

*All human knowledge begins with intuitions,
proceeds from thence to concepts,
and ends with ideas.*
(Kant, 1781)

4.1. CONCLUSIONS

4.1.1. CURATOR~DESIGNER~VISITOR INTERACTION IN HSI DESIGN

Over a period of 10 years, I have been on a professional practice and research journey in heritage site interpretation (HSI) design. As a design practitioner, I continued to work on HSI projects, also working with clients on multi-disciplinary group student projects as part of my roles as a digital media lecturer, trying to ensure the students understood a collaborative and project based method of working with their peers. In that time, I have seen a growth in the interest, use and development of Design Thinking, with UX and UC design becoming a focus, initially in American museums, and then in UK museums. Participatory design, also known as co-design, (Damala *et al.*, 2014; Fuks, Moura & Cardador, 2012; Simon, 2010) has also been researched and analysed in

museum environments. Museum visitors have been encouraged to participate with interactive exhibits, take part in funded workshops and collaborate with museum staff, stakeholders and University researchers to understand how visitors and, more in general, citizens can engage more with museum exhibits and with heritage (Avram & Maye, 2016; Giaccardi, 2012a; Ciolfi & Bannon, 2002; Ciolfi, Bannon & Fernström, 2008; Heath & vom Lehn, 2009; Hetland, Pierroux & Esborg, 2020).

Despite some exceptions (see for example Petrelli *et al.*, 2016) heritage sites were not as advanced; there was a slower take up, trust and understanding of digital technology in this time, particularly at local smaller sites, which has since changed/is changing. The launch of the Beaulieu Abbey kiosk interpretation in 2010 was at the cusp of a period of change for heritage site interpretation. There is now more acceptance of mobile technology, with augmented reality and interactive exhibits in place amongst the more traditional interpretations (Vermeeren *et al.*, 2018). Heritage sites are generally presented as a specific moment in time, with the rooms 'dressed' in the relevant period as though the inhabitants have just left. In the last 5 years, with technology and high end 3D gaming software more accessible with regards costs and computing power, additional 3D applications, virtual and augmented, more engaging interactive exhibits can be found at larger heritage sites as well as museums.

Roles have changed and evolved within HSI as a result; designing interpretation is generally still reliant on decisions by the stakeholders (owners and managers), curatorial team, education team and front of house/visitor services' team. Interpretation briefs are generally still put out to tender or design teams invited/commissioned to fulfil the brief. This has been evidenced by the selected comparison case studies, and by my own practice working with the Beaulieu Abbey team.

In this thesis and my Reflection in Practice website, I have detailed and explained my professional practice in HSI design, how it compares to other HSI practice at larger heritage organisations by other design professionals. This was undertaken to answer the research question, which queries the nature and scope of communication gaps in the interrelationships between designer, curator and visitors in the ideation, designing and crafting of interpretation at heritage sites.

In answering the research question, I have undertaken multi-disciplinary research across the academic areas of User Experience Design (UX) and Interaction Design, and Heritage Practice, also bridging analytical and methodological frameworks such as Action research, IPA, Practice-led and Practice-based design, and Reflective Practice. From my perspective as a professional practitioner,

my deeper knowledge in these areas, strengthens and informs my expertise in the design of heritage site interpretation and interactive technology applications. My experience as a business owner helps me to see the value of business models, processes, team work and collaboration required in developing and crafting digital interpretation at heritage sites and museums. Through this, I am able to recommend suitable digital technologies and processes for different types of heritage interpretation, and understand what may be needed for 3D reconstructions of cultural heritage sites and how they may be portrayed. In addition, through understanding the value of visitor research and understanding, I know how to design the interpretation content and navigation in a way that different types of visitors are able to engage with the cultural history of a heritage site over specific periods of architectural change/time.

Through the set objectives, my research showed there was a communication gap between designers and visitors throughout the HSI process, through to installation and evaluation of the outcome. The review and comparison of three examples of professional interpretation design at three different heritage owned sites that were similar to those I worked in, highlighted that the relationship I had experienced working with the smaller Beaulieu team was unique. The cases showed that the design teams that were contracted in to deliver the interpretation were often different to a previous interpretation's design team. The curatorial team was also fluid in who was available, locally or regionally within the organisation, i.e. the teams were not consistent, as in the case of the Beaulieu curatorial team. Only one of the case study sites' interpretations involved visitor advocates in the design process. The two other sites relied on their knowledge of the visitors and visitors' feedback for planning the interpretations.

Understanding how the case studies' design teams worked with visitors in the interpretation design process was significant in highlighting two key factors:

- A lack of visitors involved in the design process
- A lack of consistency in teams to build knowledge, experience and trust in further interpretation projects.

The literature review further revealed that few interpretation design companies involve a visitor team or visitors in their design process; designers and visitors rarely worked together. Instead, a reliance on the use of personas built on information received or observed, was generally the approach used. Yet the literature stipulates how important it is to understand who is being designed for, and this can only be achieved by consistently working with them. Curatorial teams

and visitors were in communication, with the heritage organisation/curatorial/education and front of house teams employing the use of multiple methods for understanding visitors' experiences and engagement with the heritage site. Nonetheless, visitors as representatives through the ideation and design process were absent, although the use of visitor guides or audience/visitor advocates was evident in a few cases

A consistent team emerged as being a significant factor in building experience, knowledge and trust. As trust builds, assumptions are eroded, teams can work more effectively and quickly. Consistency also brings known skills and abilities which will grow with experience, forming expertise as a team.

Therefore, I designed and proposed a new model for professional HSI practice based on user centred design, to ensure visitors/visitor representatives were part of the full HSI design process followed by professionals, collaboration and therefore communication was possible between the curatorial, design and visitors team throughout, and recommendations to ensure those teams were consistent for each site. The model's name reflects the importance of the collaborative relationship in designing heritage site interpretation: Collaborative Heritage Site Interpretation Design (CHSID) (Chapter 4, section 4.2, Fig.87).

The CHSID model answers the questions raised in Chapter 1, Fig.1 as the research aim, namely:

- *'Visitors' who are they?* – a visitor team replaces this question and will help to understand other visitor types and the types of visitor expectations to design for
- *Is the Curator/Designer relationship important in crafting an interpretation?* – a combined team of consistent team members which has proven to be important for designing heritage interpretation
- *How can we measure and understand the gap in understanding who the visitors are, and whether it is important?* – again, a visitor team will help in understanding by being a permanent team working with the designers and curators. And yes, research has reinforced that it is important to measure/evaluate visitor feedback by all team members, not just the curatorial team members.

4.1.2. HOW SUCCESSFUL VISITOR EXPERIENCES ARE DETERMINED:

Throughout the thesis, I remarked on the importance of understanding who heritage site visitors are in, how to determine their visitor experience. Analysis of and reflection of surveys, observations, anecdotes, and feedback via comment cards, visitor books and social media have been undertaken as part of my work to determine the most effective method for gaining an understanding of their expectations and experiences. In this respect, Beaulieu has many years' experience in understanding their visitors with Munn (2013) explaining that they prefer to analyse their data rather than it being done externally because they 'live and breathe' Beaulieu and therefore have a better understanding of nuances in the data (Munn, 2013).

The growing use of online/social media platforms by heritage interpretation sites for interacting with their visitors also provides a rich source of visitor feedback. Third party online platforms such as Trip Advisor are known to provide honest, unsolicited feedback, i.e. visitors may provide feedback they want to provide rather than be directed by questions (Baka, 2016:p.153; Stoleriu *et al.*, 2019:p.3). When there is a need to direct comments, perhaps to improve a certain aspect of the site, questions can be posted on social media channels. For example, Beaulieu's team occasionally ask their Facebook followers 'name one thing that we could do better?' (Tee, 2013) with good effect.

The proposed CHSI design model advocates the inclusion of visitors to help professional practitioners in providing successful visitors' experiences. The combined team following the proposed design process model would also review feedback, discuss and evaluate throughout the planning and design stages in determining how visitors may relate to and engage with interpretation. The inclusion of a final evaluation and feedback stage is an additional and important step. The various stages, including the final evaluation stage, ensure that it is not just the heritage site that evaluates their visitors' opinions and experiences, as has been the case, but the whole team involved, i.e. the Design Team, Visitor team, and Curatorial Team, with lessons learned and taken forward to the next interpretation design project.

Similar to the layering of information and choice of content, the use of multiple feedback tools provides a rich resource for analysing and understanding a broad range of visitor types and their varied experiences. Designing visitors' experiences for heritage site interpretation, should, therefore, consist of the following:

- Visitor Feedback: using multiple qualitative methods i.e. finding out their stories, their opinions and comments. Statistical survey data is relevant for finding out demographic information with regards to targets and growth, but of relatively limited value for determining experiences. Enabling visitors to provide feedback without being led/biased by questions, i.e. completely volitional, should provide the most honest comments (Kouprie & Visser, 2009).
- Planning and Design Team: using a consistent team from which experience and understanding of the visitors forms a knowledge bank, shared understanding and trust which can be drawn on for future interpretations
- Design model: using an inclusive and collaborative design model, the CHSID model, in which a Visitors' Team (VT) forms a permanent part
- Design Process: using a thorough evaluative design process such as the new CHSID process, in which all members of the planning and design teams are consistently involved.
- Multimedia Interpretation Content: using storytelling/narrative of the inhabitants of a heritage site, providing a choice of time slices at the heritage site through the use of visualisations (2D and 3D), a choice of content at different levels, easy to use gamification providing interaction with content and knowledge gained of the site at different or generic age levels dependent on the heritage site
- Technology and Platforms: multimedia content should be available on multiple platforms, kiosk placement should be considered with regard to visitor flow, with more than one kiosk (or touch screen) available across the site. If the content is likely to increase dwelling time, as in the case of the Beaulieu Abbey interpretation, an area where visitors can engage with the content more leisurely without disrupting or delaying other visitors. By creating the multimedia interpretation as a responsive web application, access may therefore be achieved via visitors' personal devices, using their own data, or by accessing a guest login to the heritage site's WiFi, as well as other more static devices such as kiosks and fixed touch screens.
- Volunteer Guides: Volunteer guides provide a variety of 'stories' about the heritage site which are often personalised to the visitor group in front of them. They are also a friendly face that may make a huge difference to a visitor's experience, and can feedback to the CHSI team regarding visitors' comments from their interaction with visitors.

4.1.3. THE BEAULIEU ABBEY KIOSK INTERPRETATION:

Undertaking research for this thesis has been invaluable for understanding whether the kiosk application and content is a suitable resource for learning about the size of the abbey and its context in the community. Interviews with the Launch Guests, Beaulieu Team and External Professionals provided positive and constructive feedback regarding the importance of choice for different visitor types. Choice in whether, as a child, adult or professional/academic visitor, exploring the content made sense from the comments provided, as did the ability to see the abbey and abbey buildings in the different periods of time, as they would have been used. The cultural lifestyle of the Cistercian monks, the Royal visits, building the abbey and the dissolution are related via nine characters, each with their particular story. These were considered positive and engaging attributes by the launch attendees.

The positive responses support and validate completing the kiosk application to include:

- the two remaining levels: adult and professional/academic
- updated from Flash Player (PC only) to be multi-platform including mobile
- test usability of the KubeMatrix for mobile devices and touch screens
- research the addition of voice activation for people with disabilities
- research the addition of augmented reality in certain areas of the application

. There were a couple of suggestions for improvement such as labelling the KubeMatrix boxes and incorporating the different levels, i.e. adult and professional/ academic, with the 'child' version mostly used for the kiosk interpretation. The majority of the Launch Guests commented they would like to see the application available at other heritage sites, on mobile platforms and multiple kiosk placements.

A general concern by the Beaulieu Team for interpretation elements within an exhibition, either at the Abbey's Domus museum or the National Motor Museum, was the flow of visitors. For example, where there may be a queue forming at a particular spot such as the kiosk interpretation: a concern held by most heritage organisations. At the Launch event, a small percentage (17.6%) of the Launch Guests commented about not being able to use the kiosk because of a queue, therefore, adding mobile platforms and more kiosks for access would alleviate 'queueing to use' frustration for visitors and help to ensure flow through the interpretative exhibits.

Having reflected on the Launch event feedback also through HSI design literature, there is a clear need for an application such as the Beaulieu Abbey kiosk interpretation that provides choice and layering of information. There is evidence to support a requirement for additional information for a range of visitor types, including educational groups, which visitors can engage with in their preferred choice i.e. on site, off site, in front of an exhibit or in a space away from the exhibit (coffee shop, outside, nearby seating etc.). Provision of multiple resources of interpretation that tell a story of the building and the people who lived at or were involved with the site, helps to augment visitors' preferred method of learning and engaging with information. By enabling visitors' choice in how they interpret information may also help to provoke meaning and memories, therefore forming enhanced knowledge and experience in their visit.

In updating and completing the interpretation application as a responsive website, it can then be made available for the Beaulieu Team to use by their Abbey visitors. Research through the use of observations and talking with visitors using the application on their mobile devices, and iPads or touch screens installed at different points within the Domus museum could then take place. The resulting research could be analysed to discover aspects such as:

- the types of visitors that prefer to engage with digital applications and those that prefer not to
- whether the application's voice activation works well for people with disabilities to share the same exploration and learning experiences as people without disabilities
- the effectiveness of the choice of levels i.e. the correct level of information for child, adult and professional/academic
- whether the familiarization of using a heritage interpretation application which has a consistent approach, interface and brand would enhance use of the application and lessen perceived barriers to the use of technology at heritage sites (built heritage, ruins, places/spaces and museums)

Additional research for discovering how the KubeMatrix could be used for accessing content within other disciplines is a consideration based on feedback from the Innoventions Award (2004) and subsequent conferences and demonstrations. For example: accessing properties for sale in regional areas with the ability to view the property's room interiors, navigating around a museum, or a hospital, navigating other application content where there may be choice for different levels/age ranges of information such as online learning applications. With the technology

available, accessing 'rooms' and 'spaces' using the KubeMatrix as a navigation tool to choose the 'rooms/spaces' through virtual reality and/or mixed reality headsets would also be a significant design research area to consider.

Software technology has also increased in its ease of use, making it simpler and quicker to create applications using 3D environments and augmented reality for mobile devices. Researching the impact mobile and augmented reality may have on visitors being able to become more 'immersed' in the augmented world of past environments, would be valuable for future heritage site interpretation design. Research regarding whether visitors would be able to experience the heritage site through augmented and mixed reality in the same way as physically visiting the heritage site would provide further understanding of how visitors prefer to understand and learn about different heritage sites.

4.2. CONTRIBUTION TO KNOWLEDGE

NEW CHSI DESIGN MODEL:

In answer to the research question: ‘What is the nature and scope of communication gaps in the interrelationships between designer, curator and visitors in the ideation, designing and crafting of interpretation at heritage sites, and whether this is important?’ both the primary and secondary research I conducted confirmed that involvement and engagement with visitors throughout the HSI planning and design process are currently lacking. In the vast majority of heritage site interpretation design practice, visitors are considered but not part of the team. In order to ensure HSI design follows a growing movement towards a more ‘user-centred’ design framework within

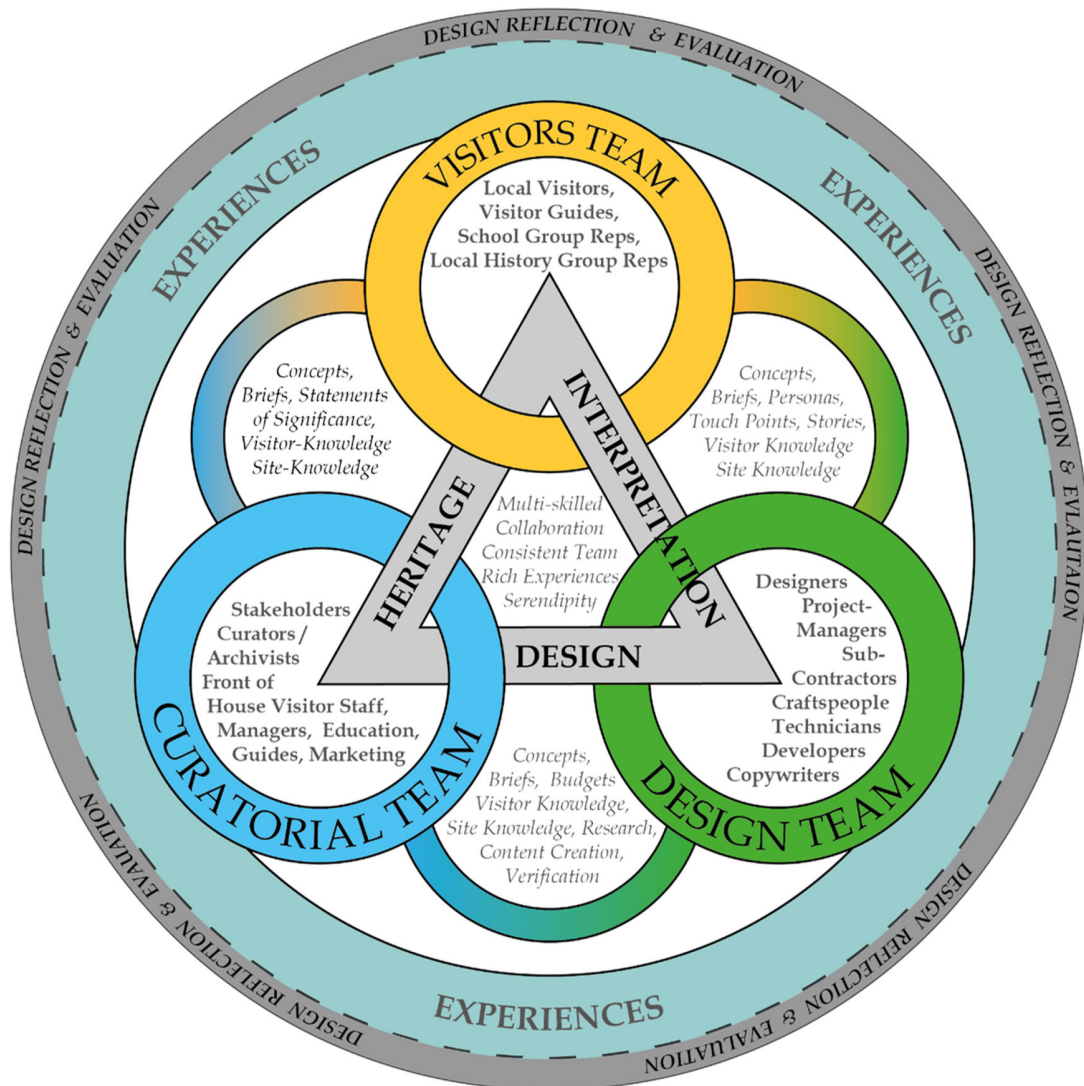


Figure 87: Collaborative HSI Design Proposed Model (Wilson, 2020)

the majority of design disciplines, I extended the user-centred design model to accommodate HSI design, by recommending the placing of a permanent team of visitors/visitor representatives with the Curatorial Team and Design Team in what could be called 'visitor-centred' design (Ciolfi, Bannon & Fernström, 2008; Hashim, 2013; Ch'ng *et al.*, 2020). Involving a team of permanent visitors/visitor representatives throughout the process would fill the 'gap' (Chapter 1, section 1.1, Fig.1) perceived and subsequently confirmed through my doctoral research. What also emerged was that the curatorial team and design team were not always consistent, and therefore trust and communication needed to be built/re-built for each interpretation design. Shared experiences, skillsets and knowledge of the site through collaboration of the specialist teams and stakeholders would not be able to grow, to create a consistent, reliable, communicative team of experts for the heritage site. Knowing how well our consistent, close working, reliable Digital Media Team worked together, it made sense to echo this in the development of the 'visitor-centred' model to reflect such a collaborative consistent team. The result, therefore, was the development of a new 'visitor-centred' interpretation design model for heritage sites: the 'Collaborative Heritage Site Interpretation Design' (CHSID) model, which is presented as a diagram in Fig.87⁸⁵ and further explained.

The proposed CHSID model includes a visitors' team, a physical presence of a representation of local visitors for the relevant heritage site. A tender or 'call', similar to a call for local volunteer guides, could be used to create a visitors' team of local people willing to be involved in their local heritage site and the design of interpretation. Dependent on the success of the call, a selection can be made to include as many visitor types as possible. Their involvement would be throughout the planning and design stages, therefore involved and engaged with the other teams rather than a (sub) conscious consideration.

Compared to the existing Beaulieu model (shown in Chapter 1, section 1.1.2, Fig.3), the new Cultural Heritage Site Interpretation Design model (Fig.87) includes three core changes:

Experiences Sphere:

The 'Visitors' sphere of consideration has been replaced by an 'Experiences' sphere' of consideration. The consideration for each of the teams would be how to create experiences for the visitors in the design of heritage site interpretation. The experiences of working together

⁸⁵ A larger image of the model can also be viewed on this link <http://thetalkingwalls.co.uk/wordpress/?p=3540>

would also build forming a useful knowledge bank for future HSI design projects, and trust, thereby eliminating possible assumptions in individuals' abilities, experience and knowledge (Black, 2005; Roberts, 2014). The model reflects the co-curation and participatory design processes already being used at certain larger museums (Ciolfi, Bannon & Fernström, 2008; Simon, 2010; Ciolfi *et al.*, 2016) and a few smaller sites (Claisse, 2018), although the emphasis on a consistent set of teams is not apparent in these existing cases as in the proposed CHSID model.

Design Reflection & Evaluation Sphere:

In the analysis of the Beaulieu Team, Launch Guests and External Professionals interviews, evaluation of the kiosk interpretation design was important to gain insights of the visitors' engagement, and therefore reflect on whether the kiosk interpretation required adaptation. In the different design processes, reflection is an important element throughout, yet this does not always seem to occur after delivery/installation. As an external designer for the Beaulieu project, I reflected on and evaluated the design on a regular basis to ensure the design, navigation and content formed a comprehensive view and understanding of the abbey for visitor engagement. I was able to test stages of development with colleagues at University and with my company colleagues, especially in the use of the KubeMatrix as navigation for mobile, web and kiosk platforms. On completion and delivery of the project, evaluation and reflection was initially concerned with whether I had completed and fulfilled my contract with Beaulieu and with the funding provider. I was also curious to know how visitors engaged with the range of content and choices available through the kiosk interpretation and keen to observe how they used the kiosk interpretation. The observations achieved have helped to develop the application further.

The analysis of the case studies' design companies and the Design Team interviews, reinforced my initial concern, i.e. that the client's brief was fulfilled on time and budget, not how visitors used their interpretation. Consequently, the new model highlights reflection and evaluation should be considered throughout the project process by each of the teams and their members. The CHSI design process (see Fig.84) also stipulates a final evaluation of the project, observations and feedback from visitors, reflection on what went well, what could be improved, experiences gained and feedback of the overall design experience.

Visitors Team:

The included Visitors Team would provide insights about their individual expectations, the aspects that may affect their experience and how they might be improved. Their personal insights and

experience would help to develop further visitor types and scenarios in discussion with the curatorial and design team. By also using an empathetic approach⁸⁶ (Kouprie & Visser, 2009; Scott, 2012:p.4; Devecchi & Guerrini, 2017:p.4; Dam & Siang, 2020), deeper insight and understanding of the type of heritage site interpretation design would form as a result.

Visitors do not just vary in type (Falk & Dierking, 2013:p.62)⁸⁷, they also vary in motivation and how they may visit, i.e. the same visitor may visit as part of a group, as part of a couple or alone. Each occasion means a different type of visit, and of experience. The Interpretation team would be able to make use of these experiences, building a 'visitor story journey', highlighting the different touch points where experience(s) may be formed. Personas, user journeys/stories and empathic design are all part of the user centred design (UCD) process, which is core to the Design Thinking methodology (Beckman & Barry, 2007; Lockwood, 2009; Dam & Siang, 2018). The two main differences that have emerged in the use of a UCD process are:

- the lack of consistent involvement of users/visitors (i.e. an active team) throughout the design process
- a lack of the designers' evaluation and understanding of their users'/visitors' engagement and experience with the outcome (Kouprie & Visser, 2009; Roberts, 2014)

By incorporating a representative team of visitors through the design process, the new model would negate the differences highlighted above.

Design Team:

Generally, the CHSI design team may comprise of sub-contractors (craftspeople, technicians, developers, copywriters) working under a project manager. The team may be an in-house CHSI design team (larger organisations) or contracted via a tender process; either situation tends to bring in the skills required for a particular heritage site interpretation project as and when required (Montagu Scott, 2013). The most effective outcome appears to be when the CHSI design team is reasonably local and known by the heritage site curatorial team, and where the teams have experience in working with each other, and in heritage site interpretation design.

⁸⁶ An empathetic approach (or empathic) is used with Design Thinking and Participatory Design to understand others' experiences by imagining ourselves in their role, their culture and background.

⁸⁷ Visitor types for this thesis also refers to Experience Seekers, History Buffs, labels or 'tags' used by English Heritage and also by Trip Advisor.

Curatorial Team:

The research I conducted did not lead to identifying a 'typical' Curatorial Team; the case study heritage organisations differ in how they are structured, and therefore the make-up of the different teams also differs. The main premise, reviewing the case studies and Beaulieu, involves stakeholder and managerial representation, curators, archivists, the front of house staff, visitor guides and education representatives. In the case of Beaulieu Abbey (plus Palace House and Bucklers Hard), the curatorial/interpretation team consists of one archivist who is also responsible for education (Living History) and one designer who is also a stakeholder and curator. The team refers to the Management Team and Stakeholders, although as the team consists of one of the stakeholders, the decision-making process can be expedited more simply than possibly the case study teams' decisions. The Beaulieu team as a small, multi-skilled team (Montagu Scott, 2013), brings in additional skills when they need to, using people they have already worked with, ensuring consistency and understanding.

Outcomes: collaboration, understanding, experiences, serendipity and trust:

The curatorial and design team would work closely together to be most effective; consistency in teams would aid collaboration and understanding between the team members, i.e. they would already know each other, built trust in abilities and recognised each team member's soft (and software) skill strengths. The research has shown that it is beneficial if there is a consistent team (Roberts, 2014:p.203). Projects can usually move more quickly, learning curves diminished, collaboration and communication made easier/smooth, due to the trust that has been built and recognition of others' expertise within the team. Chance acquisition of new knowledge (serendipity) provides added value to each of the team members' experience, increasing their knowledge and skills (Nonaka, 2007; Copeland, 2017). The Beaulieu team is a consistent team; they are experienced in what they do but also in working with each other. Their knowledge of each other, their strengths and abilities were highlighted in the interviews. Working with such a cohesive team was a good experience and a valuable lesson that I have been able to use in forming our Digital Media team⁸⁸.

⁸⁸ The Digital Media team consists of multi-skilled practice based lecturers who teach on a range of Digital Media degrees at the University of Winchester, Department of Digital Futures.

NEW CHSI DESIGN PROCESS:

Two of the thesis aim’s objectives stated: ‘evaluating methods used to measure and understand visitors’ experiences of interpretation design’ and ‘how this translates through the design process and interpretation’. In developing an understanding of the different design processes used within professional HSI design, I realised there was a definite lack of a detailed step-by-step process for the various stages involved. There were a few examples (Black, 2005; Veverka, 2011; Tilkin, 2016) which provided a reasonable outline, but I could not find a comprehensive detailed design process, which could be used as a flexible template for the majority of HSI design.

I would not have been awarded the funding for the Beaulieu Abbey kiosk interpretation had I not provided a detailed plan, schedule, timeline and costs within the funding plan. To map and provide this information, I needed to work out and clarify what was involved at each stage of the project i.e. a detailed step by step process. Having had to do similar as a business owner, I was able to achieve this reasonably well albeit with research. The successful business plan became the project brief, for which the step process was also required, making it clear for those involved what the tasks were and when they needed to be completed.

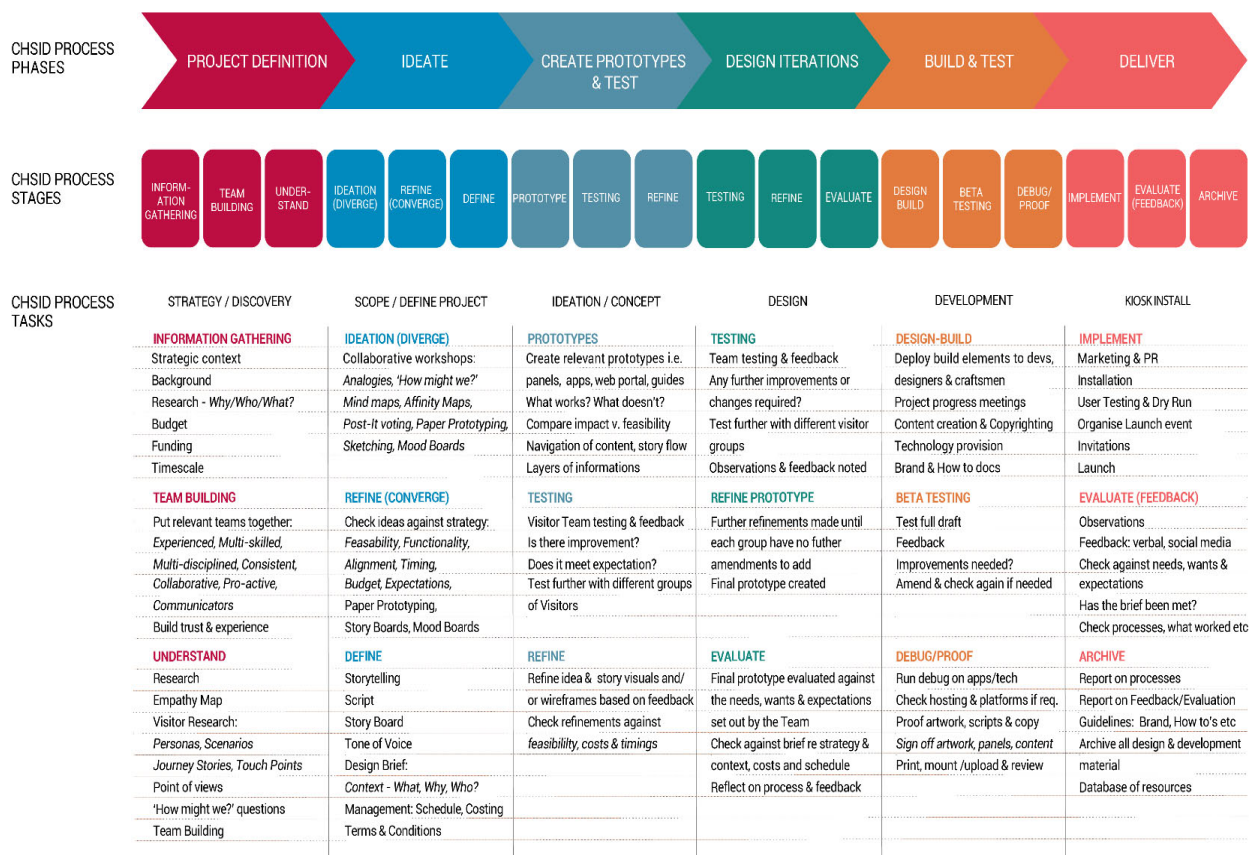


Figure 88: *New 'Collaborative HSI Design Process' (Wilson, 2020)*

I therefore considered that in providing a new model for designing HSI, with an accompanying flexible stepped design process to follow for each stage, would be beneficial in helping to take the model forward for future HSI design (Roberts, 2014:p.194). Taking this into account, I re-worked my original Beaulieu design process (Chapter 2, section 2.1.1. Fig.34) to create a detailed design process for future HSI design (see Fig.88)⁸⁹. The new CHSID step process involves six consecutive 'Phases' each containing three 'Stages' of 'Tasks', guiding the teams on what should be considered at each Stage, similar to the Beaulieu Abbey existing design process. The list of 'Tasks' cover generally what may be required for the design of an HSI design project, there may be tasks that are not relevant or tasks that may change slightly depending on the type of interpretation; they are for guidance, consideration and possibly discussion at the start, and during, the HSI design process.

With the Beaulieu Abbey kiosk project (and subsequent projects such as Hyde and Malmesbury Abbey), research to inform the design was vital throughout the process. For the abbey, it was initially to learn more about the subject areas, then how the abbey was built, understanding the culture of Cistercian monks, what they wore, how they lived, how the building developed, the historical references regarding the use of the abbey and then the dissolution. In addition, research about the best method of 3D modelling, the textures to ensure a certain level of realism and authenticity, the technology and kiosks to purchase was required; research regarding the visitors, and researching the guest list. Research is, therefore, an assumed process to be undertaken at each Stage as necessary for each project. The only Phase where it has been consistently mentioned is in the first Task list: 'Strategy/Discovery' when research is required for 'Information Gathering', 'Team Building' and 'Understand'. The Task lists, thereafter, suggest research is required for each list item.

The new CHSIDP (Fig. 88) has also been designed as a set of laminated 'cards' which could be used in the collaborative team meetings as prompts for discussion, reminders or checklists (see Appendix K).

⁸⁹ A larger image of the model can also be viewed on this link <http://thetalkingwalls.co.uk/wordpress/?p=3540>

4.3. RECOMMENDATIONS FOR FUTURE RESEARCH AND APPLICATIONS

The work I have undertaken for this thesis highlighted areas that would be valuable to re-visit for further research and analysis. Further research to evaluate how the CHSID model and process compares with the design processes of smaller heritage site organisations would be essential in establishing their use in the field of heritage site interpretation design.

The additional research would also provide an opportunity to review the changes that are happening in curatorial and management practice at heritage sites, and changes in the technology now available and used in museums (for example, augmented reality or mixed reality via headsets or mobile devices for viewing (and walking through) rooms, buildings, and gardens that once existed). Furthermore, it would be beneficial to HSI design teams to understand how visitors respond to differing forms of technology at similar heritage sites.

Reflection on how the proposed CHSID model and process would have worked in my heritage site interpretation design for Hyde Abbey, and how it is currently working for the Malmesbury Abbey HSI design in comparison to the 2008-10 Beaulieu Abbey kiosk interpretation would add to a valuable body of knowledge involving applied research and knowledge exchange impact for future CHSI design. Hyde Abbey and Malmesbury Abbey (and Market Town) HSI involved community groups and media companies working with Digital Media at the University of Winchester. The difference in approach to each is significant in understanding the resulting interpretation. For example, Hyde Abbey involved a disparate team with completely separate projects, consistently changing, with additional requirements, whereas Malmesbury consists of a cohesive team with each sub project clearly aligned to an overall outcome. Ideally, reflection of practice involving the team of visitors throughout the planning and design stages of the proposed CHSID model and process would be the next step from the completion of the Malmesbury Abbey HSI design. The reflection and subsequent evaluation would focus on the effectiveness of the visitor team, team collaboration and communication in the planning and design of the Malmesbury Abbey heritage site interpretation design.

My team and I are about to embark on a new 'CHSI' project 'Virtual Cities - Winchester', covering approximately 6 time 'slices'. This will be undertaken by our Centre of Enterprise, Design & Innovations' Digital Heritage Interpretation team over the next couple of years, using the CHSID model and process. This will involve a larger, mostly in-house design team, working with different Faculty experts. It will be an important project to thoroughly test the new model and process.

Before undertaking research regarding Practice-led and Practice-based design research PhDs, I found it confusing in trying to find a 'formula' or PhD structure that would suit a design practitioner, design researcher or research designer. Design is a growing field in areas of Design Thinking, Human Computer Interaction, User Experience and User Centred Design involving critical thinking, critical inquiry, analysis and innovation. As design importance expands within a multitude of industry disciplines, so will the amount of design professionals who wish to take their practice to a greater level of research, such as a PhD, to inform their practice or advance their career. Design Research and Design Practice as Research will, therefore, require a flexible framework (and language) to bridge design practice/design research with academic research. My table, 'Figure 9 - Design PhDs' in Chapter 1, section 1.2.1 is aimed at addressing such a framework, and is an additional contribution to the growing body of work in Practice-led and Practice-based design research PhDs.

A further outcome of this doctoral work is the possibility of developing a taxonomy for a common design language which can be used by heritage site interpretation design teams, based on Bloom's Digital Taxonomy⁹⁰ (Kleinsasser, 1996; Armstrong, 2006; Churches, 2007). The difference in terms used within the field of design and the different design disciplines may appear to be confusing for designers from the different disciplines, but, more importantly for CHSID team members not involved or trained in design⁹¹. A by-product of the thematic analysis of interview and feedback data was recognition of the frequency of words and terms used by the curatorial professionals, designers and launch guests, and how they differed according to their discipline. Research has proven that for teams to be able to communicate clearly, a common language is normally required (Veldpaus L, 2016). Initial research has proven that there is a collaborative design taxonomy (Ostergaard & Summers, 2009), although this is collaboration amongst engineers primarily, a UX Web taxonomy (Wondrack, 2015) and a taxonomy of design methods process models (Céret *et al.*, 2013), but as yet not a common language taxonomy for multi-disciplined, collaborative heritage site interpretation, or interpretation design per se. Further research can determine whether a heritage interpretation design taxonomy would be valuable in communication between the team members, and if considered positively, I would like to develop this further as an addition to the CHSI design model and process.

⁹⁰ Bloom's Digital Taxonomy is an adaptation by Andrew Churches of Bloom's Taxonomy of Verbs

⁹¹ A range of word frequency 'Wordles' for the three groups i.e. curators, designers and visitors, which highlighted the difference in terms used, can be found on this link: http://thetalkingwalls.co.uk/wordpress/index.php/nggallery/thumbnails?page_id=1689

4.3.1. IMPACT OF THESIS ON PERSONAL DESIGN PRACTICE AND DESIGN RESEARCH:

By undertaking my doctoral research, my theoretical understanding of design processes has grown considerably. In addition, self-understanding and confidence in and of my role as a professional heritage site interpretation designer has also grown. From this research, I have already received requests, and completed work for smaller heritage interpretation projects, in which our digital design and development students have assisted, making use of current technology such as Augmented Reality and Virtual Reality, 3D interactive game software such as Unreal and Unity, QR codes and web apps. Through these interpretation projects, 'we' are collectively learning about navigating through 3D virtual space and how to deploy interactive 3D content to websites and web apps, as stated by Lawson (2006):

'Design is a collective process in which the rapport between group members can be seen as significant as their ideas.' (Lawson, 2006:p.240).

The impact on my work as a design lecturer, is also significant. The theory of design and design thinking has been built into the programmes, with students learning through collaboration across modules for multi-disciplinary projects, including client projects. The formation of the 'digital design and development' team has benefitted from the collaborative design research, with student groups also benefitting from research regarding team communication, and how to understand the team's individual skills and strengths. Engaging students in 'doing' and 'making' and encouraging independent study by layering information are aspects brought through from the interpretation design research. Each project the 'student teams' undertake are critical to their process of self-development and understanding of working collaboratively.

In addition to my lecturing role, I am also the Co-Director/Founder of the Centre of Enterprise, Design and Innovation (CEDI) which has been formed to engage in knowledge exchange activities, research and consultancy. As part of this centre, a unit for Digital Heritage Interpretation Design has been formed, in which I will be working with colleagues and students to design and create heritage applications, applying research and practice from this thesis further into the future.