

Northumbria Research Link

Citation: Mason, Marco (2017) User Experience Design. In: The Manual of Digital Museum Planning. Rowman & Littlefield, Lanham, Maryland. ISBN 9781442278950, 9781442278967, 9781442278974

Published by: Rowman & Littlefield

URL: <https://rowman.com/ISBN/9781442278950>
<<https://rowman.com/ISBN/9781442278950>>

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/id/eprint/45732/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)



**Northumbria
University**
NEWCASTLE



UniversityLibrary

Designing Digital Experience

Introduction

“Technologies migrate as they mature. In early childhood, their very existence is a marvel, even as people wonder what can be made of it. In early adolescence, they become more and more able to perform useful functions for us, and for a while, they are judged primarily on their ability to do more and more, better and better. Finally, in maturity, it is the quality of the experience provided by these technologies that matter.”

Designer and theorist Donald Norman,

Designing digital media for museums is no longer about the technology or functionality alone but about the experiences it delivers to diverse visitors. In Chapter XX, Lisa Wright describes some of the ways in which museums are using digital technologies to enhance people’s connection with collections, with each other, or with research, ideas and stories.

The design methodology I present in this chapter applies to those types of museum experiences that are enhanced by the use of digital media, which Lisa Wright describes as those that does not separate the digital experience into something different from the overall museum experience. Those include mobile applications, augmented and virtual reality experience, digital multisensory technologies and more basic digital interactives (also called ‘interactives’) - such as a touch table or a video game.

Many of these experiences are developed through a process called *Visitor Experience Design* (VX design) in which *design* is not just about the form of an object or system, but instead a dynamic *method of thinking* that places the visitor at the centre of the design process. VX design is premised on the idea that a successful experience is the result of understanding and responding to visitor needs, behaviour and expectations. In this aspect, VX design is not specifically for a digital experience, but can also be applied to any aspect of exhibition design. Rather than focusing on a specific technology and what it can do, VX

Design aims to facilitate or enhance an interaction- the design of the interaction determines the quality of the visitor experience.

This chapter can be read in conjunction with Lisa Wright's chapter. It focuses specifically on the VX design approach which guides the discovery, creation, and development phases of a digital project. It begins by describing certain principles that characterise VX design. I then explore the levels of design that need to be considered in a digital project- working from visitor experience towards the concrete visual design of the interface. Finally, I provide a step by step guide to the VX design process, including sample design techniques.

VX Design Principles

Visitor Experience Design is based on a number of principles which determine a particular way of working as follows:

1. **Approach design as a *visitor-centered practice*.** Putting visitors first requires that the designer has *empathy* for the visitor- particularly when it comes to understanding why the visitor engages with the experience, what they expect from their engagement, what barriers may stand in the way from them having a full or satisfying experience and other factors. Empathy is built through qualitative visitor research. *Ethnographic methods* such as interviews, observations, and immersion in the field can provide a more nuanced understanding of motivation, behaviour and expectations than an analysis based only on statistical data (see "Research phase").
2. **Embrace diversity.** Museum visitors are diverse. Attempts to empathize with visitors should acknowledge the different types of visitors- teachers, learners, children, teens, artists, scientists, community workers- and attempt to develop a nuanced understanding of each one.
3. **Collaboration is key.** Museum staff have different forms of expertise. Design

activities – such as creative brainstorming sessions, **design charrettes**, and design workshops should include museum professionals from different departments in order to ensure that a wide range of perspectives – from curatorial concerns to technical features - are incorporated into the design process. These charrettes should also ideally include the end users as well.

4. **Use Visualizations:** In a group comprised of people from various backgrounds and areas of expertise, using a range of visual techniques – from deliverables to prototypes – offer a common language that increases communication and, in turn, enhances teamwork collaboration, encourages participation, and boosts creativity, hence fostering innovation¹. Visual tools effectively support communication because they are effective “tools for thinking”
5. **Assume Change, Be Agile.** **Agile development** is a term and practice borrowed from the software industry that foregrounds ‘customer’ collaboration, enables quick response to change and emphasizes continuous development. Agile methodologies embrace an *iterative process* to advance design through cyclical design iterations. A ‘portion’ of the whole problem may be developed and tested among end users which is then adjusted based on this feedback.
6. **Adopt prototyping.** Prototyping plays a fundamental role in agile development as it allows for the evaluation of a possible solution and then the use of the feedback to create a new prototype, advancing the design towards the best solution. *Low-fidelity prototypes* - which can be as technically simple as a paper mock-up, are particularly useful, especially in the early stages of design. Creating low-fidelity prototypes does not require specific skills, which enables professionals with different backgrounds, i.e., curators, conservators and educators, to play a meaningful role in the design process. In addition, prototyping at any level of design offers the possibility of

experimenting and failing early which encourages early development of many possible options.

The “culture of prototyping” is at the basis of advanced design practice as it is related to the “continuous learning” that takes place during the entire collaborative design process. During the iterative process, team members go through a learning process as they gather knowledge by experimenting; designers and non-designers employ different types of prototypes together in order to explore possible solutions and their suitability, according to the particular problems faced during the three levels of design.

Levels of Design

Visitor Experience design treats aesthetic, experiential and technological issues simultaneously through multiple iterations instead of as a linear sequence where one hands off to another in a fixed sequence. A good VX design addresses equally the overarching visitor experience; the concrete structure that arranges content, interactions, and functionality; and the final details of the graphic interface. This applies to projects at any scale - from complex information systems (for example, a network of multiple devices), to simple interactive designs such as a mobile app. VX design considers the following:

- The *level of experience*: How the experience makes the visitor feel or what the experience will make the visitor do? The ‘experience’ can be understood through a narrative, which outlines the environment, context, needs, and motivations of visitors. This level of design is often informed by audience research- using ethnographic research methodologies such as focus groups or observation.
- The *level of interaction*: Levels of interaction refers to the way visitor experience is structured. An **Interaction Framework** consisting of storyboards, wireframes and

~~verbal descriptions is used to represent the way a visitor moves through content.~~

These structure are defined by using storyboards, wireframes and verbal descriptions to represent the way a visitor moves through content.” Other techniques such as visual style guides and mood boards can also be used to define the high level “look and feel” of the interface.

- The *level of the interface*: At this level, the designers give form to the structure and functionality of the experience. They address the following questions: What are the graphic components that constitute the interface? What shapes do they take? Where should we place them on the screen? How should visitors move between one graphic element and another?

<Insert Figure x.1: Levels of Experience here>

The VX Design Process

The VX Design process happens at 3 different levels, and emphasizes empathy and collaboration with end users, multi-disciplinary design teams, and an agile methodology- that uses prototypes to iterate until a final design solution is achieved. The following is a step-by-step guide to the VX design process- which is summarized in Figure x 2 below. .

<Insert Figure x.2 VX Design Process here>

Step 1 –Research

There are four types of research that inform VX Design-

- Visitor Research
- Organizational Research
- Technical Research
- Interpretive Plan

This research may be done during the planning stages of the project and/or may take place once the design process has begun. Here we will assume that the design process starts with understanding potential visitors and their journeys as well as the goals of the institution. The former furnishes a deeper understanding of how the experience can satisfy visitor needs, desires, and expectations, while the latter provides context for the experience, including, for example, organizational goals and exhibition objectives, and the physical environment.

Visitor Research

In order to understand the potential user or visitor of a digital experience, team members – museum practitioners and/or designers – need to collect data using various forms of research methodologies. These include ethnographic research methodologies which can support the development of empathy, quantitative research to determine audience segments (for example, learners have specific requirements - see Chapter YY, as may families, professionals and others) and data analytics (see chapter XX) which can give insight into past interactions. This research then will be analyzed in the subsequent “Design Requirements” phase where various outcomes are visualized as models.

<Insert Side Bar 1: Ethnographic Research Methodologies>

Organizational Research

Data from key members of the organization and project stakeholders should be collected in parallel with visitor studies. This is done in order to collect maximum information about the museum’s vision and interpretative goals regarding, for example, how the interactive(s) and information systems should conform to the museum’s (digital) strategies and impact its overall mission. Economic issues (e.g. investment of resources, the business model, etc.) and project feasibility are other important aspects of project preparation. Beyond interview sessions with stakeholders, other activities that foster the exchange of

knowledge and information should be undertaken through meetings, the exchange of documents, literature reviews, and joint brainstorming sessions.

Technical Research

No project is without technical problems: knowing them in advance allows the design team to develop solutions. The experts to interview are those responsible for implementing and maintaining the solution, such as IT/web & new media developers. Valuable data may also come to light from investigations into other mobile projects through direct observation and a review of specialist publications and research reports.

Interpretive Plan

The Interpretive Plan describes (in words) the visitor journey including the communication objectives of the experience, key messages it seeks to convey and how content should be communicated via the experience. The Interpretive Plan may make use of diagrammatic sketches such as mind-maps, affinity diagrams, and bubble and Venn diagrams help to gather themes and organize them into groupings based on relationships between arguments. The interpretive plan is typically informed by a basic understanding of the theme and content of the exhibit (based on a curator's briefing and interaction with other content experts), and aims to translate 'raw content' into a story that is compelling and relevant to the visitor. The interpretive plan for an exhibit can then be broken down into **multimedia treatments** to guide the development of specific digital experiences. Multimedia treatments are a narrative description of the digital experience in form of, for example, storyboard as described in more detail in the section "The Design Framework: Storyboards and Wireframes" below. Also, see Chapter XX for more on Interpretive Planning and Media Treatments.

Step 2 - Design Requirements

Overabundant data can be confusing and therefore unusable if it is not analyzed, interpreted and presented in a way that supports the design process. *Design Requirements* bridge the gap between research and design; the visitor experience defined on the more abstract level (see Experience Level) are translated in more “tangible” interactions. They are neither features nor interface functions nor technical specifications, rather, they are statements that provide insights into the design as a whole, define *what* the interactive objects should do, represent and consolidate visitor and stakeholder demands, and set design parameters without being specific about *how* they will be met.

Clear design requirements constitute a key underlying aspect of the overall project because in their absence each member on the team might work from a different idea. Clearly articulating what you are designing enables everyone to know the projects’ goals and when they’ve been reached. Design Requirements can include, but are not limited to the following:

- Visitor Experience Requirements
- Content Requirements
- Functional Requirements
- Look and Feel Requirements

Visitor Experience Requirements

The first step in generating visitor experience requirements is to define visitor motivations. Without a clear idea of a visitor’s reasons for engaging, it is difficult to create a compelling visitor experience. Creating narratives is an effective method for imagining ideal visitor experiences and high-level interactions. Experiences created around a story are more engaging, as digital systems are designed to provoke in the visitor a series of behaviours that take place over time.

One effective narrative technique to analyse the data gathered from visitor research is the *persona*², which is a sketch of an archetypical character – around a page in length – that describes an individual with a name, a picture and a story that describes their motivations, goals, emotions, and behaviors (Figure x.3). The *persona* is a great exercise in empathy. During the entire creative process team members constantly refer to it whenever a question or concern arises about how aspects of the digital interactive should be designed to satisfy visitor needs. Other effective techniques include empathy maps, emotional journey maps and user experience maps.

<Insert Sidebar 2: Mapping Visitor Motivations>

Once the persona has been created, the team can place their fictional persona into a series of *scenarios*, thus creating visual narratives of possible end results (Figure x.4). These scenarios can include engaging with the experience but also social interaction with peers or a museum guide during the process. During this process, team members think about the story visitors might experience, and from this, common elements emerge to help figure out how to satisfy needs and goals. A scenario helps a team to think through how interactive objects can support the personas (i.e. the visitors or users) to achieve their goals – and, in turn, to satisfy their experiential goals by establishing the primary touch points the visitor has with the system. By focusing on high-level actions from the perspective of the visitor, the team members extract design requirements.

<Insert Figure x.4: Example of a Visual Scenario here>

Content Requirements

Content requirements describe what kind of information needs to be presented to a visitor, and in what form and structure. They are guided by the interpretive plan that identifies how the content should be structured.

Content requirements for digital media experiences will vary depending on the type of experience. Generally, digital content will be text, images, audio, or video. Content for a mobile app audio tour would be descriptions of each stop on the tour; a digital game would need text scripting out the challenges and questions for visitors; an augmented reality experience will need images or video and text to layer onto views in the museum. The assigned content team must work with the experience designers during this stage to ensure that the planned content will work within the digital experience, i.e. how much text, how many images, how long of an audio or video clip?

<Insert Sidebar 3: Guidelines for Content for Digital Experience>

Content requirements might have software implications that are related to the functional requirements. For example, the museum team might decide to handle content through a content management system (CMS) which will enable centralized control and more efficient updating. (See Chapters X and Y). This technical requirement has to be decided at the early stage, as it will affect the next design phase and the final software development.

~ The content and its structure are crucial to define the digital interactive structure and lay out the interface functionality. Without appropriate logical organisation of themes and sub-themes, the effectiveness of the final digital product will likely be compromised.

Functional Requirements

~ Functional and technology features are factors that, concomitantly with visitor experience and content requirements, influence visitor experience. The functional requirements determine what the product should do, that is the main (general) actions that visitors will perform (e.g. the system should: visualize statistic data; explore different levels of content; share content through social networks; locate the visitor position; and so on). Functional requirements include considering the languages of the experience, the height

(whether it is reachable by children or people with disabilities), access to Wi-Fi and so on.

Technical requirements that might be included in this stage is the form of the experience. For example, a multi-touch table provokes different interactions compared to a large multi-touch wall. Another technical requirement might come from technological constraints such as inability to install a Wi-Fi system in the entire building or the limitation of using a particular screen in an open place where the sunlight would prevent a clear visualisation of the interface.

Particular kinds of functional requirement are dictated by necessary attention being paid to visitors with disabilities. A **Universal Design** approach ensures that digital media is as accessible as possible to everyone. Guidelines for universal design are provided by a number of regulatory documents, such as the USA's Americans with Disabilities Act of 1990 (ADA) – which provide guidelines about, for instance, dimensions of a screen or interactive device or size of text.. They may also be addressed in the museum's policies. For example, the Smithsonian's policy is that “All exhibition interactives, audio-only programs (e.g. music with lyrics and texts of speeches), and audiovisuals with soundtracks produced by the Smithsonian must be either open or closed captioned.”³

Look and Feel Requirements

The look of digital experiences and the physical components around them should create a seamless experience that is welcoming and evokes the exhibition's themes. This is not just important in terms of aesthetic value (as Don Norman says “attractive things work better”⁴) but also for their meaningfulness. For example, by first looking at all the objects of the collection for which the **interactive** has to be designed, it is possible to extract a sense of colour or particular geometric shapes that, in turn, can offer insights for visual design. An effective visual technique for defining look and feel is the *mood board*, which is a visual

collage consisting of images with explanatory text. By gathering colors, textures, and patterns the mood board provides a visual definition of the interface's aesthetic.

The design of a digital experience may also touch on the issue of the brand and visual identity of the museum⁵. Because digital interactives are increasingly integrated into the museum's visual identity system, they have to be consistent with all factors – such as color, typography and image style – which govern the visitor's verbal, visual, and behavioral interaction with the museum's branding. It is likely that many museums will have their own brand guidelines, and these should be integrated in the design process from the beginning.

Step 3 – Developing The Design: Design and Visual Frameworks.

After listening to visitors, understanding the context, and gathering other data from different stakeholders with the aim of defining requirements, the team start developing the design. As we saw above, the requirements don't specify *how* design elements should be formed, nor do they define how they work together as a cohesive whole. Working out the *how* takes place in the design development phase when the *design framework* and *visual framework* for the digital interactive are defined.

In this phase we shift from design activities performed for the conceptualization of the visitor *experience* to ones that aim to define a comprehensive interactive structure (design framework), including high-level visual aspects (visual framework). Even if it is more concrete than the previous one, this phase is still performed at a high level of abstraction, as team members are concerned with the overall structure of the visitor experience. Hence, activities do not focus on the granular form of interface components such as buttons or graphical elements, as these aspects will be the focus of the Design Refinement phase.

The Design Framework: Storyboards and Wireframes

The Design Framework aims to make the visitor journey imagined in the conceptual

phase (e.g. by context scenarios) more tangible. One of the most effective translation techniques is the *storyboard*. **Storyboards** present interactions in the context of stories that represent the sequence of activities that a visitors transits to achieve their goals (Figure x.5). The storyboard helps to develop the exhibition's visitor journey by defining the actions visitors perform within the exhibition environment through interaction with the **digital interactive**.

<Insert Figure x.5 Sample Storyboard here>

While the storyboards are an effective way to contextualize interaction, wire-framing is a useful technique for laying out content and functionality (figure x.6a, b). **A wireframe is the blueprint for the experience. It is usually a set of diagrams combined with textual descriptions that walks through the user experience visually from beginning to end.** Wireframes can be simple pencil drawings, or realized using editing software.

Questions to be addressed include:

- What choices can the user make, e.g. start, home, back, forward, language, etc.?
- What content lives on each “page” or at each step?
- How does the content relate across steps? Are there layers of stories? Is it linear or can visitors choose their own path?
- How does the user interact with the content? For example, reading, listening, watching, clicking or gesturing?

Wireframes also identify how each of these choices is presented to visitors, and the results of those choices. Wireframes typically require several revisions before finalization.

Once finalized, the wireframe will have identified:

- Interactive platforms that will be used

- User interface, experience and journey
- Content creation guidelines
- Technology approach and framework

Wireframes typically do not describe typographic style, color, or graphical details, since the aim is to design functionality and content architecture. ~~A wireframe can be seen as a low fidelity prototype consisting of an unfinished and sketched draft used to test interface structure.~~

Relationships between different interfaces can be defined using a flowchart: a diagram that clearly illustrates the overall structure of the digital experience, showing its key components and presenting its primary workflows as visitors should perceive them (Figure 7).

<Insert Figure x.6a Wireframe, x.6b Final Result here, Figure 7 flowchart>

Content plays a fundamental role in defining the design framework. This is one of the reasons why the ongoing involvement of curators and educators is fundamental in designing for visitor experience, even after the development of an interpretive plan. The organization, grouping, ordering, and presentation of content is crucial to determining the overall structure of interactions.

Defining the Visual Framework

While the design framework establishes the interface structure for behavior and content, the visual design framework defines the visual guidelines which will be developed in the next phase. The visual design framework sets the visual language of the digital experience and is usually integrated with the exhibition graphics.

A fundamental technique for defining the visual framework is the *visual style guide*. The style guide is a tool that, to some extent, develops in more detail than the mood board

(see “Look and Feel Requirements”). It describes the way the interface is intended to look by defining the graphic of key elements. This helps to make the interface consistent as it is developed in the next Refinement phase. The main elements defined by the style guide document are:

- the guidelines for adequate use of typography by showing samples of the fonts, text styles, and their hierarchy;
- a color palette that depicts the set of colors that must be adopted in the interface; picture and video formats,
- defining the sizes, composition, and style to adopt; and
- key icons and eventually infographics should also be defined by setting standards.

Step 4 – The Design Refinement Phase

The design refinement phase gives final form to the overriding structure and functionality designed in the previous phases. In this phase of refinement the team asks questions like: What are the graphic components that constitute the interface? Where should we place them on the screen? What form should the digital content take? As with other phases, prototypes are used here to ‘test’ the design. (figure x 11)

<Insert Sidebar 4: Prototypes at every Step>

The design of the interface concerns the arrangement of graphic components to enable effective interaction, user-friendly navigation within the interface, and visually present these elements on the screen in a way which means that a visitor can have easy access to and meaningful experiences with the content. A checklist of attributes can be developed which allows a team to judge the coherence of their design (figure x.9).

<Insert Figure x.11 here: Sample Graphic Checklist:>

Interface Layout

The interface layout is a crucial aspect of the design because it determines how the visitor will visually comprehend what is on the screen. This structure determines the quality of visual flow, which should allow the visitor to easily recognize elements (or groups of elements) and understand the relationships between different pieces of content. Basically, this means arranging interface elements on the screen in a way that will be readily understood by visitors. The three general principles of creating a cohesive visual structure are: grouping, hierarchy, and alignment and grid.

- *Grouping* can be achieved by using visual properties such as form, dimension, and proximity. Diverse components can be drawn into relation through the rubric of a common visual form and dimensional parameters. Through proximity we can associate items according to the distance separating them. Placing objects close together within a layout creates a focal point toward which the eye will gravitate.
- *Hierarchy* establishes a sequential order of the components, such as which buttons/ icons, images or videos visitors need to see at first glance, which are secondary, and which only need to be consulted occasionally. The on screen position of components affects how one element will emerge with respect to another. For instance, icons positioned at the centre of the screen may be especially prominent. Another factor for determining visual hierarchy is scale. This is meant not only in the dimensional sense (e.g. a bigger button is more important than a smaller one) but also as it pertains to other parameters. For instance, by tweaking colours and transparency, bright elements can be given greater emphasis than dark ones.

- *Alignment* and *grid* allow screen components to be systematically ordered and related. Alignment is a fundamental graphic design principle for lining up graphic elements, for example, along their edges or on their centers. Alignment and grid allow screen components to be systematically ordered and related. These allow a relationship among components to be suggested and, at the same time, the cognitive fatigue of the visitor to be reduced. They also posit a relationship among items and establish recognizable patterns and a sense of continuity, which ultimately lead to a clear, consistent visual structure and layout.

Creating User-Friendly Navigation.

The interface of a digital interactive is not an assemblage of static components but a dynamic, interactive product. The interaction itself has to be designed: this requires designing in time. Hence, the position, shape and dimension of each interface component, influences the way the visitor interacts with the interface and, therefore, orients his or herself within the experience. Good navigation is intuitive, easy-to-understand, and easy-to-do. A successful navigation design focuses on identifying and tracing the logical connections which support effective movement between pages and contents. In term of design this means to drawing logical connections between each graphic component on the screen in order to show visitors how they are interrelated and suggest possible interactions. The guru of usability Nielsen Norman suggests fifteen guidelines to help users navigating the interface⁶, form such as “Put menus in familiar locations”, “Provide local navigation menus for closely related content”, and “Ensure that your menus have enough visual weight.”

Graphics

Together with interface layout and navigation, graphics play an important role in the visitor experience. Graphics involve the design of key visual features such as visual patterns, icons and imagery, text, and colour. Graphics includes what seems aesthetically pleasing as well as how the visual elements affect the functionality of the interface functionality and meaning. A polished design should please the senses while satisfying the criteria of usability and accessibility. For example, we design icons not only for decoration but also to provide meaning and a stronger sense of orientation; colour and graphic shapes can (and should) incorporate the meaning of the exhibition into the interface. A compelling graphic contributes visual consistency to the whole interface, for example by differentiating groups of elements (Figure x.12) and drawing relationships between pieces of information.

<Insert Figure x.12 here> Visual consistency between the devices and collections

¹ Carlgren, Lisa, Maria Elmquist, and Ingo Rauth. "Exploring the use of design thinking in large organizations: Towards a research agenda." *Swedish Design Research Journal* 1, no. 14 (2014): 47-56.

² Pruitt, John, and Tamara Adlin. *The persona lifecycle: keeping people in mind throughout product design*. Morgan Kaufmann, 2010.

³ Smithsonian Guidelines for Accessible Exhibition Design 2007. Retrieved September 18, 2016 from <https://www.si.edu/Accessibility/SGAED>

⁴ Norman, Don. "Emotion & design: attractive things work better." *interactions* 9, no. 4 (2002): 36-42.

⁵ King, Emily. *C/id: Visual Identity and Branding for the Arts*. Laurence King Publishing, 2006.

⁶ [Kathryn Whitenton](#), 2015. *Menu Design: Checklist of 15 UX Guidelines to Help Users*. Retrieved September 18, 2016 from <https://www.nngroup.com/articles/menu-design/>