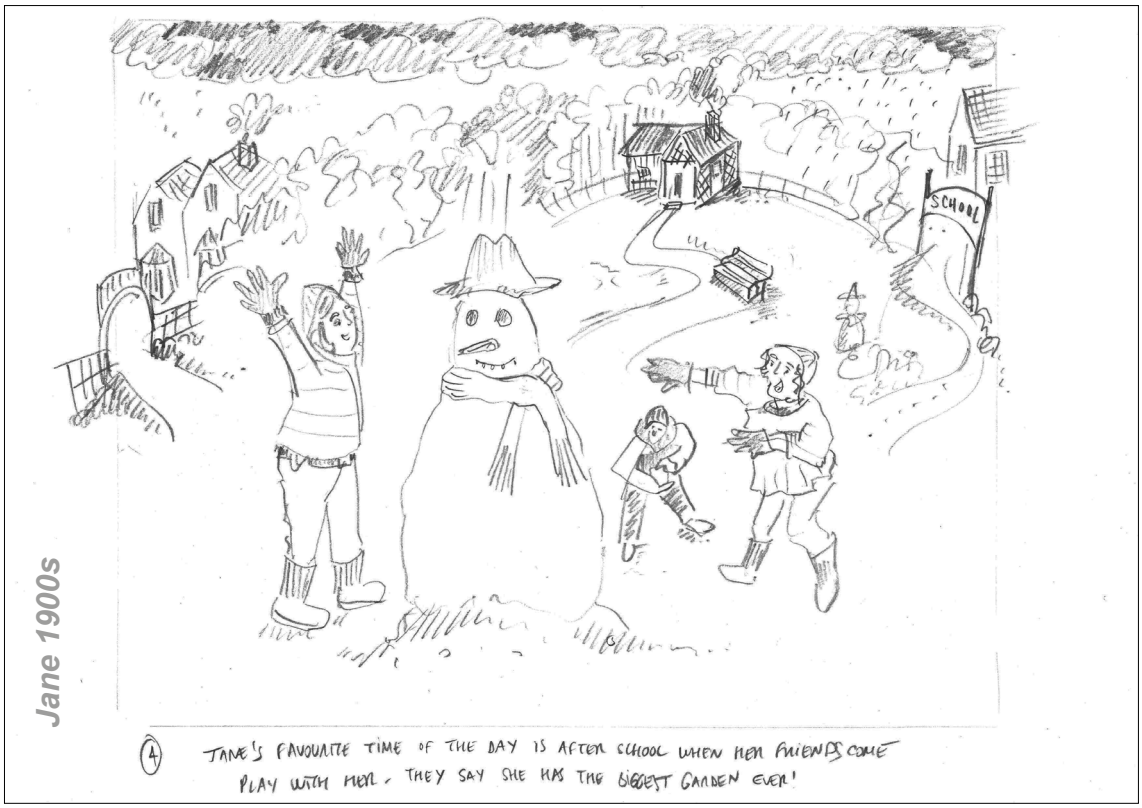
Design synthesis, storyboarding inspired by imagined characters.

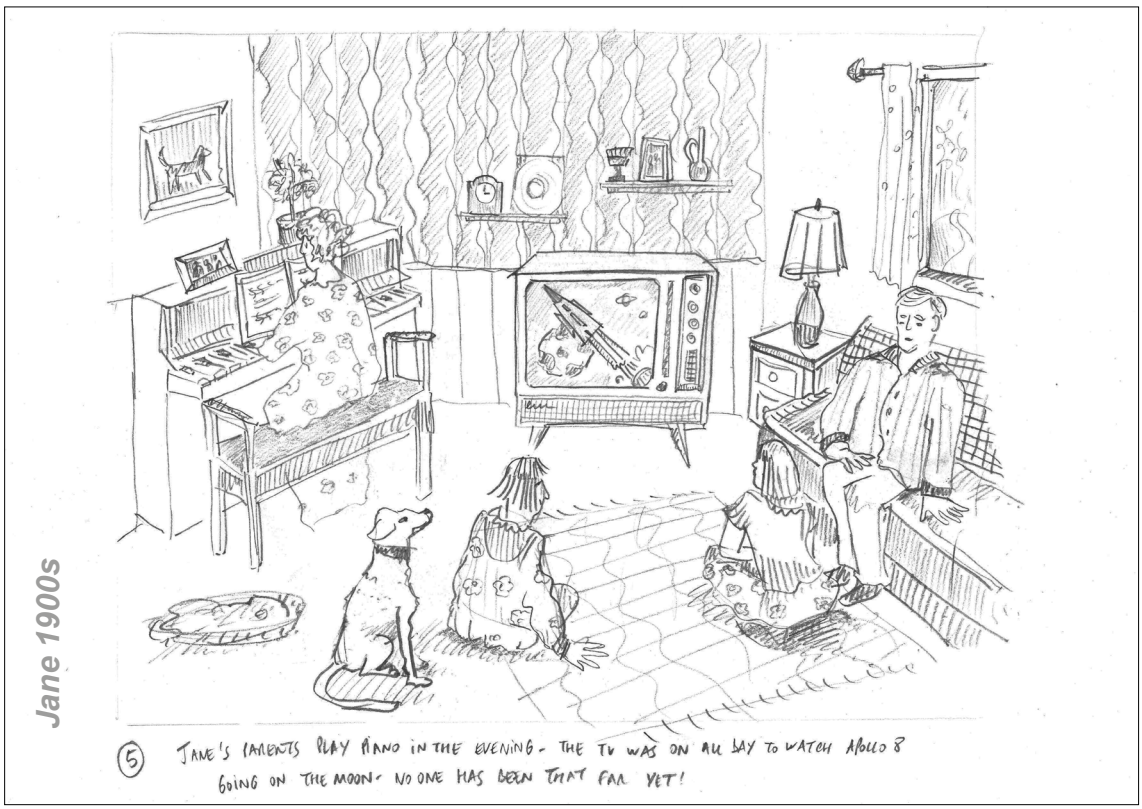




6-C Co-creation workshop 1

Design synthesis, storyboarding inspired by imagined characters.





6-C Co-creation workshop 1

Design synthesis, storyboarding inspired by imagined characters.

6-D Co-creation workshop 1

Design synthesis, personas 1/5.

6-D Co-creation workshop 1

Design synthesis, personas 2/5.

6-D Co-creation workshop 1

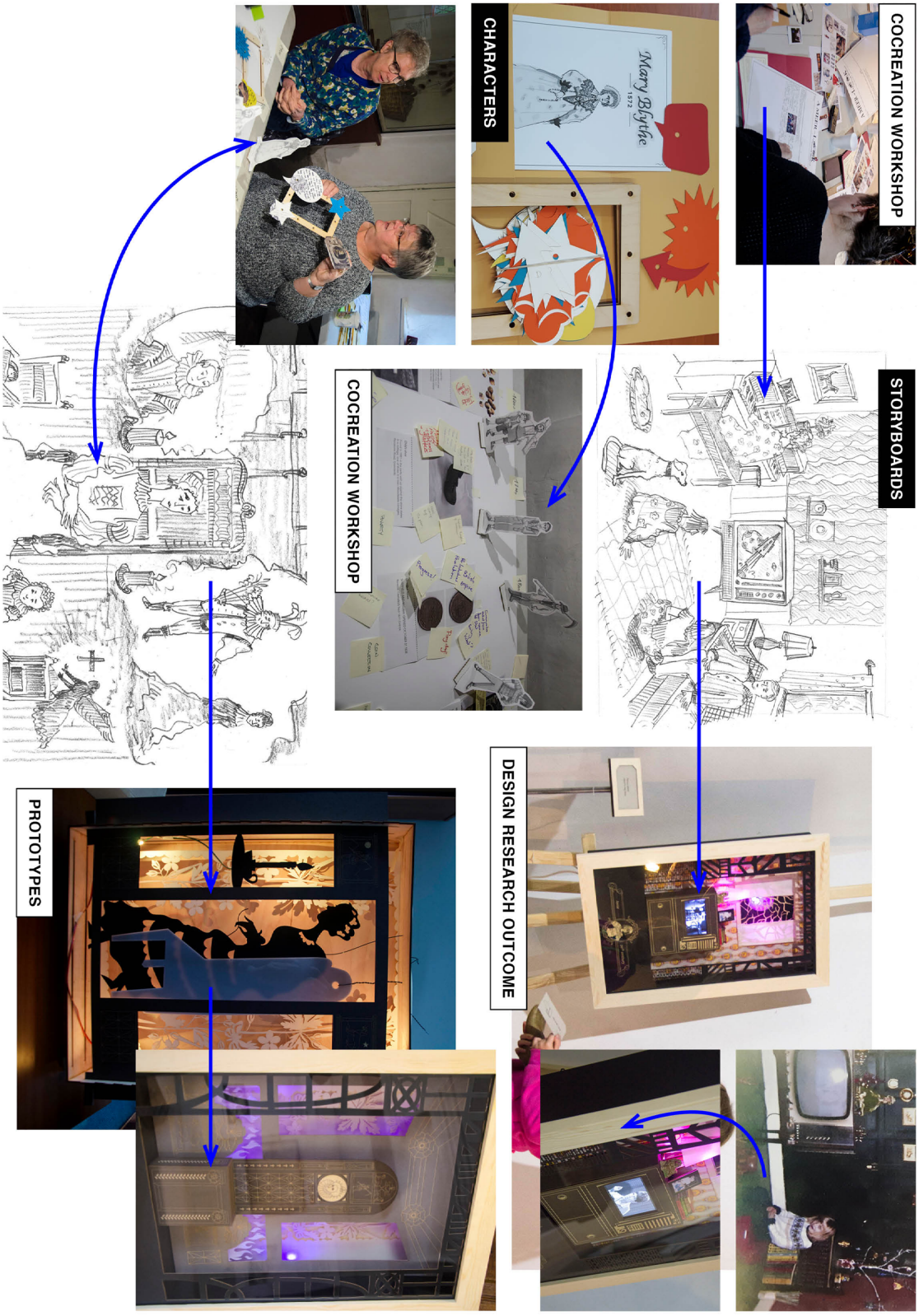
Design synthesis, personas 3/5.

6-D Co-creation workshop 1

Design synthesis, personas 4/5.

6-D Co-creation workshop 1

Design synthesis, personas 5/5.



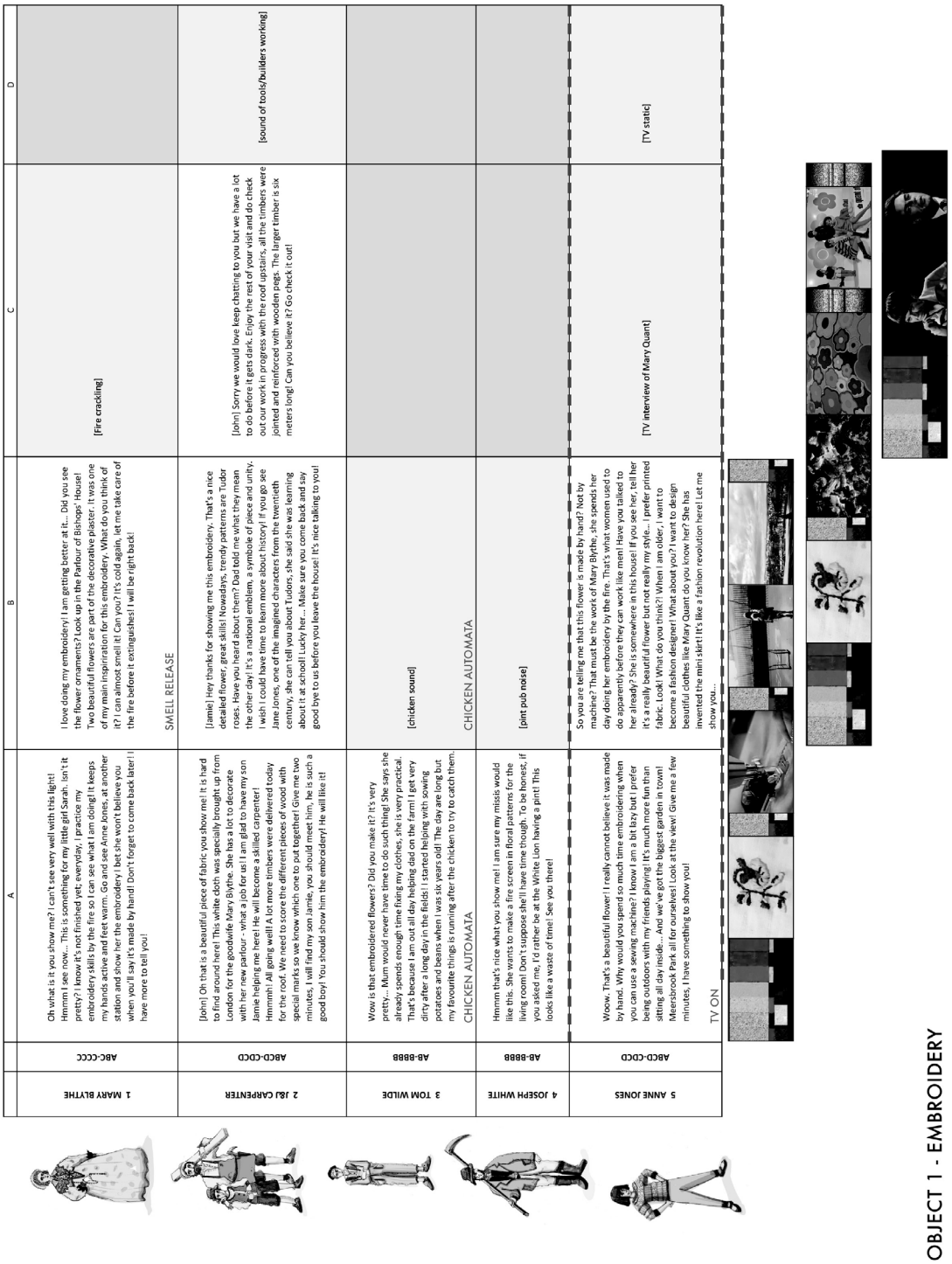
6-E Design synthesis

Examples of connections between design research artefacts and design research outcomes.

	CONTENT FOR PROTOTYPE	CONTENT FOR FINAL INSTALLATION
1	*Wow! Was this really made by hand? Not by my machine? Can you show me how to make one like this?*	*Woow. That's a beautiful flower! I really cannot believe it was made by hand. Why would you spend so much time embroidering when you can use a sewing machine? I know I am a bit lazy but I prefer being outdoors with my friends playing! It's much more fun than sitting all day inside... And we've got the biggest garden in town! Meersbrook Park all for ourselves! Look at the view! Give me a few minutes, I have something to show you!*
2	*Is it from granny's house? It's not really my style... Look! Mum just bought me a new jumper for my birthday what do you think?*	*This must be the work of Mary Blythe, women did not have the time to go out and work in those days because everything took so long to do by hand. Have you talked to her already? She is somewhere in this house! If you see her, tell her it's a really beautiful flower but not really my style… I prefer printed fabric. Look! What do you think?! When I am older, I want to become a fashion designer! What about you? I want to design beautiful clothes like Mary Quant do you know her? She has invented the mini skirt! It's like a fashion revolution here! Let me show you...*

6-F Content development

Comparison of content between a prototype and the final installation.

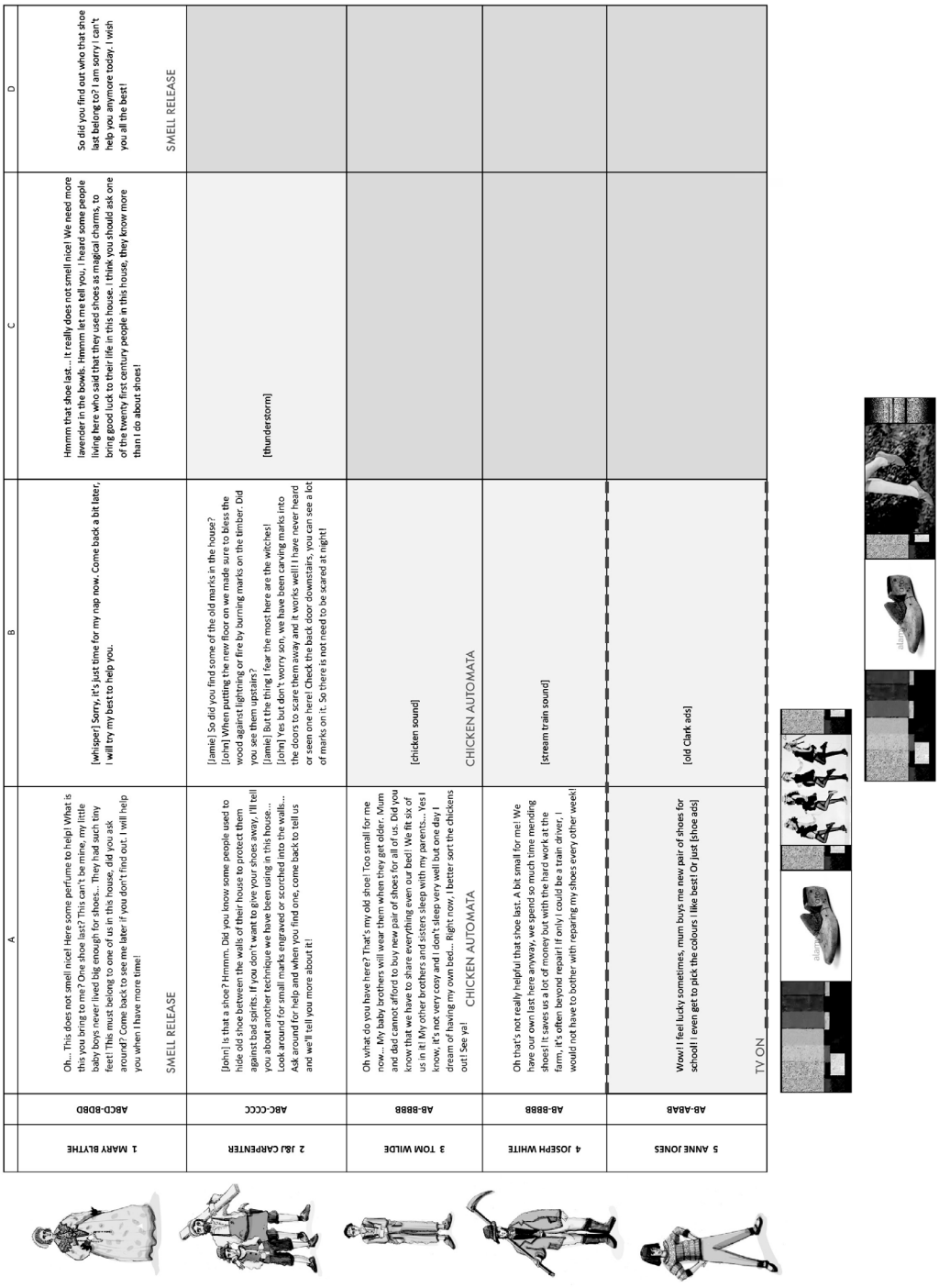


6-G Script for the Interactive Tableaux per object

Characters' reactions when showed with the embroidery.

6-G Script for the Interactive Tableaux per object

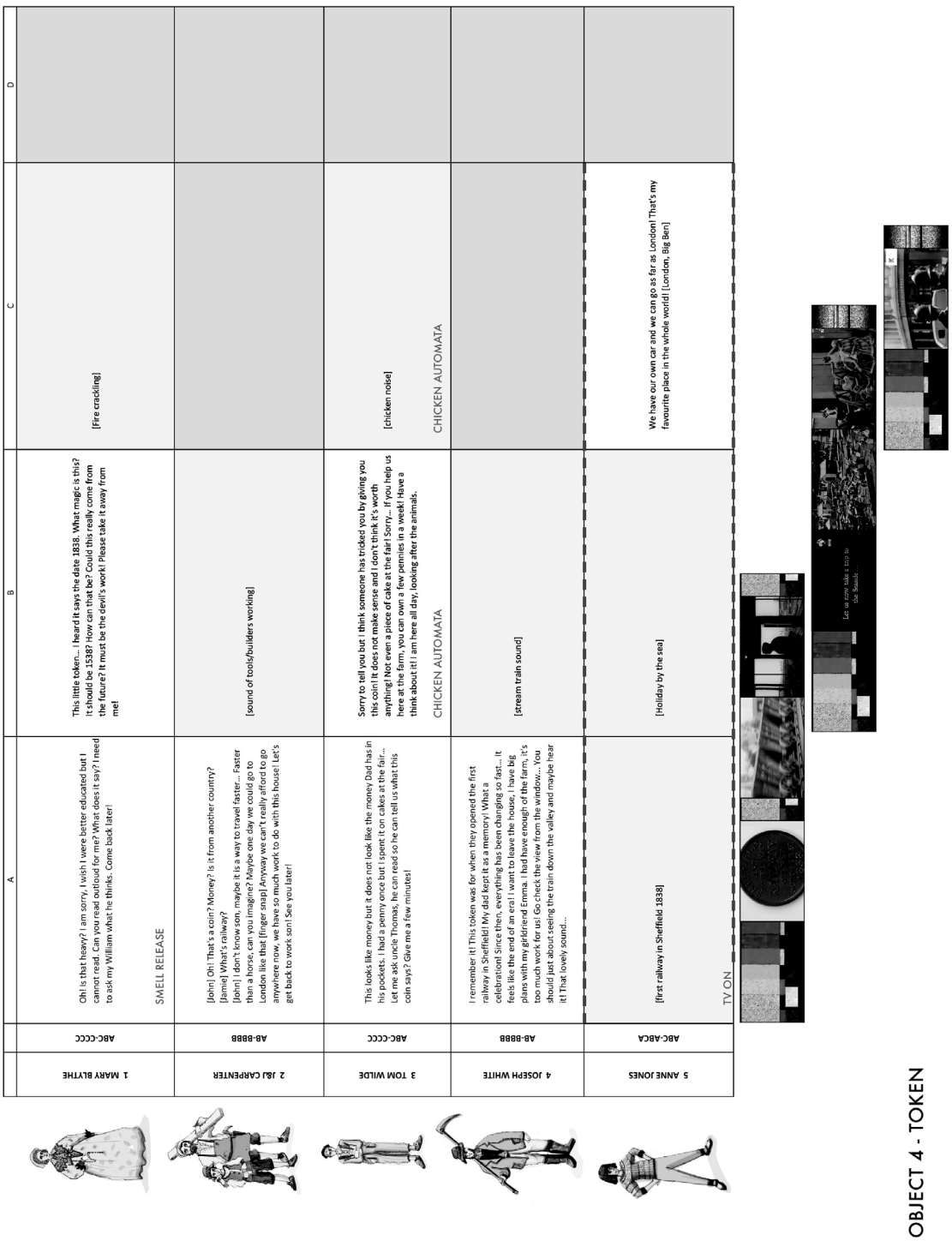
Characters' reactions when showed with the knife.



OBJECT 3 - SHOE LAST

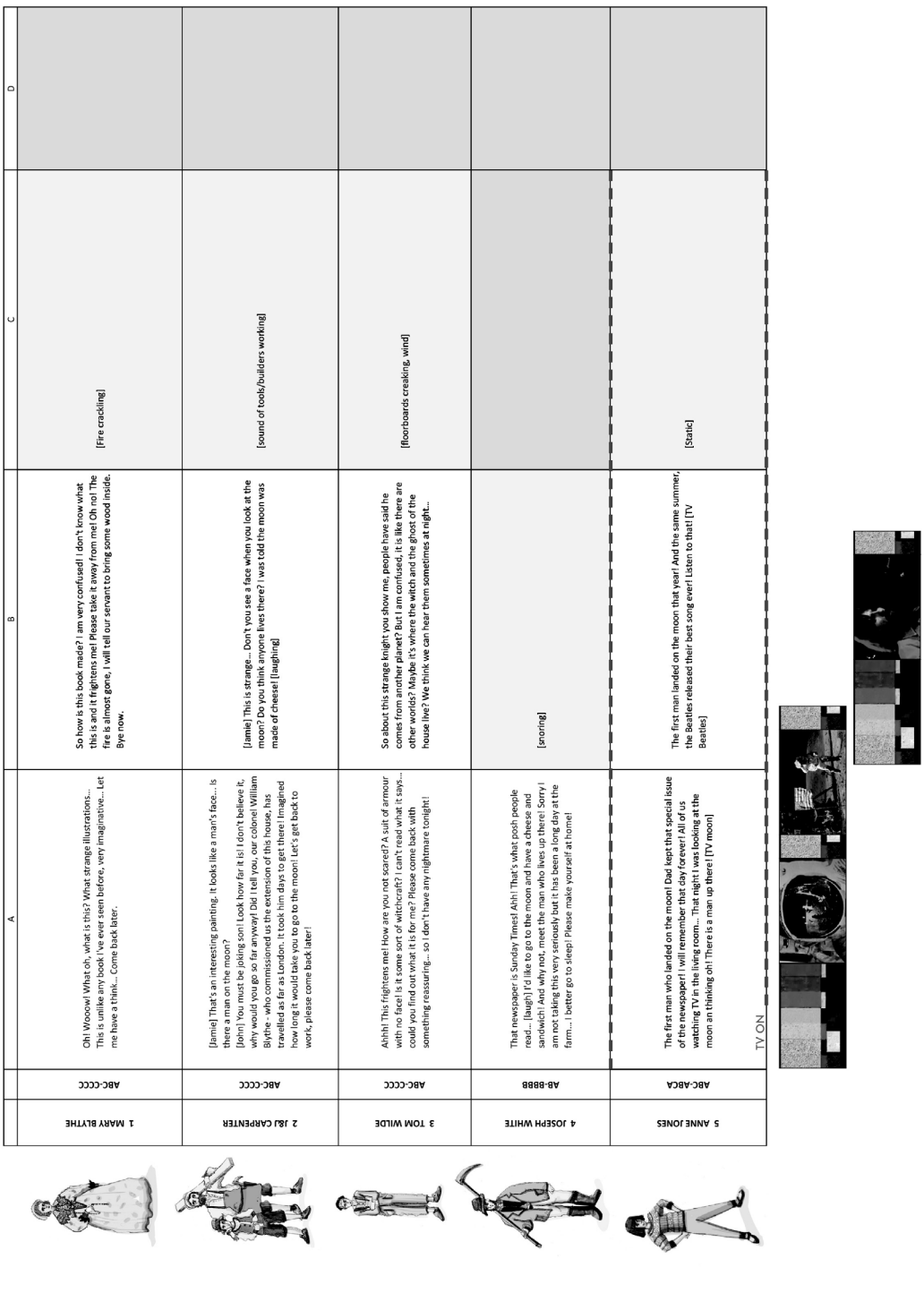
6-G Script for the Interactive Tableaux per object

Characters' reactions when showed with the shoe last.



6-G Script for the Interactive Tableaux per object

Characters' reactions when showed with the token.



6-G Script for the Interactive Tableaux per object

Characters' reactions when showed with the newspaper.







7-A The Interactive Tableaux

Details of Mary's tableau.







7-A The Interactive Tableaux

Details of John and Jamie's tableau.







7-A The Interactive Tableaux

Details of Tom's tableau.







7-A The Interactive Tableaux

Details of Joseph's tableau.







7-A The Interactive Tableaux

Details of Anne's tableau.

Your feedback is important for my research

Date:

As part of my PhD I created the interactive portraits with museum volunteers at the Bishops' House. I would be very grateful if you could take five minutes to tell me about your experience with the interactive installation today. By filling this questionnaire, you agree for me to use your answers for my research. Thank you for your help!

Have you visited Bishops' House before today? ☐ No, it's the first time! ☐ Yes, a long time ago ☐ Yes, I come regurlarly ☐ Other: _____

Today you visited the house... ☐ Alone ☐ With family ☐ In a group ☐ Other: _____

Which object(s) did you pick for your visit?

☐ 

☐ 

☐ 

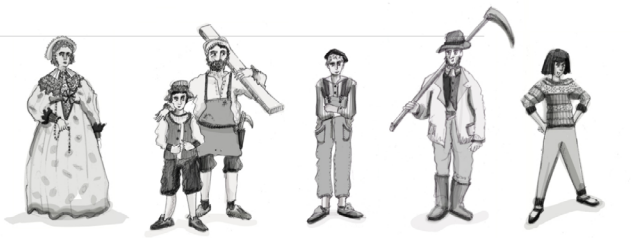
☐ 

☐ 

Did the object(s) remind you of anything?

Which character(s) did you like the best?

Can you tell me why?



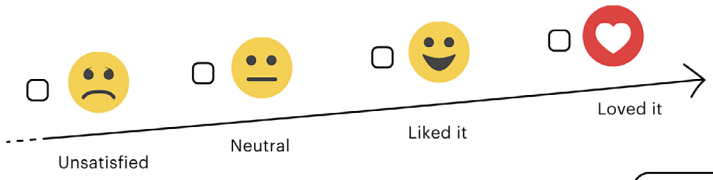
☐ *Mary* ☐ *John & Jamie* ☐ *Tom* ☐ *Joseph* ☐ *Anne*

→

7-B The Interactive Tableaux

Evaluation materials, questionnaire (front).

How much did you like the interactive portraits?





How would you describe your experience with the interactive portraits?

Was there something unexpected or surprising with the interactive installation?

Did you learn anything interesting about the characters, objects or house?

For this interactive exhibition, I worked with the volunteers to co-create the characters and stories. Would you come back to Bishops' House to see more characters and hear more stories about them?

- ☐ Yes, I would like to hear more!
- ☐ No, not really...
- ☐ Other: _____

Would you come back to Bishops' House anyway?

- ☐ Yes
- ☐ No
- ☐ Other: _____

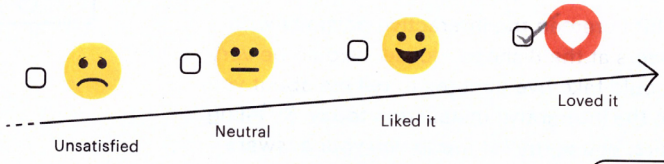
THANK YOU!

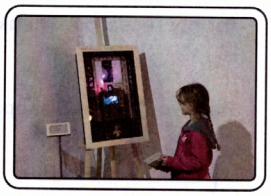
Caroline Claisse, PhD Candidate

7-B The Interactive Tableaux

Evaluation materials, questionnaire (back).

How much did you like the interactive portraits?





How would you describe your experience with the interactive portraits?

Wonderful! I went around all 5 with all 5 objects. I liked ~~seeing~~ hearing the character's personalities develop.

Was there something unexpected or surprising with the interactive installation?

How much content there was!

Did you learn anything interesting about the characters, objects or house?

I did know ~~that~~ all the facts about the house but it was fun to hear them in context!

For this interactive exhibition, I worked with the volunteers to co-create the characters and stories. Would you come back to Bishops' House to see more characters and hear more stories about them?

- [x] Yes, I would like to hear more!
- [ ] No, not really...
- [ ] Other: _____

Would you come back to Bishops' House anyway?

- [x] Yes
- [ ] No
- [ ] Other: _____

THANK YOU!

Caroline Claisse, PhD Candidate

7-B The Interactive Tableaux

Evaluation materials, questionnaire (back) completed by one visitor.