9 Weaving Location and Narrative for Mobile Guides

Mike Sharples, Elizabeth FitzGerald, Paul Mulholland, and Robert Jones

Museums are designed as social spaces. They are places where people can talk, share experiences, and create collective memories. The spatial layout of exhibits allows groups of visitors to view and converse. Talk is encouraged and staff are employed to support families, school groups and tours. Yet much of the computer technology that has been introduced into museums is for individual rather than collaborative use. Handheld guides have been designed to be held up to the ear and multimedia museum displays usually have a single small screen. Recent developments such as museum guide applications for mobile phones continue the theme of supporting the solitary museum visitor. It is not surprising that some curators regard computer technologies as barriers to social engagement with the museum (Tallon & Walker, 2008).

Since the 1960s, attempts have been made to design more social museum technology, including dual earpieces for audio guides (Tallon, 2008), quiz questions for pairs of museum users equipped with communicating handheld devices (Yatani, Onuma, Sugimoto & Kusunoki, 2004), multimedia displays that allow visitors to leave opinions and arguments relating to museum exhibits for others to view and respond (Hsi, 1997), and the use of social media to provoke conversations around museum collections (Johnson et al., 2010). While these have had varying success in connecting and engaging visitors, they can create a fragmented experience where the visitor's attention is divided between the museum environment, the technology and the social interaction. In this chapter, we explore how narrative structures can create threads of experience that connect visitors with museum exhibits and with the narratives woven by other groups of visitors through their conversations and interactions. Computer technology can be designed to anchor these narratives to locations and enhance them through social interactions to create memorable experiences that can be replayed and shared.

The chapter draws on the model of 'explicit interactivity' proposed by the US game designer Eric Zimmerman (Zimmerman, 2004), where interactive objects in the environment combine to tell a story, presenting individuals or groups (who may variously be termed audience, players, readers or users) with opportunities to affect the content of the story as it is being delivered.

The human participants, computer applications, and locations intermingle to form narratives that unfold through a combination of human-computer interactions and physical movements around the space.

Our aim is to offer museum curators and exhibit designers some ways of enabling visitors to create connected story interpretations of their museum experiences by engaging with software that is preprogrammed yet responsive to location and physical movement. This leads to a phenomenon known as the 'Interactive Dilemma': "the inevitable conflict between author's determinism and interactor's freedom" (Peinado & Gervas, 2004: 1). In relation to museums, it is the perennial tension between guiding visitors in where to go, what to see, and how to understand, or allowing them to wander freely and construct their own interpretations.

If a human tour guide is replaced by a location-sensitive multimedia device, then the visitor has greater power to break from the well-trodden route and create a personal interpretation, but must also expend more effort in creating connected meaning out of the fragments of situated experience. A tempting compromise for designers of interactive guides might be to ease this effort by providing a variety of suggested routes or tours, adapted to user profiles, but our early experience of developing a location-based guide (Naismith, Sharples & Ting, 2005) suggests that this might be the worst of both worlds, with the visitor frustrated at being presented with an order of locations to visit and without sufficient influence over the form or content to gain a satisfying experience. We attempt to resolve this dilemma by presenting narrative structure as the key feature in such experiences, an artifact designed for storytelling that can be controlled by an implicit partnership of systems designers, museum curators, and visitors.

MOBILE COMPUTER-BASED STORYTELLING

Mobile computer-based storytelling emerged from the commentary of a tour guide delivered as an audio tour on a portable handset. Some, such as Wapping Audio Tour, present a mixture of performance and sightseeing, narrated by actors: "The artists alternated between uncovering the existing history of this part of the docklands and creating their own through writing stories, staging a wake, talking to the people who live in the area and guiding tourists from the records of their walks"(Wapping Audio, 2012). Interactivity comes from the visitor moving round the environment and keying in codes to get a commentary linked to the location. Recent projects have extended the interactivity by providing multimedia guides with touch screens to call up additional content (Proctor & Burton, 2004), or by automatically sensing the movement of the visitor to adapt the content to the user's route and length of time at the current location (Lonsdale, Byrne & Beale, 2005). A good introduction to interactive handheld guides is provided by *Digital Technologies and the Museum Experience: Handheld Guides and*

other Media (Tallon & Walker, 2008), including an entertaining history of audio guides.

Recent work has focused on digital mobile storytelling as a tool for learning (Jenkins, 2004; Nisi et al., 2004; Paay et al., 2008; Sprake, 2011). Properly executed, locational stories are an effective method for presenting educational history materials in an enjoyable manner (Aylett, 2006). Coherent and well-structured interactive stories can have inherent value, as interactivity helps audiences "to more intensely internalize the material" (Vorderer, 2003: 147) by laying down an episodic memory of events connected to physical locations and social experiences. Therefore, an understanding of locational storytelling can assist in the construction of successful learning materials as well as offering engaging stories in and about places.

THE MOBILIZED VISITOR

The UK design researcher Juliet Sprake considers the different kinds of relation between guide, tour and visitor, as author, text, and reader, as well as architect, building and user (Sprake, 2011). A tour is a continual work in progress, so a progressive dialogue between a (human) guide and visitors can be considered as analogous to an understanding of a text as a decentered system of language that can never be collapsed into finite meanings by an author (Barthes, 1986). Conversely, it could be argued that to give a building such as a museum a tour is to impose a limit on that building that encapsulates and closes its design. Thus, a tour is a temporally repeated point of tension between a predesigned environment and an unfolding story of its use.

The mobilized visitor is both an observer of and an actor in this tense drama. Tours comprise the visiting experience and the documentation of that experience in the form of narratives. These texts might be read by people before they visit a location, to understand its history and to plan the trip. So, even before they arrive, visitors are designated as readers of a pre-prepared text, yet they are also active producers of meaning by their actions in constructing the visit and interacting with the guide and the location. Sprake draws on the notion of 'creative users' (Hill, 2003) of a building to suggest that learning through touring can be understood through the kinds of new knowledge and experiences interactively evolved by spatiotemporal processes of touring.

Sprake (2011) proposes three attributes of the mobilized visitor as learner: stumbling upon, noticing, and connecting. Visitors stumble upon spaces in unexpected ways and in so doing create their own narratives of experience. They notice some parts of the environment in ways that are prescribed, and others in ways that create personal meaning, so that touring is an interaction between the noticer and what is noticed, where that noticing develops personal knowledge of the object. Visitors accelerate and decelerate, view

from different perspectives, and enter into conversations and juxtapositions that create cognitive and social connections.

> Designing directions and navigation activities in tours that depend on the physical mobility of participants around and between buildings opens up opportunities for learning through making imaginative associations between people, objects and places. (Sprake, 2011: 38)

A FRAMEWORK FOR DESIGN OF LOCATION-BASED NARRATIVE

Narrative is the process of combining "different heterogeneous parts (actions, events etc.) into a coherent whole and crafting the relationships between these different parts" (Yiannoutsou & Avouris, 2010: 1). The mobilized visitor weaves a personal narrative by moving around a space, by noticing, or being informed about, the artifacts at each location and by making conceptual connections between them. This narrative may align or conflict with the prepared stories presented explicitly by tour guides or implicitly by the spatial layout of a museum or heritage site.

Significant research has already been undertaken in defining the many structural forms applicable to interactive narrative, and we propose a framework (Figure 9.1) to describe interactive narratives structures based on Ryan (1997) and Phelps (1998). By matching different types of narrative structure to locations and encounters over time, curators may be able to commission interactive narratives for a combination of handheld visitor devices and museum displays that offer visitors a connected flow of experience and the perception of an unfolding story of their visit.

In our use of these structures, the nodes represent information-rich locations (where information may be presented by some combination of computer device, physical object or label) and the links denote physical movements between locations. It should be noted that the links do not indicate the physical direction of the movement, rather that two locations are connected by a user

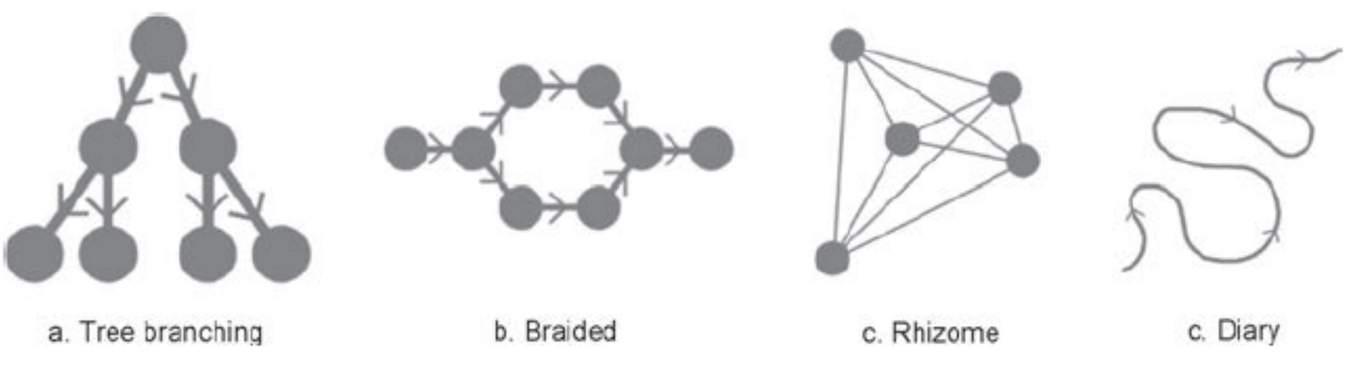

Figure 9.1 Four types of narrative structure. a. Tree branching, b. Braided, c. Rhizome, d. Diary.

moving from the first location to the second. A story may be told explicitly at each location, or the user may create a personal narrative by connecting the pieces of information. In some cases a storytelling may continue as the user moves between locations, either to complete a story that started at a different location, or to provide a seamless continuity of telling.

The category definitions given in Figure 9.1. are not intended to be comprehensive, but they are relevant to the aim of exploring applications of different interaction structures to locational narratives in digital media. While examination of narrative structure takes prominence, it is also necessary to look at additional factors, including the extent to which these examples are digitally delivered, their stated purposes, the relationships between user and creator, and the degree of locational involvement.

Contextual factors affect, and are affected by, these structures. The entity controlling the narrative structure can at different time points be some combination of a computer-based system; or a human administrator who dynamically adapts the plot; or the user interacting with the environment and technology to start, stop and nudge the narrative. Thus, a visitor as user is both in a context (e.g., listening to an audio narrative at a specific location) and a creator of context, through interactions between personal goals, locations, artifacts, technologies, and other people (Lonsdale, Baber & Sharples, 2004).

These narrative structures can be exploited for specific educational purposes by the designers of interactive guides and experiences, depending on how they are perceived in relation to learning and technology. The structures can be seen as instances on a continuum from narrative instruction (branching) to personal story making (diary). Or they can be considered as design resources, to explore how narrative can be embedded into a museum experience that enables stories from curators, designers and artists to be interwoven with the conversations and journeys of visitors. Or they can be interpreted as functional flow diagrams for software developers to program narrative museum experiences.

Tree Branching

The tree-branching structure (Figure 9.1a) is divided into acts: From one initial act, the user is presented with a choice amongst several possible continuations. Having picked one, the user experiences that act before being presented with another choice as to which act should come next, and so on.

In moving from one act to the next, the user always progresses the narrative. The choice of acts is determined by the creator of the experience, and this determines the level of interactivity: the more branches that are available, the more interactive the story. Applied to locational narrative, a node in this tree is a piece of information accessed at a location, and a link is made by moving to another location. One direction of movement may lead down one branch of the narrative tree; another direction may follow a different branch.

Braided Multilinear

The braided multilinear experience (Figure 9.1b) comprises a core narrative that branches out into a number of plot directions; these plots then converge again and reintegrate with the core. A user may temporarily deviate from the core narrative but cannot avoid it or alter it.

The structure incorporates a traditional linear story but scattered with interactive branch elements. This gives it interactive flexibility, as the creators can control the exact number of branches and the points along the story at which they are encountered. An example would be a handheld guide where the user is directed down one physical route or another, based on the user's preference or profile, with each route creating a connected story.

Rhizome

In the rhizome structure (Figure 9.1c) all the nodes are interconnected. In theory, this can offer the user a large degree of agency: They cannot themselves define the narrative elements, but they can control which ones are included and how they are ordered. As the user moves around a physical environment and approaches a pre-prepared location, the device offers not a disconnected chunk of information, but a continuation of the narrative that is prompted by that location. This structure has similarities to a hypertext story such as the US author Michael Joyce's 'afternoon, a story' (Bolter & Joyce, 1987) where the user's choice of moves weaves a story out of elements of text and where revisiting a node may produce a different telling to the first visit. As a locational narrative, a well-designed rhizome structure may empower the user with freedom to roam between locations, yet engaged by a narrative flow that adapts to the (literal) moves and turns of the user and device. The stories of many visitors can be interwoven, so that tellings depend on paths taken by other people or how often locations have been visited.

Diary

A diary (Figure 9.1d) "capture[s] the particulars of experience" (Bolger, Davis & Rafaeli, 2003: 1). It records a chronological log of the user's activities and replays it to them. The developer of the diary application does not influence its content, but provides the tools that allow the user to generate these records. The user determines the content of each particular segment and the order in which these segments are encountered. From the perspective of location and narrative, a diary structure might be a series of objects or signs placed at locations with means for the visitor to record the experience of encountering them. A narrative might be constructed by creating fictional computer-generated characters at each location who engage in a dialogue with the user, or by encouraging users to tell and share stories of their visits using materials collected on the tour.

CASE STUDIES OF LOCATIONAL NARRATIVES

Having laid a foundation of narrative structures, we now provide some case studies of how these have been developed in practice for location-based guides, tales, and visitor experiences.

Tree Branching: A Chaotic Encounter

A Chaotic Encounter is an application, running on GPS location-aware devices, which delivers a short tree branching audio narrative whose content depends on the user's movement (FitzGerald, Sharples, Jones & Priestnall, 2011). The aim with this research prototype is for the user to hear an entertaining story, based on a Nottingham folktale, which can be played a number of times with each rendition being subtly different. For the prototype system, the tree has three levels (Figure 9.2), with three branches at each level, so from a single initial audio segment, there are three possible continuations, and then three continuations thereafter, making nine possible narratives.

The story follows a classic Exposition-Climax-Denoument sequence, but the transitions depend on the user's movement. The GPS in the device records its speed and direction, and as the system finishes playing each section of the story, its continuation depends on how often these change. If the user walks at a steady pace, then the story features few characters and is relatively mundane. If the user changes speed or direction then the story contains many characters and is more surreal. The transition from one segment to another is instant, so the user experiences a single flowing story.

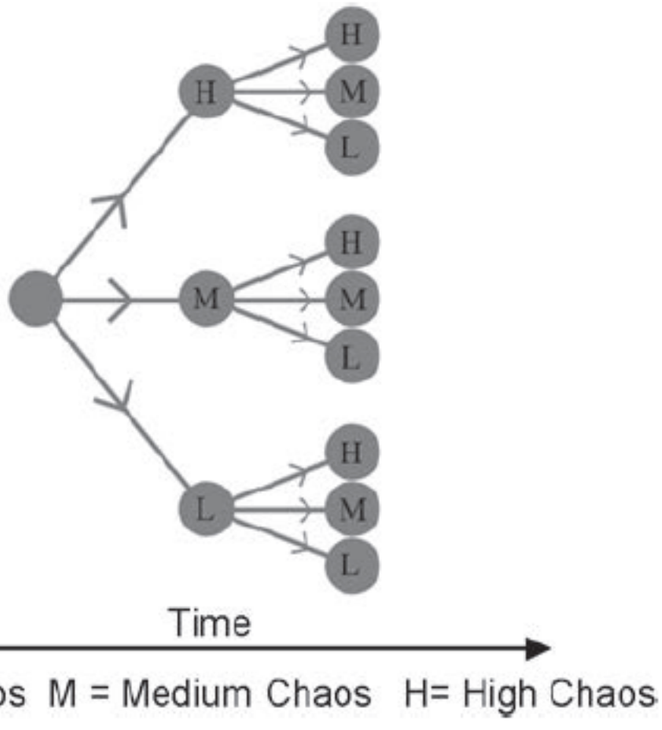

Figure 9.2 Narrative in a Chaotic Encounter (from FitzGerald, Sharples, Jones & Priestnall, 2011).

The system was tested with 10 participants in two modes: automatic and manual. In the automatic mode, the users were told that their movement had an effect on the narrative, but not how this was calculated. In the manual mode, the system did not respond to movement: At the end of each segment the audio stopped, and the user could select from one of three continuations. In each mode, the users could play the story as often as they wished. The users were interviewed at the end, and they also completed a short open-ended questionnaire to assess their attitudes to each version. The results of the trial were that the users generally preferred the automatic movement-sensitive version as it did not interrupt the story. However, the GPS was too inaccurate to give reliable information on speed and direction, which sometimes resulted in the same story being played a number of times. New 'smartphones' now contain accelerometers, and these would be more sensitive to changes in speed and direction. Over a larger physical space, a combination of GPS and accelerometer could offer tree-branching stories that change with both location and movement. The difficulty for the designer comes in creating a narrative sequence for each branch of the story. If the story had a further three levels, each with three branches, that would require 27 different story endings, a further level would need 71 new narrative sequences, and so on. For this reason, a braided multilinear structure, where the different narrative paths rejoin, would be more feasible for a longer narrative.

Braided Multilinear: Hidden Histories—to the Castle!

Hidden Histories: To the Castle! was a pilot project to investigate how visitors experienced, and learned from, two different types of historical audio tours that took place in Nottingham city center. One audio tour was led by members of a local community history group, who physically guided visitors along a planned route consisting of seven points of interest. An alternative technology-based audio tour was also created, which used a GPS-enabled smartphone application to deliver audio at the same points of interest, together with a map of the route for participants to follow (Figure 9.3).

The subject matter was the Reform Riot that occurred in Nottingham in 1831, with a core narrative that explored the background to the riot and the conditions under which it occurred, followed by a succession of events that happened during the riot itself, leading finally to the aftermath of the riot and the consequences for those involved. At each stopping point, participants in the tour listened to historical accounts (either performed in person by members of the local community history group, or through their audio recordings delivered through smartphones) related to that particular location and the relevance or importance of that location to the events in the riot. These narratives came from a variety of sources and were intended to convey different, sometimes conflicting, perspectives on aspects of the riot as they occurred.

Figure 9.3 The 'people-led' audio tour (left) and the 'technology-led' tour (right). Image © Elizabeth FitzGerald.

This project exemplifies a braided multilinear structure, where the flow of narrative is central to the experience, branches out to explore subplots or contrasting themes, then converges once more, and these side nodes are reintegrated into the core narrative. The different historical sources were analogous to subplots, where different perspectives could be compared and contrasted, such as 'official' sources (e.g., government or military reports) and eyewitness reports, which offered conflicting information about what was occurring at the time.

An initial evaluation of the project has analyzed participant data to find evidence of informal public learning, through a framework to examine how participants attained (a) historical literacy; (b) historical empathy; and (c) the development of interpretation skills when listening to differing, sometimes conflicting, historical sources (FitzGerald, 2012). Participant data were collected through the use of questionnaires (n = 16), researcher observations, and a post-walk group interview (n = 6). All participants on both audio tours showed evidence of historical literacy, and some participants demonstrated historical empathy and interpretation skills. However, it is not clear at this time to what extent other aspects of the walk (e.g., use of technology, group vs. individual experiences, the demographic and sociopolitical viewpoint of the participants) might have had an impact on participants' engagement with the historical content.

Rhizome: Context Aware Gallery Explorer (CAGE)

CAGE is an example of a rhizome structure for museum and gallery visiting. The project was an offshoot from the large MOBIlearn project (MOBIlearn, 2012), funded by the European Commission, whose aim was to explore context-sensitive approaches to informal, problem-based and workplace learning, based on innovations in mobile technology. A test site was installed

in an art gallery at Nottingham Castle to explore contextual mobile learning (see Figure 9.4). This consisted of an ultrasound system to provide accurate measurement of the location of a handheld device: an iPad multimedia personal digital assistant. The ultrasound transmitters can be seen placed on the radiators in Figure 9.4. When a visitor walked around the gallery, the technology located its position to within 10 cm and provided context-sensitive information about the paintings, based on the visitor's current location, how long he or she was standing at that location, the route he or she had taken, and specific preferences such as the visitor's language. As the visitor walked past a painting for the first time, the handheld device gave a short audio description of its title and artist. If the visitor stopped, the device offered a longer audio description. Then, if the visitor lingered for a longer period, the device provided a multimedia interaction where the visitor could see the painting on the screen of the device and click on parts of the image to get information about the painting's composition and technique.

One aim of the CAGE system was to deliver narratives through the handheld device that disrupted a visitor's procession along the line of paintings on the walls of the gallery. By indicating other paintings by the same artist

Figure 9.4 CAGE gallery explorer. Image © Mike Sharples.

or with similar composition in other parts of the gallery, the system was designed to find whether a multimedia device could encourage a visitor to make conceptual connections and conduct explorations of the gallery that would not be obvious from the physical layout of the paintings. Video and audio recordings of visitors using the guide showed that in this, the CAGE system was unsuccessful. Although some visitors glanced at paintings on the other side of the gallery when they were mentioned in the audio description, none of them actually moved across the gallery to continue their tour. It would appear that the physical design of a gallery or museum space, in this case reinforced by the long red carpet, exerts a strong linear pull that a simple suggestion to move elsewhere will not disrupt.

An alternative approach would be to design a more complex and adaptive rhizome narrative, where instead of suggesting specific connections, the visitor's movement around the gallery or museum would always progress the narrative, whatever path is taken. The example of hyperfiction (such as 'afternoon, a story') suggests that this is possible, but it would require careful design.

Where the CAGE software proved successful was in providing simple audio 'labels' that invited visitors to stop and look at paintings as they walked past, and in supporting group interactions where the multimedia commentary sparked a discussion of the painting. Although CAGE was implemented and tested in 2004, it remains one of the few indoor context-sensitive guide systems where an adaptive narrative can be generated simply by the user moving around a location.

Diary: MyArtSpace

MyArtSpace was a project that ran for a year from February 2006 in three UK venues: the Urbis museum of urban life in Manchester, the D-Day museum in Portsmouth, and the Study Gallery in Poole. Over 3,000 children engaged with the MyArtSpace service whose aim was to improve the effectiveness of school museum visits by connecting learning in classrooms and museums. The general method was for the teacher to discuss a forthcoming museum visit with the class and decide on one or more questions to be investigated. Then the children visited the museum and were loaned mobile phones running the MyArtSpace software (Figure 9.5), to create multimedia diaries of their visit that they could share and present back in the classroom.

Thus, the narrative structure for MyArtSpace is a diary created by the museum visitors on a mobile phone. The children generally worked in pairs, moving freely around the museum or gallery to collect evidence that would help them answer the inquiry question. Some exhibits had two letter codes (e.g., 'AX') beside them and on keying in the code to the phone, the MyArtSpace application provided a short multimedia presentation about the exhibit. The visitors could also take a photo, record a short voice commentary, or make a note. On pressing the 'Save' button, the presentation, photo,

Figure 9.5 Screenshots from the MyArtSpace phone application. Image © MyArtSpace Project.

recording or note, was automatically sent by GSM phone connection to a personal website, which could be accessed after the visit at home or in the classroom to see a 'timeline' record of all the items collected. These could then be viewed, shared with other children, and included in a group PowerPoint presentation or a written story of the visit.

The MyArtSpace system was successful in encouraging children to spend longer engaging with the exhibits (an average of 90 minutes with MyArtSpace, compared to 20 minutes for a conventional school visit). It also encouraged the children to take a curatorial role, collecting and assessing evidence from the visit to form a narrative presentation that was not merely a record of the trip, but an attempt to address the inquiry question. For example, on a visit to the D-Day museum (which commemorates the Allied landings in Normandy during World War II), one group of children successfully found and compared evidence to answer "Were the D-Day landings a success or failure?", while another group sought evidence for "What was the role of women during the D-Day landings?"

One difficulty with such a diary narrative structure is that the entries are contextualized. The visitor captures activity and experience at one set of times and locations, then views them at another where the contextualizing information—such as conversation, ambient sound and peripheral vision—is missing. A time-ordered list of entries can help in recapturing the particulars of experience, and this could be further assisted by showing a map of the route taken through the museum space and the points at which the items were collected or recorded. But the visitor's intentions in collecting the evidence are still lost, along with the original emotions and sensory experiences. A recurring theme from projects such as MyArtSpace, Ambient Wood (Rogers et al., 2004) and Savannah (Facer et al., 2004) is the difficulty in connecting experiential learning in the field with teaching back in the classroom.

More recent work in mobile learning has focused on how to create 'micro-sites for learning' in the field (Vavoula & Sharples, 2009), where learners can find, or be offered, the physical and conceptual space to reflect on their activity in progress, and to weave their collections and experiences into a meta narrative that links together the diary entries into a coherent strand

of interrelated evidence that addresses the inquiry question. The further the dissociation of this weaving in time and space from the original collecting of evidence, the more difficult the task becomes. Having the children work in pairs can help this process, if they are encouraged to question each other's evidence: asking why that photograph or recording is relevant to the inquiry question and whether it can be captured in a more effective form.

The company that implemented MyArtSpace has now developed it as a commercial service, named OOKL (OOKL, 2012) that promotes cultural venues and enables visitors to download information about cultural objects and events to their smartphones. The service also encourages visitors to become 'citizen curators' by capturing digital content (images and recordings) relating to objects in cultural places, which can then be submitted to the venue and shared with others who visit.

Modeling Curatorial Narratives: The DECIPHER Project

The previous case studies have described how each type of narrative structure (tree branching, braided, rhizome and diary) can be overlaid on a physical space by traversing locations of interest in an order selected by the designer, or chosen by the user, or both.

When the physical environment is a curated museum or gallery, as in the case of CAGE, the narrative produced by interacting with the handheld device has to coexist with the narrative layout of the museum space. A lack of cohesion between the two narrative structures may offer additional opportunities to the visitor, or could lead to disengagement with the technology if it suggests paths not cued in the physical space. An understanding of the narrative structure used in a museum space can inform the design of location-based assistance that is sensitive to, and extends, the physical museum.

DECIPHER is a cultural heritage project, supported by the European Commission, that aims to formally model aspects of the curatorial narrative structure built across heritage objects. This model is now being used to develop software assistance for narrative construction in a number of settings such as curation of a physical museum space, design of online museum resources, or development of handheld computer guides. The formal model has been realized as the 'curate ontology' (Mulholland et al., 2012). Development of the ontology drew on a review of the museum narrative literature and a detailed analysis of two museum exhibitions: Gabriel Metsu at the National Gallery of Ireland, and The Moderns at the Irish Museum of Modern Art. The paper by Maguire (2012) provides a full report of the analysis.

The DECIPHER project draws on structuralist accounts of films and novels to formalize interactive media narratives (Hazel, 2012) at three levels of description: story, plot and narrative discourse. A story can be defined as a conceptualization of the events that can be told. These events may be organized according to properties such as time and theme. A plot is defined as imposing an interpretation on the story in terms of relations between events,

in doing so defining which events are important and asserting dependencies between them. A narrative (or narrative discourse) is a presentation of the story and plot in a form such as a physical or digital exhibition.

At the story level, aspects of an exhibition can be understood as collections of events organized according to properties. For example, part of the Gabriel Metsu exhibition organized his works and associated events chronologically to show the development of his style during the early part of his career. The rest of the exhibition covering the later parts of his career, once his style had become established, were organized according to themes such as subject matter, and chronology was less important. At the plot level, exhibitions and their associated visitor materials often refer to relationships between events such as how the creation of an artwork was influenced by historical events or events related to the artist or their peers. The paper by Collins, Mulholland and Wolff (2012) describes plot relations identified in curatorial narratives. At the presentation level, a museum exhibition may emphasize story-level temporal or thematic properties such as the organization of art into schools and by time period (Wolff, Mulholland & Collins, 2012). Or it may focus more on the plot, for example, emphasizing how one artist was influenced by, or reacted against, the work of another. Lisa Corrin, the director of the Williams College Museum of Art in the United States, and colleagues (1997) describe how the work of Manet can be better understood if exhibited with the paintings he was reacting against rather than other impressionist paintings.

The 'curate ontology' of the DECIPHER project, with its levels of story, plot and narrative can be used to describe the four types of narrative structure (tree branching, braided, rhizome and diary) and how they reveal their underlying story and plot.

A branching structure could be realized as a narrative that emphasizes how the organizing dimensions such as time and theme can be interpreted hierarchically. For example, a component of the narrative relating a particular time or artistic movement could lead to further optional components that subdivide the time or theme. This could be understood as a more traditional, taxonomic narrative structure of a museum collection in which the visitor has the option to select greater or lesser levels of detail.

A braided narrative has a common start and end point and offers greater agency at intermediate stages. This structure is currently used in museum narratives. For example, as described in (Maguire, 2012), exhibitions may start with a primer space in which the visitor is introduced to ideas that can assist interpretation of the exhibition. The Moderns exhibition began with a primer space that introduced key concepts related to modernism. Exhibitions also often finish on a crescendo, associated, for example, with the most well-known artwork in the exhibition. Between the introductory and concluding sections, reading order may be less managed, providing a braided structure, in which the visitor can follow various aspects of the underlying story and plot.

A rhizome narrative can be understood as emphasizing the plot over the story. Here, priority is given to relations such as "influence" rather than story properties such as time. Plot relations may create a graph structure interconnecting heritage objects and their associated events. A rhizome narrative would allow the visitor to pursue these relations in any preferred way. A potential role for location-based technology in a physical museum space could be to support such plot-based navigation still sensitive to the narrative structure of the physical space. A key strand of ongoing work in the DECIPHER project is concerned with using the curate ontology to provide assistance in the construction, visualization and navigation of narratives by both curatorial staff and visitor groups.

A diary structure emphasizes the events of the story organized chronologically. For example, a narrative about the life of an artist organized by time could be interpreted as a diary narrative. In the area of narrative inquiry, the organization of events by time is referred to as a chronicle (Polkinghorne, 1998). Children in the MyArtSpace project created and shared chronicles of their museum visits to address the inquiry questions.

GUIDELINES FOR WEAVING LOCATION AND NARRATIVE FOR MOBILE GUIDES

Here we offer guidelines for designers of location-based narrative guides and experiences, based on findings from the projects reported in this chapter. The overarching need is to address the 'Interactive Dilemma' of conflict between the designer's desire for a coherent narrative flow and the user's freedom to explore a cultural venue and construct personal meaning from its space and the artifacts it contains. Every object tells a story. Every space offers multiple interpretations. Every visitor weaves a narrative. The greater the opportunity for participants to interact with their surroundings and with the technology, the more difficult it becomes to lead them through a pre-prepared story. "If interactivity is the property that makes the biggest difference between old and new media, it does not facilitate story telling" (Ryan, 2006: 99). The task for a designer of location-based narrative is to provide appropriate top-down structure, enabling the visitor as user to engage with well-formed narrative patterns that unify and interpret the visiting experience while giving a sense of freedom to explore and create.

Support the User to Create Narrative through Movement

Previous studies of multimedia guides in museums have emphasized the importance of a 'heads-up' museum experience, where the visitor is engaged with the physical artifacts rather than fiddling with a digital display (Hsi, 2003). This, of course, depends on what the display shows and whether it complements or detracts from the visiting experience. In general, the aim

should be for the technology to augment rather than replace the physical experience. One way to do that is to let the visitor weave a narrative through physical movement around the museum. The CAGE system, by tracking the user's route, allowed the user to wander, heads up, and offered simple audio prompts on passing each painting for the first time. The findings from the CAGE trials also indicated that if a visitor (or group of visitors) showed engagement with a painting, by standing in front of the painting and listening to the end of the audio description, then an interactive multimedia display could extend that engagement, by allowing parts of the painting and its composition to be explored in more depth.

Balance Structure and Freedom for Rhizome and Diary Structures

Tree and braided structures prescribe a preset narrative flow, as the user follows the directed links from one node to the next. For rhizomes and diaries the user has freedom to explore the informational and physical space, moving from any location to any other. Thus, they place demands on the user to construct a coherent story from the fragments. This finding for interactive fiction applies also to locational narrative:

> For a short work the audience may be willing to wade through all segments of a narrative in order to piece together a coherent story. For a longer work the tendency is for people to lose interest. (Phelps, 1998: 1)

A designer of a rhizome might support the user's construction of narrative by creating a structure whereby any tour produces a coherent story. But this is a hard labor, as it requires pre-plotting every combination of move between nodes (locations). For 6 locations, there are 15 possible connections, but that rapidly rises to 45 connections for 10 locations, and 190 for 20 locations, even without considering what happens if a person revisits the same location later in the narrative. Authors of hyperfiction circumvent this problem by a variety of 'cheats', such as leading the reader round in circles: having a small network of nodes but with different story text for each visit. That depends on the reader not being aware of his or her position in the story network—but for locational narratives the visitor knows very well where he or she is in the physical space of a museum or gallery. To create a coherent flowing narrative from even a medium-sized rhizome network is beyond the current state of artificial intelligence.

The alternative, for a rhizome or diary, is to provide tools for the user to construct their own narrative of the visit, by recording their tour through the space and allowing them to add notes and reflections. Then, at a later time, the tour can be replayed, so the user can re-create the visit and form the series of location-based events into a personal recollection or a public presentation. That was the structure of MyArtSpace, which provided the user with a website showing a time-ordered series of items collected during

the visit. A more sophisticated location-tracking system might also show a map with the visitor's route through the physical space.

Employ Appropriate Media and Be Sensitive to the Environment

Hidden Histories: To the Castle! made effective use of audio and historically relevant surroundings to inform the user and invoke a sense of drama. The CAGE system switched from audio to mixed media when the user stood still in front of a painting for longer than 30 seconds. Practical guidelines for effective audio experiences have been investigated in (FitzGerald, Sharples, Jones & Priestnall, 2011). They also discuss sensitivity to local surroundings such as heritage sites where local residents live, especially if visitors are encouraged to explore the area on their own. A further factor when considering movement through physical space is the need for participants to be aware of safety hazards in their immediate environment such as traffic, uneven flooring, or other people moving nearby.

CONCLUSIONS

This chapter has shown how narrative structures can influence the design and purposeful use of location-based guides for museums, galleries and heritage sites. Each structure offers a different range of possibilities: for the designer, to provide tools, media, stories and guidance that shape the activity; and for the visitor as user of the technology, to interpret stories, create narratives through action, and afterwards construct a coherent telling of the experience. A tree-branching structure can integrate the taxonomic structure of a museum collection into an unfolding story. A braided narrative can fit with the physical layout of a museum, with fixed start and end points and guided routes through the collections. A rhizome structure may allow visitors greater opportunity to create their own connections between exhibits and to intersect with the paths and stories of other visitors. A diary provides a chronological drive to explain a sequence of events or create a memorable recollection of a visit. In all these structures it is important to maintain a coherent sense of story, so the participant is not lost in a confusion of real and virtual narratives. We hope the discussion of structure for interactive narratives will lead to the design of new types of mobile guide and museum display that connect a strong narrative drive with freedom for the participants to enjoy stumbling upon, noticing, and connecting in their rich surroundings.

ACKNOWLEDGMENTS

MOBIlearn (IST-2001–37187) was funded by the EC Information Society Technologies program. MyArtSpace was funded by the UK Department for

Culture, Media and Sport through Culture Online. The DECIPHER project (270001) is funded by the EU 7th Framework Programme in the area of Digital Libraries and Digital Preservation. Hidden Histories: To the Castle! was funded by the Engineering and Physical Sciences Research Council (Towards Pervasive Media—grant number EP/H024867/1). Rob Jones's studentship is supported by the Horizon Doctoral Training Centre at the University of Nottingham (RCUK Grant No. EP/G037574/1).

REFERENCES

Barthes, R. (1986). *The rustle of language*. Oxford: Blackwell.

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology, 54*, 579–616.

Bolter, J.D., & Joyce, M. (1987). Hypertext and creative writing. In *Proceedings of the ACM conference on Hypertext (HYPERTEXT '87)* (pp. 41–50). New York, NY: Association for Computing Machinery.

Collins, T., Mulholland, P., & Wolff, A. (2012). Web supported employment: Using object and event descriptions to facilitate storytelling online and in galleries. In *Proceedings of ACM Web Science 2012*, Northwestern University, Evanston IL, June 22–24, 2012 (pp. 104–107). New York, NY: Association for Computing Machinery.

Corrin, L.C., Kwon, M., & Bryson, N. (1997). *Mark Dion*. London: Phaidon Press.

Facer, K., Joiner, R., Stanton, D., Reid, J., Hull, R., & Kirk, D. (2004). Savannah: Mobile gaming and learning? *Journal of Computer Assisted Learning, 20*, 399–409.

FitzGerald, E. (2012). Assessing informal learning: A case study using historical audio guides. In *Proceedings of Computers and Learning Research Group (CALRG) Conference 2012, Milton Keynes, UK, June 19–20, 2012* (pp. 9–10). Milton Keynes: The Open University.

FitzGerald, E., Sharples, M., Jones, R., & Priestnall, G. (2011). Guidelines for the design of location-based audio for mobile learning. *International Journal of Mobile and Blended Learning, 3*(4), 70–85.

Hazel, P. (2008). Narrative and new media. In *Proceedings of the 5th International Narrative and Interactive Learning Environments Conference (NILE 08), Edinburgh, Scotland, August 6–8, 2008* (p. 40). Edinburgh: Heriot Watt University.

Hill, J. (2003). *Actions of architecture*. London: Routledge.

Hsi, S. (1997). *Facilitating knowledge integration in science through electronic discussion: The multimedia forum kiosk*. PhD Thesis, University of California, Berkley.

Hsi, S. (2003). A study of user experiences mediated by nomadic web content in a museum. *Journal of Computer Assisted Learning, 19*, 308–319.

Jenkins, H. (2004). Game design as narrative architecture. In N. Wardrip-Fruin & P. Harrigan (Eds.), *First person: New media as story, performance, and game* (pp. 118–130). Cambridge, MA: MIT Press.

Johnson, L., Witchey, H., Smith, R., Levine, A., & Haywood, K. (2010). *The 2010 horizon report: Museum edition*. Austin, TX: The New Media Consortium.

Lonsdale, P., Baber, C., & Sharples, M. (2004). A context awareness architecture for facilitating mobile learning. In J. Attewell & C. Savill-Smith (Eds.), *Learning with mobile devices: Research and development* (pp. 79–85). London: Learning and Skills Development Agency.

Lonsdale, P., Byrne, W., & Beale, R. (2005). Using context awareness to enhance visitor engagement in a gallery space. In *Proceedings of HCI 2005 Conference*

on People and Computers XIX, Edinburgh, Scotland, September 5–9, 2005 (pp. 798–809). Berlin: Springer-Verlag.

Maguire, M. (2012). Museum practices report. *Public DECIPHER deliverable D2.1.1*. Retrieved from http://decipher-research.eu/documents/Decipher_deliverables/Decipher-D2.1.1-WP2-IMMA-(en)-Museum%20Practices%20Report-v07-PU.pdf

MOBIlearn (2012). *MOBIlearn project website*. Retrieved from http://www.mobilearn.org/

Mulholland, P., Wolff, A., & Collins, T. (2012). Curate and storyspace: An ontology and web-based environment for describing curatorial narratives. In E. Simperl, P. Cimiano, A. Polleres, Ó. Corcho, & V. Presutti (Eds.), *Proceedings of the semantic web: Research and applications—9th extended semantic web conference, ESWC 2012, Heraklion, Crete, Greece, May 27–31, 2012. Springer Lecture Notes in Computer Science 7295* (pp. 748–762). Berlin: Springer-Verlag.

Naismith, L., Sharples, M., & Ting, J. (2005). Evaluation of CAERUS: A context aware mobile guide. In H. van der Merwe & T. Brown (Eds.), *Mobile technology: The future of learning in your hands, mLearn 2005 book of abstracts, 4th world conference on mLearning, Cape Town, October 25–28, 2005* (p. 50). Cape Town: mLearn 2005.

Nisi, V., Wood, A., Davenport, G., & Oakley, I. (2004). HopStory: An interactive, location-based narrative distributed in time and space. In *Proceedings of the 2nd international conference on technologies for interactive digital storytelling and entertainment (TIDSE'04), Darmstadt, Germany, June 24–26* (pp. 132–141). Berlin: Springer-Verlag.

OOKL (2012). *OOKL: Love culture*. Retrieved from http://www.ooklnet.com/

Paay, J., Kjeldskov, J., Chritiensen, A., Ibsen, A., Jensen, D., Nielsen, G., & Vutborg, R. (2008). Location-based storytelling in the urban environment. In *Proceedings of the 20th Australasian conference on computer-human interaction: Designing for habitus and habitat, Cairns, QLD, Australia, December 8–12, 2008* (pp. 122–129). New York, NY: Association for Computing Machinery.

Peinado, F., & Gervas, P. (2004). Transferring game mastering laws to interactive digital storytelling. In S. Göbel, U. Spierling, A. Hoffmann, I. Iurgel, O. Schneider, J. Dechau & A. Feix (Eds.) *Proceedings of the 2nd international conference on technologies for interactive digital storytelling and entertainment (TIDSE'04), Darmstadt, Germany, June 24–26, 2004. Lecture notes in computer science, Band* 3105 (pp. 48–54). Berlin: Springer-Verlag.

Phelps, K. (1998). *Story shapes for digital media*. Retrieved from http://www.glasswings.com.au/modern/shapes/

Polkinghorne, D. (1998). *Narrative knowing and the human sciences*. Albany: State University of New York Press.

Proctor, N., & Burton, J. (2004). Tate Modern multimedia tour pilots. In J. Attewell & C. Savill-Smith (Eds.), *Learning with mobile devices: Research and development* (pp. 127–130). London: Learning and Skills Development Agency.

Rogers, Y., Price, S., Fitzpatrick, G., Fleck, R., Harris, E., Smith, H., & Weal, M. (2004). Ambient wood: Designing new forms of digital augmentation for learning outdoors. In *Proceedings of the 2004 conference on interaction design and children: Building a community (IDC 2004)* (pp. 3–10). New York, NY: Association for Computing Machinery.

Ryan, M. (1997). Interactive drama: Narrativity in a highly interactive environment. *Modern fiction studies, 43*(3), 677–707.

Ryan, M. (2006). *Avatars of story*. Minneapolis: University of Minnesota Press.

Sprake, J. (2011). *Learning-through-touring: Mobilising learners and touring technologies to creatively explore the built environment*. Rotterdam: Sense Publishers.

Tallon, L. (2008). Introduction: Mobile, digital, and personal. In L. Tallon & K. Walker (Eds.), *Digital technologies and the museum experience: Handheld guides and other media* (pp. xiii–xxv). Lanham, MD: AltaMira Press.

Tallon, L., & Walker, K. (2008). *Digital technologies and the museum experience: Handheld guides and other media*. Lanham, MD: AltaMira Press.

Vavoula, G., & Sharples, M. (2009). Meeting the challenges in evaluating mobile learning: A 3-level evaluation framework. *International Journal of Mobile and Blended Learning, 1*(2), 54–75.

Vorderer, P. (2003). Entertainment theory. In J. Bryant, D. R. Roskos-Ewoldsen, & J. Cantor (Eds.), *Communication and emotion: Essays in honor of Dolf Zillman* (pp. 131–153). New Jersey, NY: Lawrence Erlbaum Associates.

Wapping Audio (2012). *Wapping audio tour: History*. Retrieved from http://www.wappingaudio.org/?page=history

Wolff, A., Mulholland, P., & Collins, T. (2012). Storyspace: A story-driven approach for creating museum narratives. To be published in *Proceedings of hypertext 2012, 23rd ACM conference on hypertext and social media, Milwaukee, WI, June 25–28, 2012*. New York, NY: Association for Computing Machinery.

Yatani, K., Onuma, M., Sugimoto, M., & Kusunoki, F. (2004). Musex: A system for supporting children's collaborative learning in a museum with PDAs. *Systems and Computers in Japan, 35*(14), 773–782.

Yiannoutsou, N., & Avouris, N. (2010). Reflections on use of location-based playful narratives for learning. In *Proceedings of the international conference for mobile learning 2010, Porto, Portugal, March 19–21, 2010* (pp. 149–156). Porto, Portugal: IADIS.

Zimmerman, E. (2004). Narrative, interactivity, play, and games: Four naughty concepts in need of discipline. In N. Wardrip-Fruin & P. Harrigan (Eds.), *First person: New media as story, performance, and game* (pp. 154–164). Cambridge, MA: MIT Press.

Introduction
Museum Communication and Social Media
The Connected Museum

Kirsten Drotner and Kim Christian Schrøder

This book is about the relations between social media and museums. It is about ways in which museums use social media for communication and for forging new social connections; and it is about ways in which users of social media take up and appropriate these services for museum-related issues. This focus immediately raises a number of key questions, which the chapters to follow will discuss and exemplify. First, what are social media, and how are they used in museums? Second, which modes of museum communication do social media facilitate, and what are their constraints? Last, but not least, what forms of social connection can, and do, museums shape through the use of social media, and what are the implications of these connections for museum organization and practices on a daily basis?

As is indicated by these questions, this book is not about the use of technologies in museums and other heritage institutions. Rather it is about the manners and modes of communication and the types of social connection that result from the appropriation by museums of particular technologies and their affordances. While the impact of social media on heritage cultures has recently been explored as an example of so-called participatory cultures (Giaccardi, 2012), this book offers a systematic examination of the communicative options and obstacles that these services entail for museums. As such, the book follows a trend in recent museum studies where we see a move from treating the use of (digital) technologies as an "add on" to existing problematics and practices, on to more integrative approaches that see technologies as means of communication, interaction and exchange. Consider, for example, how book titles in museum studies are changing from what may be termed hyphenated titles ("museums and . . .") to titles that signify changing conceptions of what museums are and could be—such as the engaging museum (Black, 2005), the responsive museum (Reeve & Woollard, 2006), the digital museum (Din & Hecht, 2007) and the participatory museum (Simon, 2010), to name but a few.

While we realize the complexity in addressing the major questions noted above, we find it in order in this introduction to map some of the key markers of interest that will be taken up in a richer fashion in the ensuing chapters. These markers are primarily of a conceptual nature—identifying the widely

used, some would say misused, notion of social media; specifying aspects of museum studies where the appropriation of social media is of particular relevance; and discussing theoretical challenges in seeking to analyze and understand how social media catalyze transformations in the museum sector and, on a grander canvas, in the natural and cultural heritage domains.

SOCIAL MEDIA ARE NOT MEDIA

Some social media have gained phenomenal popularity over the last decade across many parts of the world, and across boundaries of class, gender and generation. Today, social media are used by individuals, by corporate firms and by the public sector. Social media are hyped as a victory of individual users over corporate power, and as the privileging of user-led, two-way, many-to-many, communication rather than mass mediated, one-way, one-to-many, communication. Conversely, social media are deplored as catalysts of performative egotism and as instigators of an everflowing deluge of banal communication.

In a less normative sense, the term social media encompasses a wide range of quite diverse Internet-based and mobile services that facilitate users' shaping and sharing of content and participation in online communities. Related terms are "the participative web" (OECD, 2007), web 2.0 (O'Reilly, 2005), and "the social web", a term attributed to the American media researcher Howard Rheingold (Quittner, 1996)—all indicating the main characteristics of these services. They are web-based and they accelerate easy user interaction in terms of networking, collaboration around affinities of interest, and sharing and commenting on self-created or self-edited content. As such, these services are not new media technologies, rather they expand and popularize potential uses inherent to the Internet. From a rather slow start in 1997 with the creation of social network sites (boyd & Ellison, 2007), social media currently include the following categories:

- **Blogs (short for weblogs) and micro-blogs.** Online journals allowing users to create and share brief personal comments, for example to current topics, or short personal updates, and to see the contents posted by others. Usually displayed in reverse chronological order. The most popular micro-blog is Twitter, whose messages are called tweets
- **Media-sharing sites.** Allow users to upload, rate and comment on visuals. Popular examples are YouTube (videos) and Flickr (still images)
- **Social bookmarking sites.** Here users may organize and share links to websites. Popular examples are Delicious, Digg, and reddit
- **Social network sites (SNS).** The most popular form of social media and often taken as their equivalent. SNS are defined as "web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and

those made by others within the system" (boyd & Ellison, 2007: n.p.). The most popular examples are Facebook and MySpace

Virtual world sites. Offer game-like environments for user interaction, for example through the construction and manipulation of avatars (a virtual representation of the user), and often as part of online gaming

Wikis. Sites for collective creation and modification of content. The most popular example is Wikipedia.

These categories constantly evolve and to some degree overlap. Twitter, for example, is both a micro-blogging service and an SNS; and users of the SNS Facebook can share photographs, just as users of the photo-sharing sites Flickr and Instagram can create lists of contacts. Despite their transmuting character, social media share modes of communication that provide a useful basis of definition. According to the Danish media researcher Stine Lomborg (2011, pp. 65–6), social media are a particular subgenre of digital media that may be characterized with a view to familiar communicative distinctions of sender, text, and user dimensions. Social media seem to de-institutionalize and de-professionalize the producer, or sender, dimension, since professional and ordinary voices have equal access to the often free software. In terms of the text dimension, social media serve to destabilize textual properties, through the options for collaborative content creation where focus is on the production of meaning (blogs, wikis, virtual worlds). In terms of the user dimension, social media privilege symmetrical communicative relations formed around what Lomborg terms "everyday togetherness and relationship maintenance among participants" (Lomborg, 2011, p. 65). This symmetricality is particularly evident with SNS, where focus is on the display and exchange of social contacts and contexts; and in content sharing sites where focus is on the exchange and use of texts, images and sound (for example Flickr and YouTube). All social media invite and allow easy interaction and exchange between one and a few users (some SNS); between a few and many users (some wikis); and between one and many users (blogs, content sharing sites).

MODES OF COMMUNICATION WITH SOCIAL MEDIA

Seen from a museum perspective, it is important to reach beyond the normative, and often binary, understanding of social media as a cause of celebration or concern, and to acknowledge the possibilities fashioned through their diversity of services and modes of communication. In terms of museum communication, social media fundamentally invite museums to reorchestrate their communicative models away from a transmission model defined from an institutional perspective (what we want to impart) on to a user perspective (what people may want to know). This reorchestration lets museums begin to find new answers to what they communicate, how and to whom they communicate, where and when their communication takes

place, and, importantly, for what ends. In terms of the whats and hows of communication, social media catalyze modes of communication that consist less of unilateral communication processes (information about the museum and its objects), and are more concerned with interactive communication processes (involving external stakeholders as resources). In terms of the whos of communication, social media allow museums to redefine, and refine, their potential and actual partners of communication from being identified as audiences making sense of information and entertainment as defined by the museum, on to being cocreators of communicative processes. Centrally, social media serve to advance museum presence where and when actual and potential visitors and their communicative networks are already active ("find us on Twitter, YouTube, Facebook") rather than amassing all communicative efforts into the physical museum spaces and an informative homepage. Last, but not least, in answering all of these questions as to the what, how, who, when and where as they embark on more systematic appropriation of social media, museums are given a chance to redefine why they want to communicate in the first place, thereby also allowing, and demanding, a possible reformulation of their visions and goals: are museums institutions in their own right serving their own ends? Or are they a means to an ulterior end?

In exploring the options offered by social media, museums also need to understand the possible obstacles to their systematic uptake and uses. In doing so, it is useful to keep in mind that these services share important aspects with other web-based content of a digital nature. What gets uploaded, in principle has eternal life; it can be copied and shared, often without the producer knowing; and it may be accessed across boundaries of space and time. So, permanence, replicability and accessibility are important features of all digital content on the Internet. So is its commercial nature. Unlike popular conceptions of the democratic web, most Internet services are owned by large, corporate companies, and this is certainly true of the most popular social media. Much has been made of the possible complicity of major players in terms of censoring sites and content on the request of autocratic governments and regimes. Much less is made of the more mundane lack of transparency and accountability for end users in terms of data ownership and management. Likewise, owners' data mining for sale and their options of surveillance escape most ordinary users' attention. Such constraints question the apparent trends to de-institutionalize and de-professionalize the producer dimensions, noted above; and commercial ownership of social media may fundamentally challenge the aims of many museums, who are committed to being in the service of the public at large or of local communities, a commitment that may involve legal obligations, too. In adopting and advancing their use of social media, do museums at the same time, and perhaps unwittingly, compromise on their aims of public accountability, service to the community, and social inclusion? In attempting to answer such questions, museums would do well to keep in mind their legacies and draw on theoretical insights already gained in museum studies.

WHAT IS NEW WITH SOCIAL MEDIA IN MUSEUM STUDIES?

As noted, social media may serve to advance museums in their efforts to nurture stakeholder commitment, community involvement and public engagement and learning. Such efforts have been well documented by museums over the last two decades, just as the concepts that go along with these efforts have long dominated professional museum discourses particularly with respect to visitor studies (Black, 2005; Lang, Reeve & Woollard, 2006). It is important, however, to understand that social media potentially impact all of the five dimensions that make up a museum according to the standard definition offered by the statutes of the International Council of Museums (ICOM): acquisition, conservation, research, exhibition and communication (International Council of Museums, 2007). In terms of acquisition, museum professionals may adopt social media as means to extend their own communicative network and involve the public, for example in locating objects or trace routes of transmission from one location to another. In terms of conservation, social media are means of activating community resources, for example for collaborative classification thorough so-called folksonomy (a term conflating folk and taxonomy, see Wal, 2007; Peters, 2009). Categorization of content, for example through the use of wikis, may be considered part of conservation or research depending on the actual processes involved; and such overlaps indicate how the main dimensions of museum work have always fed into, and depended on, one another.

Certainly, in terms of the research dimension social media prompt museum researchers to invite ordinary people to become part of the research process in a manner similar to traditions developed in action research (Reason & Bradbury-Huang, 2008). So, museum researchers may request specialist online communities of, for example, bird watchers to co-collect data on migration patterns and comment on each other's observations and the researchers' work-in-progress; or local community groups are invited to co-create personal narratives as preparation for exhibitions (Turmin, 2012). Also, the presence of particular museums on social media may prompt unsolicited user questions and comments on museum content, thus offering potential new research perspectives if such questions and comments are taken up by the museum researchers and made part of ongoing dialogues.

Social media equally play into exhibition and curatorial practices. On site, museum professionals may for example invite visitors to rank or comment on objects and issues raised in actual exhibitions. If the visit is contextualized as part of a learning process, social media offer means for visitors to share their interactions with the learning objects and to network with each other, thus advancing what the American media researcher Henry Jenkins terms a participatory culture (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006). Crucially, these services may also play into visitors' self-directed visitor experiences, for example through tweets, thus serving to re-contextualize the museum experience. On line, both museum professionals and users may

appropriate social media as easy means of sharing, re-posting and bookmarking items and elements from particular exhibitions, processes that do not so much serve to re-contextualize the museum experience as to augment it.

As is indicated by the examples just listed of the impact of social media on research, museum communication may focus on research communication that is traditionally directed at more specialist publics; or it may focus on public communication about exhibitions and about the museum itself. In addition, museums naturally also perform internal communication that we will leave aside here. In museum studies, discourses on the uptake and use of social media are particularly vibrant in relation to public communication, and this focus is also reflected in the priorities of the present volume.

Public museum communication focuses on communication with actual and potential visitors, and this focus has gained increasing importance since the 1990s. The combined, and contentious, discourses on knowledge societies and experience economies, have served to put a premium on the communities that museums serve and are a part of. While knowledge society discourses tend to define these communities in terms of publics to be engaged for enlightenment and learning, the experience economy discourses tend to define the communities that museums may serve in terms of customers and stakeholders to be engaged for entertainment and enjoyment. In practical terms, most museums do not operate according to these discursive binaries for the simple reason that they are at pains to live up to ICOM's mission statement whereby museums should work for "the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment" (International Council of Museums, 2007). Still, the two discourses are helpful when attempting to map how social media impact public communication at museums because they illuminate key dilemmas for museums in adopting these services.

Social media hold tremendous promise for museums in advancing visitor involvement and in forging engagement for potential visitors and society at large. Equally, these services offer their users new means of interaction, participation and networking with particular museums when and where users wish. These potentials primarily rest on the communicative modes that social media provide in terms of presence where people are already busy communicating; in terms of easy feedback from and dialogue with a diversity of social fora; and in terms of the options of collaboration and cocreation of content. Through these options museums may demonstrate their continued importance for people's understanding of themselves and the world and thereby strengthen their public connections and enduring social relevance.

Still, the uptake and use of social media by museums equally creates obstacles that throw into relief how communicative practices are by necessity implicated by larger socio-economic contexts. The commercial nature and communicative rationale of most social media with their quantitative rankings and evaluations play into existing pressures for museums to treat (potential) visitors as consumers of particular services and to think in terms

of visitor volume (clicks, "likes", unique views) as indicators of communicative success. Also, the user-orientation that comes with social media easily feeds into a corporate discourse that "the customer is always right", an association that in museums may imply decreasing legitimacy of professional insights in favour of visitor satisfaction. In addition, when museums apply social media they disband with authority over the data generated through interaction with users, a situation that museums have barely begun to address, but which is a core concern in many of the contributions to this volume (see for instance the chapters by Meecham and by Marselis & Schütze).

What has been more openly discussed by museum professionals are the challenges posed to organizational forms of authority within the museum. First, the adoption and development of social media by museums require substantial resources and a sustained effort. Dialogic connections with the public need to be maintained in order for non-professionals to engage in them and feel that they are being taken seriously. Allocation of such resources naturally invite discussions about organizational priorities, for example on the resources needed for public communication relative to those needed for the other dimensions of museum work that tend not to be associated with the use of social media. Second, social media allow and demand other models of communication which challenge the established authority of voice for museums. How to monitor, manage and balance professional insight and public dialogue is clearly high on the agenda for many museums and mobilizes considerable professional efforts as several chapters in this volume demonstrate. Studying social media and museum communication equally challenges established professional boundaries whose connection requires innovative approaches.

STUDYING THE CONNECTED MUSEUM

As we have seen, social media are means of catalyzing more holistic approaches to museum communication by taking visitor engagement and, on a grander canvas, community connections as baselines of communication, thereby challenging former distinctions between on site and online communication, between actual and potential visitors. Analysing and attempting to understand such holistic approaches equally requires new forms of scientific collaboration and interaction, both between academic researchers and professional groups inside museum institutions, and between academic researchers from different disciplinary backgrounds. In general terms, scholars and practitioners in museum studies need to team up with colleagues from ICT and media studies; and important, if short-lived, fora of interaction across familiar disciplinary boundaries are offered at conferences such as Museums and the Web and MuseumNext with their related online fora, and Nodem (Network of Design and Digital Heritage). Moreover, in recent years interdisciplinary research groups and centres have emerged focusing

on the study of digital cultural and natural heritage, including the appropriation of social media in these sectors.

In more concrete terms, and acknowledging the key importance played by social media in innovating public communication at museums, the established traditions of visitor studies (Lang, Reeve & Woollard, 2006; Reussner, 2010) and audience studies (Alasuutari, 1999; Nightingale, 2011) could benefit from closer and more sustained dialogue. Originating in museum studies and media studies, respectively, both traditions share important theoretical and conceptual tenets, just as they share key methodological issues in terms of empirical analysis and interpretation. What would merit particular scrutiny is their shared focus on segmenting their objects of study—be they visitors or audiences—and their joint focus on analysing visiting/audiencing as contextualized practices of meaning-making that emerge through the interaction between particular contents and users. While these links still wait to be forged in more systematic ways, several chapters in this volume testify to their scholarly adoption and relevance en route to developing holistic research on the connected museum.

In general terms, the book aims to promote a much-needed dialogue within and across research traditions, and to develop dialogue between professional stakeholders such as museum researchers, educators, designers and policy makers.

Through these dialogues, we hope to begin to reorient academic and professional perspectives towards the communicative, rather than the technological, dimensions of social media for engagement, learning and inclusion. As the chapter authors will demonstrate, the use of social media for museum communication operates as a catalyst for this reorientation rather than as an entirely new discourse or set of practices.

THE ORGANIZATION OF THE BOOK

Most of the chapters that make up this book originate in a symposium hosted by the Danish Research Centre on Education and Advanced Media Materials (DREAM) in October 2010. All contributions have a strong visitor, or audience, orientation, and they could all subscribe to the assertion, reminiscent of the American semiotician Charles Peirce's definition of the sign, that 'connected' museums must transform themselves from "being about something to being for somebody" (Weil 1999, p. 229).

The composition of the book reflects three complementary perspectives on the connected museum as it addresses the communicative challenges of deploying digital and social media strategies.

Part One, *Framing the Dilemmas: Curation or Cocreation*?, comprises three chapters, each of which presents its own original take on the programmatic and conceptual discussion of how contemporary museums may position their communication strategies on a number of related continua—authority

versus playfulness, authentic versus surrogate experiences, the real versus the virtual and information versus entertainment.

In chapter 1, "The Trusted Artifice: Reconnecting with the Museum's Fictive Tradition Online", Ross Parry argues that in spite of their multifaceted ways of embarking on the affordances of digital technologies, museums are too concerned to preserve their curatorial and communicative chastity and authority when they take initiatives in the area of digital and social media. Locating his argument in a conceptual redefinition of the conventional—but, since postmodernist thought became hegemonic in cultural research, also highly controversial—core value of 'authenticity', and a repositioning of the virtual and the simulated as part of 'the real', Parry invites museums to more boldly embrace the fictive and illusory dimensions of web culture. Rather than being alien to the traditional curatorial and communicative practices of museums, Parry suggests, the pursuit of this path will serve to "reconnect with the playful, illustrative, fictive and theatrical qualities that have come to define the museum".

In chapter 2, "Social Work: Museums, Technology, and Material Culture", Pam Meecham discusses the manifold challenges which museums are encountering on their way to becoming more democratized, visitor-engaging cultural institutions. The chapter pinpoints a series of crucial issues in these developments, as they affect both the 'inside' of museums and art galleries (the breakdown of high/low; the ambiguity of the buzzword 'social'), and the consequences of 'externalizing' their collections when they go online and global (such as the issue of 'authentic' versus 'surrogate' art experiences). Fundamentally skeptical of the wholesale enthusiasm for the digital museum in many quarters, Meecham argues that we should seriously consider "what is sustained, gained and lost in translation when embodied communication becomes digital and divested of the physical social interaction that occurs in the gallery space that hosts the unique artifact". The argument is illustrated through several striking examples, notably the Google Art Project, and the *Van Gogh Alive* exhibition, which offers visitors an immersive, walk-through experience of the painter's works, as projected in fractured form on to the walls and floors of the hall accompanied by classical music. The chapter also discusses the possible implications of non-authentic, but engaging and entertaining art experiences for cognitive and affective learning.

Chapter 3 by Lynda Kelly, "The Connected Museum in the World of Social Media", is a strong programmatic statement for the determined visitor orientation of the connected museum, as it emphasizes the necessity to enable synergies between the material, online and mobile visitor experiences. Kelly is particularly keen to systematically explore the new forms of interaction between museums and their audiences, as the emergence and consolidation of social and mobile media offer applications which are revolutionizing the dialogical and participatory dimensions of the museum/audience nexus. Kelly argues programmatically that these ongoing transformations can be fruitfully grasped through six key themes, which collectively encapsulate the universe

of transformations, to do with mobility, the social dimension, digital learning, participation, combining tradition and innovation, and organizational change. To some extent Kelly sees these themes as a necessary survival strategy for museums, which increasingly depend on engaging a generation who not only embraces participatory forms of digital communication, but who expects them 24/7.

The second part of the volume, *Researching the Dilemmas: The Iterative Design/Research Process*, features three chapters which, while sharing the gamut of themes running through the book as a whole, emphasize the benefits to be reaped from developing exhibition designs in close collaboration between researchers and museum curators and designers, through research which illuminates usability as well as sense-making dimensions of digital applications.

The chapter by Randi Marselis and Laura Maria Schütze, "'One Way to Holland': Migrant Heritage and Social Media", explores how museums of cultural history can deploy social media strategies in order to connect in a two-way communication process with source communities, such as ethnic minority, immigrant groups. The chapter relies on research conducted at the large, ethnographic Tropenmuseum and the minority Museum Maluku in the Netherlands, in connection with the development of an exhibition of historical photographs of post-World War II waves of immigration from the former Dutch colonies in Indonesia to the Netherlands. In addition to raising important questions to do with engagement strategies towards potential stakeholder groups, and the balancing of the museum's factual authority and credibility versus the authenticity of memory-based contributions from community members, the chapter also offers a word of caution against easy optimism with respect to social media solutions to sensitive communicative processes. In many cases contact between the museum and immigrant stakeholders was established through mainstream print media that disseminated information about the photo exhibition, and often individual immigrants were reluctant to post their information straight on to a Twitter or Facebook site, opting for less public channels such as good old email.

Karen Knutson's chapter, "Exploring Art and History at the Warhol Museum Using a Timeweb", discusses the design and evaluation of the Warhol Museum's Timeline project—an initiative which is educational in an innovative way that adopts a rhizomatic design framework, which enables the visitor's interest-driven exploration of Warhol's life and times. The chapter analyzes the lessons to be learned from launching an iterative design/research interactive online project in museums, and also addresses basic questions about how realistic our expectations should be of visitor involvement and participation, as well as the extent to which evaluative research on visitor experiences should ultimately determine the design solutions for interactive and social media applications. One significant empirical finding highlights the fact that the needs and experiences of onsite visitors and offline-online users may not be served by the same digital applications.

In their chapter about visitors as dialogue partners titled "Informal, Participatory Learning with Interactive Exhibit Settings and Online Services", Monika Hagedorn-Saupe, Lorenz Kampschulte, and Annette Noschka-Roos argue that museums are cultural hubs in modern society, and that therefore the four dimensions of cultural and science policy, democratic engagement, visitor participation and involvement (museums being *for* someone), and digital learning are essential parameters for conceptualizing museum exhibitions and museum communication in the years ahead. Within this framework the authors argue that one way to engage visitors is to build participatory strategies around delicate ethical, or even conflictual issues, which reside in many contemporary arenas, from nano-technology to Middle East archeology. They support their argument with visitor research at the Deutsches Museum about how museum visitors handled the hypothetical dilemmas of testing for genetic defects presented to them at a dialogical, interactive station. Their second example discusses research on user involvement in connection with the portal *Europeana*, an informative and collaborative access-point to digital cultural heritage in Europe.

The chapter by Glynda Hull and John Scott titled "Curating and Creating Online: Identity, Authorship and Viewing in a Digital Age", can be seen as a bridge between Part II and Part III, as it shares insights from a cross-cultural research project about young people's multimodal identity narratives in a social media universe, with the purpose of distilling from this project a strategy which will enable art museums to reconceptualize the dilemma of authority versus audience empowerment when they launch social media applications. Yet their analysis does not go so far as to suggest specific design solutions. The lessons learnt from the project opens up a best-of-both-worlds strategy, which both enables the museum to maintain the essentials of its archival and authorial curating role in communicating the voice of art history while simultaneously empowering visitors to curate their identity narratives from and into this history. Hull and Scott paint a rich picture of the bricolage-like creativity and curatorship practiced by the young participants in *Space2Cre8*, an international experimental social media universe with Facebook-like properties, and demonstrate how the multimodal meaning-making hybridizes the roles of author and recipient in a way that museums can appropriate to engage youth in meaningful participatory learning activities.

The book's third and final part, *Facing Dilemmas, Designing Solutions* brings together three chapters which highlight the development of creative digital solutions to handle the dilemmas of institutional control versus visitor empowerment and learning versus entertainment. In their chapter "Communication Interrupted: Textual Practices and Digital Interactives in Art Museums", Palmyre Pierroux and Sten Ludvigsen present ways of implementing multimodal and dialogical interactives that 'interrupt' and extend conventional communication practices in art museum gallery settings. Collaborating with interaction designers and education curators, Pierroux and Ludvigsen show how different art historical perspectives on Edvard Munch's art and its

contemporary context can be activated among visitors by different interactive stations, such as a game on a multi-touch table that invites collaborative reasoning, and visitors' photographic mimicking of the mood in a Munch self-portrait for sharing on the museum's Flickr stream. The chapter thus demonstrates how multimodal interactive devices and social media can be used in innovative ways to promote art historical learning through the playful engagement of young people's digital literacies.

The chapter by Mike Sharples, Elizabeth FitzGerald, Paul Mulholland and Robert Jones, "Weaving Location and Narrative for Mobile Guides", presents a number of ways in which different narrative models can be utilized creatively for the design of location-based mobile guides in museums, galleries and heritage sites. Starting from the premise that talk is the social glue of museum experiences, the authors believe that the digital applications developed to enrich the museum experience should support collaborative (social) rather than individual use to the greatest extent possible, in the interest of learning outcomes as well as enjoyment. They propose four narrative structures (tree-branching, braided multi-linear, rhizome, and diary) for mobile guides, which represent a continuum of different solutions to the Interactive Dilemma of balancing authors'/curators'/designers' control versus interactors'/visitors'/users' agency in the museum experience. The four narrative models are systematically illustrated through a rich array of case studies of recent mobile learning projects, whose learning strengths as well as weaknesses are frankly shared with the reader. Importantly, the authors stress that the narrative structure inherent to the museum space itself should be taken into account when superimposing a mobile narrative structure on the visitors' tour, so that the joint effect does not become one of disorientation and contradiction.

Finally, drawing on the case of an exhibition in an art museum by the Japanese artist Mariko Mori, Bruno Ingemann in a reflective essay, "New Voices in the Museum Space: An Essay on the Communicative Museum", discusses the ways in which user–visitors may be involved as participants in creating their own art experiences. Circling around the notion of *voice* Ingemann argues that art museums must give up some of their traditional scholarly and communicative authority in order to afford participatory experiences with dialogical qualities.

CONNECTING MUSEUMS—CONNECTING MUSEUM RESEARCH?

In this volume we have collected eleven research articles, which all contribute their insights to the illumination of the diverse ways in which museums—due to their adoption of a multitude of digital applications and social media forms—have become 'connected' to a range of internal and external stakeholders, and to the public world at large. The articles demonstrate the potential and realized benefits for museums which accrue

from the quantitative increase and the qualitative innovations of these connecting technologies in years to come.

As noted above, most of the research reported is indebted to theories and methodologies drawn to some extent from an interdisciplinary research environment. However, the extent to which research on museum visitors, audiences, users, and participants continues to live a life of disciplinary segregation is remarkable. This means that cross-references and inspirations from parallel research undertaken in neighboring fields such as not only media studies, but also arts disciplines like music studies, theatre studies and performance design are few and far between. It is clear, however, that much is to be gained, in terms of theoretical shortcuts and methodological sophistication, from developing and sustaining connections between museum studies and these neighboring research arenas. In the offing we are able to discern embryonic initiatives, in the form of bridge-building research networks, conference sessions and special issues of journals. These initiatives promise to cross-fertilize audience, reception, visitor, user and participant research on a new shared platform for exploring how institutional communicators across media and the arts may engage in dialogic and participatory processes of learning and entertainment. In a not too distant future, no doubt, we shall see the publication of books devoted to the synergetic outcomes of 'connected museum research'.

REFERENCES

Alasuutari, P. (Ed.). (1999). *Rethinking the media audience: The new agenda*. Thousand Oaks, CA: Sage.

Black, G. (2005). *The engaging museum: Developing museums for visitor involvement*. London: Routledge.

boyd, d. m., & Ellison, N.B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, *13*(1), 11. Retrieved from http://jcmc.indiana.edu/vol13/issue1/boyd.ellison.html

Din, H., & Hecht, P. (Eds.). (2007). *The digital museum: A think guide*. Washington, DC: American Association of Museums.

Giaccardi, E. (Ed.). (2012). *Heritage and social media: Understanding heritage in a participatory culture*. London: Routledge.

International Council of Museums (2007). What is a museum? Retrieved from http://icom.museum/the-vision/museum-definition/

Jenkins, H., Clinton, K., Purushotma, R., Robison, A.J., & Weigel, M. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century*. Building the field of digital media and learning. The John D. and Catherine T. MacArthur Foundation. Retrieved from http://digitallearning.macfound.org/atf/cf/%7B7E45C7E0-A3E0–4B89-AC9C-E807E1B0AE4E%7D/JENKINS_WHITE_PAPER.PDF

Lang, C., Reeve, J., & Woollard, V. (Eds.). (2006). *The responsive museum: Working with audiences in the twenty-first century*. Farnham: Ashgate.

Lomborg, S. (2011). Social media as communicative genres. *MedieKultur*, *51*, 55–71.

Nightingale, V. (Ed.). (2011). *The handbook of media audiences*. Chichester: Wiley-Blackwell.