



**Mobile Technology, Oral History and the 9/11 Memorial: A Study of Digitally Augmented Remembrance**

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Abstract:	<p>The National September 11 Memorial is notable in that it has designed a mobile application in unification with its physical space in Lower Manhattan. Despite the potential of such an arrangement, no research has been conducted that demonstrates the efficacy of mobile technology in augmenting the memory and remembrance functions of the built environment. Using the memorial as a site of inquiry, this project will address the following research questions: How are remembrance and memory impacted by use of mobile technology at a site of memorialization? And, what factors mediate engagement with mobile technology for the purposes of remembrance? Nineteen diverse New York City area residents visited the memorial while using the app, and then participated in a mixed-method study (in-depth focus group and survey). The results reveal that participants—if they experienced no significant technical troubles—found the app as significantly enhancing the memory and remembrance functions of the memorial. For developers of mobile technology for cultural heritage contexts, the use of curated oral histories available on a mobile phone is highly effective.</p>



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**Mobile Technology, Oral History and the 9/11 Memorial:  
A Study of Digitally Augmented Remembrance**

**ABSTRACT**

The National September 11 Memorial is notable in that it has designed a mobile application in unification with its physical space in Lower Manhattan. Despite the potential of such an arrangement, no research has been conducted that demonstrates the efficacy of mobile technology in augmenting the memory and remembrance functions of the built environment. Using the memorial as a site of inquiry, this project will address the following research questions: *How are remembrance and memory impacted by use of mobile technology at a site of memorialization?* And, *what factors mediate engagement with mobile technology for the purposes of remembrance?* Nineteen diverse New York City area residents visited the memorial while using the app, and then participated in a mixed-method study (in-depth focus group and survey). The results reveal that participants—if they experienced no significant technical troubles—found the app as significantly enhancing the memory and remembrance functions of the memorial. For developers of mobile technology for cultural heritage contexts, the use of curated oral histories available on a mobile phone is highly effective.

**Introduction**

Studies of uses of information often focus on utilitarian settings: information needed to complete a task, or fill-in gaps in knowledge of some issue. Less explored is how digital technology can be used for enhancing what one remembers. Such enhancements can include elevating attention to or emotional salience of the memory, improving or augmenting the clarity of the memory, and promoting actions dependent upon the memory. Also explored less is how computing—used in conjunction with physical space—can affect the memory experience. Mobile computing, combined with cellular Internet capabilities, has made possible the delivery of digital information to the user at nearly any physical location, allowing for the deployment of designed spaces that have both physical and digital counterparts.

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3 One particularly salient example of the marriage of physical and digital space is the National September 11  
4 Memorial. The memorial opened to the public on September 12, 2011, and acts as “tribute of remembrance and  
5 honor to the nearly 3,000 people killed in the terror attacks of September 11, 2001 at the World Trade Center site.”<sup>1</sup>  
6  
7 The memorial covers 6 acres, with its most prominent feature being two reflecting ponds that occupy the space of  
8  
9 the former World Trade Center towers, with the names of those deceased arranged around the ponds (see Figure 1).<sup>2</sup>  
10  
11 In addition to its designed space in Lower Manhattan, the memorial provides users with a mobile app—the 9/11  
12 Memorial Guide—that acts as a digital interface for the memorial. Using the app that is available for iPhone,  
13  
14 Android and Windows phones, visitors can find names on the memorial, as well as listen to oral histories. Oral  
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16 histories are arranged on a graphic representation of the physical memorial, where the placement is in relation to that  
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18 person’s name on the memorial. A user can click on that location, and see a picture of the named person, and listen  
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20 to an oral history recorded by StoryCorps (see Figure 2).  
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27 [Insert Figure 1 here]

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29 Figure 1: Photograph of the 9/11 Memorial in Lower Manhattan. Photo by {Name removed for review purposes}.

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31 [Insert Figure 2 here]

32  
33 Figure 2: Oral histories are arranged around the memorial fountains. Users can click on a location and see a picture  
34 of the named person, and listen to an oral history.  
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38 This arrangement is interesting for a variety of reasons. It converges a meaningful physical space that has been  
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40 thoughtfully designed with the familiar mobile phone interface, tacitly acknowledging how these facets can work in  
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42 tandem to create a unique experience for the visitor. To study this novel convergence, this project is interested in  
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44 addressing the following research questions:

45 RQ1 - *How are remembrance and memory impacted by use of mobile technology in conjunction with a*  
46  
47 *designed space at a site of memorialization?*

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49 RQ2 - *What factors mediate engagement with mobile technology for the purposes of remembrance?*

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51 To study this, twenty New Yorkers were selected to participate (and 19 actually participated) in a mixed-method  
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53 study (in-depth focus group and survey) to uncover the impact this multimodal encounter had on the personal  
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56 <sup>1</sup> <http://www.911memorial.org/about-memorial>

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58 <sup>2</sup> <http://www.911memorial.org/design-overview>

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3 experience of remembrance. Before the study will be introduced, relevant literature related to mobile technology for  
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5 cultural heritage contexts will be introduced, followed by research on critical issues in memorialization.  
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## 8 9 **Literature Review**

### 10 *Mobile Technology in Cultural Heritage Contexts*

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12 Mobile computing offers an opportunity to open up the interaction, multimedia and network capabilities of modern  
13  
14 computing to any physical location in a convenient format. Because of the wide array of functions and  
15  
16 conveniences offered by mobile computing, ownership and interest in ownership of smart phones by adults in the  
17  
18 United States is increasing annually. As of February 2012, 46% of adults in the United States owned a smart phone,  
19  
20 such as an iPhone, Android, or Blackberry, an 11% increase from the prior year (Smith). Youth own smart phones  
21  
22 at an even higher rate, including 71% of 25-34 year olds, which is a 13% increase from the prior year (Smith). The  
23  
24 widespread interest in mobile computing combined with the yearly growth in ownership indicates new opportunities  
25  
26 for cultural heritage institutions to make use of this technology. However, many applications of mobile computing  
27  
28 today only add convenience (e.g., getting the current hours for a museum), and do not take full advantage of the  
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30 opportunities the technology provides.  
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34 There is growth both in the number of cultural heritage institutions using mobile technology to enhance their  
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36 educational offerings and there is growth in the research related to mobile technology in such contexts. In museums  
37  
38 particularly, this is well highlighted by the American Association of Museums 2011 Mobile Technology Survey,  
39  
40 that found that one-third of all museums plan to introduce some new mobile technology platform in 2011 (AAM).  
41  
42 This is buttressed by Museums and Mobile 2012 survey, which found that 29% of museums are currently using  
43  
44 mobile technologies, and 27% are not but have plans to use mobile technologies (Tallon, "Museums and Mobile  
45  
46 Survey"). In practice, this growth is seen by such actions as Bloomberg Philanthropies donating \$15 million to  
47  
48 develop mobile technologies for the Art Institute of Chicago, The Metropolitan Museum of Art, The Museum of  
49  
50 Modern Art, The New York Botanical Garden, and Solomon R. Guggenheim Museum (Bloomberg). However,  
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52 Tallon remarks that for "a medium with such an extensive existing usage and wide-reaching potential, there is a  
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54 distinct lack of rigorous, accessible, and published research" ("Introduction," p. xix). The majority of the research  
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3 related to mobile technology in cultural heritage contexts describes and studies a specific technology used in a  
4 particular context. These include:

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7 • German Traces NYC, a augmented reality walking tour of the history of Germans in New York City,  
8 provided by Goethe-Institut Library New York (Cocciolo and Rabina)
- 9  
10 • PhillyHistory.org, which makes accessible digital collections on physical sites via smartphones (Boyer).
- 11  
12 • WolfWalk project from North Carolina State University Library, which makes University archival  
13 collections available via an iPhone app (Sierra)
- 14  
15 • iPhone application at Royal Botanic Garden, Kew (Waterson and Saunders).
- 16  
17 • iPad with group tours at the Minneapolis Institute of Arts (Isaacson, McGuire, Sayre and Wetterlund).
- 18  
19 • GPS-enabled mobile phones at archeological site of Locri (Cutrí, Naccarato, Pantano).
- 20  
21 • Mobile game with youth at the Egnathia Archaeological Park, Italy (Costabile, Ardito, Lanzilotti; Ardito,  
22 Buono, Costabile, Lanzilotti, Piccinno).
- 23  
24 • Augmented reality at the Sutton Hoo archeological site (Angelopoulou et al.)
- 25  
26 • PDA-based multi-user game used at Marble Museum of Carrara (Laurillau and Paternò; Dini, Paternò and  
27 Santoro; Ghiani, Paternò, Santoro and Spano).
- 28  
29 • mobile augmented reality with cave paintings in France (Choudary, Charvillat, Grigoras and Grigoras,  
30 2009).
- 31  
32 • mobile location search of digital repositories in Amsterdam (van Aart, Wielinga and van Hage)
- 33  
34 • iPhone application for studying Summer War of Osaka byōbu (Carillo et al.)
- 35  
36 • mobile computer vision (object recognition) in two German museums (Föckler et al.).
- 37  
38 • iPhone application at the Davis Museum and Cultural Center (Shaer, Olson, Edwards, Valdes).

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48 Other studies focus on other issues like media authoring tools for cultural heritage contexts, including details on the  
49 technical structures and workflows (Economou, Gavalas, Kenteris and Tsekouras; Kenteris, Gavalas, Economou).

50  
51 Relatedly, others have produced general platforms or templates for creating mobile experiences. For example, the  
52 TAP Into Museums project includes a modeling language for describing mobile museum tours that can be used  
53 across contexts and technical platforms (Indianapolis Museum of Art). Additionally, the project includes a content  
54 management system that allows the creation and publication of mobile content.  
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3 While some projects focus on authoring tools, one research approach is to study specific gestures, movements, and  
4 interactions, and how the technology makes use of this activity. For example, Rukzio et al. look at four types of  
5 mobile interaction styles, and the extent to which it worked well and was enjoyed by museum-goers. The four types  
6 are pointing (uses camera to aim at something), touching (RFID tag), scanning (Bluetooth connection), and user-  
7 mediated object interaction (typing in data into a mobile phone like a URL). In a mobile tourist guide situation,  
8 users found the user-mediated object interaction to be the most simple and reliable, but the least enjoyable; however,  
9 they found pointing and scanning to be most enjoyable. In a museum guide context, users found touching to be the  
10 preferred method of pulling up mobile content; however, user-mediated object interaction as the most reliable.  
11 Further studies have explored other interaction techniques, such as Mantyarvi et al., who discuss their “scan and  
12 tilt” approach, where a museum visitor scans a RFID tag and can “tilt [the device] to identify/select different  
13 artworks in the room” (p. 192).  
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27 Lastly, some studies have taken a more expansive approach to the study of mobile technology in cultural heritage  
28 contexts. One such example is Raptis et al. who created a theoretical framework, which consists of four contexts  
29 that should be considered in assembling a mobile cultural heritage application. Other researchers have similarly  
30 focused on models for conceptualizing mobile applications in cultural heritage contexts. For example, Falk and  
31 Dierking put forth twelve factors to consider in thinking through what can be learned by a mobile application.  
32 Likewise, Gammon and Burch suggest developers think about user mental models and to consider interaction  
33 between multiple users, devices, and objects.  
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#### 43 *Mobile Technology for Memorialization*

44 Currently, there are no known studies that address how mobile technology is used for remembrance, and what  
45 impact it may have on user experience. This is likely because there are few memorials that explicitly make use of  
46 mobile technology, and the ones that do are quite new. Recent mobile technology sites at memorials include the  
47 mobile website for Flight 93 National Memorial,<sup>3</sup> provided by the National Parks Service, and the mobile  
48 application at the Mount Rushmore National Memorial.<sup>4</sup> With respect to new national memorials, the National 9/11  
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57 <sup>3</sup> [http://myoncell.mobi/tours.php?acct\\_num=8146192065&qr=qr](http://myoncell.mobi/tours.php?acct_num=8146192065&qr=qr)

58 <sup>4</sup> <https://itunes.apple.com/us/app/mount-rushmore-virtual-tour/id534020138>

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3 Pentagon Memorial does not make use of mobile technology, nor does the Oklahoma City National Memorial  
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5 (although it does have a podcast).  
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9 The most relevant related literature is the related to the “growing importance of media technologies to the  
10 construction of personal remembrance...” (van Dijck, p. 2). Van Dijck studies the personal shoeboxes people  
11 create, which includes digital assets, to understand how media technologies affect the process of remembrance, and  
12 how the needs of remembrance affects the way media devices are used. Other relevant literature include the use of  
13 the World Wide Web for memorialization. This literature acknowledges the affordances of the WWW that can be  
14 taken advantage of in memorialization contexts (e.g., ability to share information), and leave out the potentials of  
15 mobile technology (e.g., ability to combine use of physical place and digital information through GPS). This  
16 omission is understandable because these studies are interested in the web-based artifacts and how they are shared,  
17 and not necessarily what the user may experience engaging this material in physically relevant settings. These  
18 studies of the use of the WWW for memorialization include Haskins’ study of the September 11 Digital Archive,  
19 Marschall’s study of web-based memorials in South Africa, and Hess’s study of web memorials.  
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### 32 *Oral History Archives and Mobile Technology*

33 Oral history “collects memories and personal commentaries of historical significance through recorded interviews,”  
34 which then get “transcribed, summarized or indexed and then placed in a library or archives” (Ritche , p. 19). Frisch  
35 observes that oral history is “a powerful tool for discovering, exploring and evaluating the nature of the process of  
36 historical memory—how people make sense of their past, how they connect individual experience and its social  
37 contexts and how the past becomes part of the present, and how people use it to interpret their lives and the world  
38 around them” (p. 188). The reason that oral history may be a particularly useful in memorialization contexts is  
39 language itself. Pennepaker and Banasik found that language affects collective memories, particularly as a way to  
40 both remember and forget. Using disaster events, they found that the very high degree of talking that people did  
41 during the first two weeks after the 1989 San Francisco Bay earthquake, as well as the Persian Gulf War, acted to  
42 create collective memories. Thus, “language... is the vehicle for important cognitive and learning process following  
43 an emotional upheaval” (p. 8). Ironically, however, “once an event is cognitively assimilated, individuals no longer  
44 need to ruminate about it and, once it is out of their minds, they may actually forget about it” (p. 8).  
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5 Oral histories can be distributed online, as StoryCorps and many libraries and archives have done. Although oral  
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7 histories are often excerpted for use in texts, documentaries, and museum exhibitions, there is little research that  
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9 exists about delivering such oral histories to users via mobile technology at significant sites. StoryCorps has  
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11 developed an app that allow users to listen to stories; however, they are not organized by topic, event, or geographic  
12  
13 location.<sup>5</sup> However, there is indication that new digital technology will alter the way that oral histories are  
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15 conducted and made available to users. For example, High, Mills and Zembrzycki interviewed leaders in the  
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17 cultural heritage field and found that “emergent and digital technologies are opening up new possibilities for  
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19 accessing... memories and transmitting them to various audiences” (p. 1).

### 20 21 22 23 *Critical approaches to Memorialization*

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25 Scholars taking a critical perspective on memorialization would question not so much the use of mobile technology  
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27 for memorialization, but the apparatus of memorialization in general. Haskins traces the growth of memorialization  
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29 in the modern nation-state, and observes that “institutions of memory have tended to promulgate official ideologies  
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31 of the ruling elites while claiming to speak on behalf of the people” (p. 402). Doss reaches a similar conclusion in  
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33 tracing representational memorials (e.g., the heroic soldier), to more contemporary minimalist designs. In her  
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35 extensive review of what she calls “memorial mania,” she notes how “both monuments and memorials are memory  
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37 aids: materialist modes of privileging particular histories and values,” and the minimalist design “adopted by many  
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39 contemporary terrorism memorials helps to manage... security narratives by simultaneously expressing and  
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41 containing affective conditions of fear” (p. 38; p. 123). She studies the 9/11 Memorial and notes how extensively  
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43 trauma is employed in its narrative, and trauma’s “representation is often superficial and mostly oriented towards the  
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45 restoration of social order and the revitalization of presumably shared social norms” (p. 133). She concludes that  
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47 “terrorism memorials reproduce the rapid assertion, or reassertion, of national authority following the extremist acts  
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49 that threat that authority” (p. 168).

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52 Other critical approaches look to issues like what gets memorialized and what does not, as well as how politics and  
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54 attitudes get expressed in memorials. One notable critique of a memorial that has failed to materialize is observed

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58 <sup>5</sup> <http://storycorps.org/iphone/>



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3 by Schulman:  
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7 81,542 people have died of AIDS in New York City as of August 16, 2008. These  
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9 people, our friends, are rarely mentioned. Their absence is not computed and the  
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11 meaning of their loss is not considered.

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13 2,752 people died in New York City on 9/11. These human beings have been highly  
14  
15 individuated. The recognition of their loss and suffering is a national ritual, and the  
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17 consequences of their aborted potential are assessed annually in public. [...]

18  
19 Where is our permanent memorial?

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21 Not the AIDS quilt, now locked up in storage somewhere, but the government-sponsored  
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23 invitation to mourn and understand, equal to Maya Lin's memorial to the dead in  
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25 Vietnam? (p. 46, p. 48).  
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29 Schulman's argument is not on the particulars of the 9/11 Memorial, but rather the memorials that have failed to  
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31 materialize—in particular one to those who have died of AIDS. This argument draws attention to issues of power  
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33 and representation, and raises issues as to who gets remembered through official government structures and for what  
34  
35 purpose. Other scholars who take a rhetorical approach to memorialization find a dialectic of memory and  
36  
37 forgetting. Blair, Dickinson and Ott observe “because a collective's memories are selective, they are seen as also  
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39 deflecting other memories...memory is operationalized by forgetting” (p. 9). Thus, using their approach, it is not  
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41 unusual that some events become part of public memory—and get reified in public places—and others do not.  
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45 Rivard finds related conflicts in her analysis of the September 11 Digital Archive in relation to the Hurricane Digital  
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47 Memory Bank. She notes that:

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49 The physical and digital components of the September 11th disaster archive rely on  
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51 principles of whiteness to render the September 11th victims heroic citizens, whose  
52  
53 deaths deserve national mourning. Whereas the Hurricane Katrina disaster archive  
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55 activates notions of Blackness equated with poverty, disposability, and criminality to  
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57 disassociate the victims of Hurricane Katrina from US national identity, thereby granting  
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3 them only distant sympathy. Therefore, taken together, the first two instances of disaster  
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5 archive demonstrate the powerful roles of emotion and race in shaping notions of national  
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7 belonging within the space of the archive. (p. 7).  
8

9 Rivard's analysis concludes, similarly to Shulman's analysis, that the mobilization of memorials is shaped by power,  
10 race, and class. These analyses give rise to a need for critical reflection on the role of mobile technology at sites of  
11 remembrance. For example, how might mobile technology be used for further reasserting the authority of the state,  
12 or to further reify problems of race, class and power? If a memory can be enhanced through the use of digital  
13 information delivered to a mobile device, can that memory be manipulated to serve some ends? This paper will  
14 explore some of these critical issues using study participant feedback.  
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### 23 **Research Method**

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27 To address research questions one and two, a mixed method research design was employed which is composed of  
28 in-depth focus groups and a survey. The goal of the research design was to elicit feedback on how mobile  
29 technology impacts the remembrance and memory functions of a memorial, with a concerted effort in creating a  
30 comfortable environment for participants to share their views and for garnering the feedback from a diverse group of  
31 people. The procedure for the study was as follows. First, the study was advertised on flyers in Manhattan and  
32 Brooklyn, New York, as well as on Facebook, and interested participants signed-up to participate online at {URL  
33 removed for review purposes}. Participants were notified via the flyers that by participating in the focus group, they  
34 would receive fifty US dollars cash upon completing it. Additionally, the study was advertised on {Institution name  
35 removed for review purposes} listserv. To maintain diversity of occupation and education, the researcher asked that  
36 students not apply to participate, but if they know someone who might be interested (e.g., neighbor, parent), then to  
37 please forward along the opportunity. This snowball method—used in combination with flyers—was thought to be  
38 an effective way to bring together a diverse body of participants. One prerequisite was that the participant already  
39 owns an Apple iPhone, Android phone, or Windows phone that has an Internet data provider.  
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3 Upon visiting the website, applicants filled-out a demographic survey online, which asked basic demographic  
4 questions (survey available in the appendix).<sup>6</sup> To maintain a diverse participant group, the list of applicants were  
5 separated into groups based on demographic factors (e.g., age, education level, gender, and ethnicity), and the  
6 researcher randomly selected a participant from those groups. After selection, an invitation to participate in the  
7 focus group was sent to the applicant, with a request that they pick a date for the focus group (which were Tuesdays  
8 at 7 pm in June 2013, and would last approximately one hour). Evening focus groups during the work week were  
9 chosen so that working adults could visit the memorial on the weekend or on Monday after work, and attend the  
10 focus group on Tuesday on their way home from work. The focus group was held at {Institution name removed for  
11 review purposes}, which is a short subway ride from the memorial. Additional applicants were contacted if no  
12 response was received until twenty persons had committed to participating, distributed over four focus groups.  
13 Participants were informed via email that they should request a ticket online for visiting the 9/11 Memorial,  
14 download the 9/11 Memorial Guide, and they should bring their smartphone with headphones to listen to the stories  
15 available onsite.  
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31 At the beginning of the focus group, the researcher first had participants fill-out a survey on a computer in the  
32 classroom where the focus group was held (survey available in the appendix).<sup>7</sup> The rationale for doing this was to  
33 help solidify a participants view on the mobile-app enabled memorial experience so as to not be easily swayed by a  
34 dominant voice in the focus group. Also, this ensured that the survey would be completed. Once everyone in the  
35 group had completed the survey, the focus group would begin, which was recorded with a HD camcorder, and a  
36 digital audio recorder was used as backup. The focus group protocol is included in the appendix. As a way of  
37 making the group feel comfortable, the researcher would have everyone go around and say their name, and what  
38 they were doing on the morning of September 11, 2011. Since nearly everyone remembers what they were doing on  
39 that morning—and usually feel free to tell it—this was thought by the researcher to be a good way to get the focus  
40 groups feeling comfortable. The researcher also was the first to recount his morning, which was done to model  
41 openness about past experience.  
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57 <sup>6</sup> Survey available at {URL removed for review purposes}

58 <sup>7</sup> Survey available at {URL removed for review purposes}

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3 Focus group data was analyzed using video coding in NVivo. In this approach, sections of participant feedback is  
4 marked-up using codes and memos. Additionally, notable quotations are transcribed. The advantage of video  
5 coding over analyzing text transcripts is that the auditory and visual elements provide additional insight into the  
6 participant's perceptions than the words and sentences alone. The codes are used to illustrate patterns and trends  
7 that emerge across the participants discussions of their experience. In the discussion of the results, particularly  
8 insights quotes from the focus group will be used to augment the quantitative results.  
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17 Forty-nine individuals applied to participate in the study, and twenty individuals were selected to participate in the  
18 study, and nineteen actually participated (one individual did not show-up for the focus group). The participants  
19 ranged in age from 22 to 63 years of age (Mean = 36.4, SD = 12.4), with 10 female, and 9 male. Participants came  
20 from a variety of ethnic and religious backgrounds, and a wide variety of professions (e.g., psychologist,  
21 photographer, account manager, registered nurse, attorney, physician, consultant, social worker, art director, and  
22 unemployed). A group not well represented in the sample is those working in traditional "blue collar" careers (e.g.,  
23 construction worker, police, firemen, etc.), or those careers that require less educational attainment. Hence, this  
24 sample best represents a college-educated group of residents living in the New York City area. Figure 3 shows a  
25 map of participant residences based on zip code, which illustrates that participants come from all five boroughs of  
26 the City of New York (Manhattan, Queens, Bronx, Staten Island, and Brooklyn), as well as New Jersey. In terms of  
27 mileage, participants lived an average of 6.6 miles (SD = 6.4 miles) from the former World Trade Center zip code  
28 (10048).  
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45 Figure 3. Participant residences based on zip code. Map © Google, Inc.  
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### 48 **Qualitative and Quantitative Results**

49 *RQ1 - How are remembrance and memory impacted by use of mobile technology in conjunction with a designed*  
50 *space at a site of memorialization?*  
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53 The results reveal that participants—if they experienced no significant technical troubles—found the app as  
54 enhancing the memory and remembrance functions of the memorial. This is largely the result of having access to  
55 the curated oral histories or stories available on the app. For example, one female participant in her twenties noted  
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3 in the survey that “listening to the stories made the experience much more ‘real’ and personal.... I was left  
4 experiencing a wide range of emotions.” Several participants noted that the stories were “powerful” or “moving”  
5 and made the experience more “personal,” more “real” or made the “experience hit closer to home.” One female  
6 participant in her thirties noted that listening to the stories via the app made the experience more “intimate” and  
7 brought her to tears. A female participant in her twenties noted that “although I felt frustrated at the mobile app at  
8 times, it really brought [the] engraved names back to life.”  
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17 For users who experienced trouble with app—especially those using the Android phone which was prone to  
18 technical trouble—the app detracted from the experience. For example, one male Android user in his twenties noted  
19 “the mobile app is... the source of my annoyance.” A female participant in her thirties noted that “Unfortunately, I  
20 was never able to get the app to work on my Samsung phone (android). It just kept crashing.”  
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27 There were a small number of users who did not experience significant technical trouble using the Android phone,  
28 but did feel like the mobile app was a detractor. For example, a male participant in his forties noted that “the site  
29 itself [the mobile app] detracted and was actually difficult to hear over the water and crowds.”  
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35 The quantitative findings mirror the results of the in-depth focus groups. Table 1 indicates that iPhone users ( $N =$   
36 14) generally had a very positive experience with the mobile app. On a scale from one to five, where five means  
37 “very much enhances” and one means “detracts very much,” the average response to the question about the mobile  
38 app impact on the memory and remembrance functions of the memorial was 4.31 (with a standard deviation of  
39 0.63). Positive perceptions are also evident in response to the question about the impact of the stories (or oral  
40 histories) on the memorial visiting experience, with an average result of 4.23 (with standard deviation of 0.73). This  
41 is further reinforced by the response to the question about on the overall mobile app impact on the memorial visiting  
42 experience, which resulted in 4.08 (with a standard deviation of 0.64).  
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51 Although still somewhat enthusiastic, on average Android phone users ( $N=5$ ) experienced more technical problems  
52 with the application than iPhone users, and this is borne out in the quantitative results. For example, to the question  
53 about the impact the app had on the memory and remembrance functions of the memorial, the average result was  
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3 3.17 (with a standard deviation of 1.17). Similarly, responses to the question regarding the impact of the stories (or  
4 oral histories) on the memorial visiting experience resulted in an average response of 3.33 (with a standard deviation  
5 of 1.03). Relatedly, the question about the overall impact of the mobile app on the experience resulted in an average  
6 response of 3.33 (with a 0.82 standard deviation). It is noteworthy that the standard deviations are higher for the  
7 Android users than the iPhone users, which indicates there was more variation in user experience. Specifically,  
8 some Android users experienced few if any technical problems, where other Android users experienced significant  
9 technical barriers. iPhone users generally had a consistent experience, which is evident in the low standard  
10 deviations across participants.  
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21 [Insert Table 1 here]  
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25 RQ2 – *What factors mediate engagement with mobile technology for the purposes of remembrance?*  
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27 An issue that was discussed by some participants was how slightly awkward they felt using their mobile phone with  
28 headphones at a memorial site. They worried about what others would think about them: were they listening to  
29 music? Were they doing something other than memorial-appropriate behavior? These users experienced some  
30 hesitation putting on the headphones, but went ahead and felt more comfortable after a few moments. One female  
31 participant in her twenties noted that although she had on her headphones, it was clear from her demeanor that she  
32 was engaging in memorial-appropriate behavior. A few participants in the focus group insisted that they did not  
33 care about what others thought, and felt perfectly comfortable putting on the headphones and using the memorial-  
34 sanctioned app.  
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45 Another issue that came up repeatedly in the focus groups as a detractor from the remembrance and memory  
46 functions of the memorial was not related to the app, but to other visitors at the site. A male participant in his  
47 twenties noted “There was also annoyance at about 80 percent of the people who were there. The site was different  
48 for them. Something on a checklist.” Participants in this study were annoyed at seeing memorial visitors posing for  
49 pictures, especially for posing for pictures in a way that was not appropriate for a memorial (e.g., “posing like  
50 Superman”). Participants intuited that these visitors may have been international visitors who did not comprehend  
51 the gravity of the memorial, but rather viewed it as another site on a tourist “checklist.” In *Tourists of History*,  
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3 Sturken notes that the “ferve tourism at Ground Zero, which has not appeared to lessen as time has passed, is a  
4 primary example of what I am calling the tourism of history,” and asks “how is American memorialization  
5 repackaged as tourist practices and cultural reenactment?” (p. 218; p. 4). Given her monograph length analysis of  
6 memorial as tourist destination—complete with looks at the consumer products available at such memorials—it is  
7 not surprising that participants perceived that a tourist ethic predominated the memorial. This view is echoed by  
8 Trimarco and Hurley Depret, who finds that “as we examine the role of history in the building of tourist desire to  
9 visit Ground Zero, the outlines of a connection between tragedy and commodity begin to emerge, for the conversion  
10 of a historical site into a tourist site is a process of commodification” (p. 43).  
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21 Following the work of scholars who critique memorialization, the researcher asked the focus group participants  
22 about any perceived connections they made between the memorial and the political contexts in which the memorial  
23 is situated, and if the app played a role in this process. By this, the researcher asked if the memorial made them  
24 think about the two wars that were an outgrowth of the events of 9/11. In popular and scholarly texts, a connection  
25 between the wars and 9/11 are often made. For example, Heller argues that the executive office used the September  
26 11 anniversary as a strategy “that would help ‘sell’ the idea of an Iraqi war to the American people,” thus making  
27 “9/11 into a commercial pitch” (p. 2). However, during the focus group, most participants indicated that they did  
28 not think at all about politics while at the memorial. The exception is during the intense security screening process  
29 to enter into the memorial (one participant noted it was “worse than an airport”) made some participants think about  
30 how 9/11 brought about—in the words of a 50 year old female participant—“a new normal.” A male participant in  
31 his twenties concurred, expressing that “the security to get in there is so tight that process is distracting and  
32 highlights how we still live differently because of what happened, and it highlights that in an uncomfortable way.”  
33 The security process—where one participant noted that they were “herded like cattle” through—was in strong relief  
34 to the more relaxed atmosphere of the memorial itself.  
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51 In discussing how the memorial and politics might be involved, one female participant in her thirties remarked how  
52 the names of the deceased imprinted on metal seemed to be artificially cooled (she was visiting on a very hot day).  
53 She remarked that this was an amazing technical feat. For her, she seemed to make a nascent connection—although  
54 not a fully fleshed out one—between the politics, and the technical and financial resources required to make such an  
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3 edifice possible. However, for the most part, participants did not perceive the memorial nor the app as having any  
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5 overtly political dimension.  
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9 There was one case where a male participant in his sixties made connections between the memorial and a larger  
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11 political context. He mentioned that he was not thinking about this while at the memorial, but once asked the  
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13 question expressed:  
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17 Before was the World Trade Center, which was this square monumental ugly building, but from a  
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19 distance it was this huge statement of global economic world domination and power. And there  
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21 it is, coming right back, we built this beautiful memorial for the people who died, and who is  
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23 going to surround it, more of the same, the people who helped create the problem to begin with,  
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25 and killed these people indirectly.... that is one of the reasons there is so much hatred for this  
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27 country.  
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31 This statement indicates that the participant doesn't necessarily see the state as asserting itself through the creation  
32  
33 of memorial, but rather as a reassertion by corporations that will occupy the airspace around the memorial in new  
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35 office towers. This statement shows a relationship in how participants perceive place (the memorial) and space  
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37 (office towers for Fortune 500 companies), and how they can be used to symbolize ideologies and provoke  
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39 animosity.  
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#### 42 **Limitations**

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44 A limitation of this project is that it uses a fairly small sample (19 individuals). Although the sample represents a  
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46 diverse group of college-educated adults living in the New York City area, this sample may not well reflect other  
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48 groups, such as international visitors who may regard the memorial in a different light. Future studies could be used  
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50 to uncover how youth or non-college educated adults approach mobile technology for remembrance, as well as  
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52 international visitors, who may view the memorial (and subsequently the app) differently based on the feedback  
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54 from participants in this study.  
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3 A further limitation of this study is that it is selective in that it only includes participants who already own a  
4 smartphone, and does not include the thoughts of those who generally forsake or forgo this technology.  
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### 9 **Conclusion**

10 For the individual, the memorial visiting experience is a complex social performance rife with negotiations of  
11 belonging, enactment of manners and opportunity for personal, affective experience. In the social setting of the  
12 memorial, attendees perform deference to the site (e.g., quiet, contemplative) and witness these who do not (e.g.,  
13 treating the memorial as another tourist destination), which acts to codify those who belong and highlight those who  
14 are guests. The memorial experience provokes a range of emotions, from the feeling of frustration and  
15 diminishment of personal movement (through obtrusive security screenings), to feelings of deep sadness while  
16 viewing the voids, which are brought “closer to home” through the use of a mobile app that make possible an  
17 increased “intimacy.” However, technical problems, such as crashing apps, will annoy and detract from the  
18 experience.  
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31 In the minds of users, the memorial experience is divorced from the politics—such as relationship to wars or  
32 bolstering of national narratives—yet sometimes politics become more readily perceptible through subtle bodily  
33 experiences (e.g., being “wanded” in a security screening line, or the feeling of artificially cooled metal to the touch  
34 of the hand). Thus, no user reported that the memorial represented a “reassertion of national authority,” however,  
35 the technical and security prowess required to construct such a memorial raised this issue to some participants in  
36 nascent form. One participant perceived an assertion of power more from corporations than from the state, although  
37 the researcher did not interrogate the participant’s perception of the relationship between those two entities. In sum,  
38 no participant took a critical interpretation of the memorial, and critical views—if to be had at all—would have had  
39 to be slowly unearthed delicately by the researcher. From conducting this study, it is clear that some research  
40 subjects would not be interested—or even outright displeased—in engaging in this line of discussion. However,  
41 others may be interested in exploring their feelings about this in more detail. This is an intriguing future research  
42 area, but would be better suited during one-on-one interviews or diary-based activities than in a focus group setting.  
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54 This line of question could also incorporate the voices of those not included in this study, such as international  
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3 visitors, who may be working with a different set of assumptions than the domestic participants included in this  
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5 study.  
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9 For developers of mobile technology for cultural heritage contexts, the use of curated oral histories is highly  
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11 effective. Participants in this study were interested in getting more stories and more contextual information about  
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13 each oral history delivered via the mobile app. In general, participants wanted further information available at the  
14  
15 site and through the app, and were hopeful that this would be achieved through the opening of the 9/11 Museum,  
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17 which is expected in 2014. Future studies that stem from this one could further aid cultural heritage professionals by  
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19 unearthing how specific design affordances—both physical and virtual—impact visitors. This line of research could  
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21 help indicate where resources are best dedicated and in what combination (e.g., creation and distribution of mobile  
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23 content, architectural features, displays of artifacts or objects, etc.). And lastly, this study highlights how any  
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25 technical problem can detract from the visiting experience. Thus, regular maintenance of apps to ensure they still  
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27 function as designed—even years after they are initially deployed—is necessary.  
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## 45 Appendix

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48 *Participant Selection Survey* – Delivered to users online via Google forms:

### 49 Study of Mobile Technology at the 9/11 Memorial

50 Thank you for your interest in participating in the Study of Mobile Technology at the 9/11 Memorial. This study is  
51 being conducted by {Research name removed for review purposes} of {Institution name removed for review  
52 purposes}. We are interested in recruiting participants living in the New York Metropolitan region, who would be  
53 willing to visit the 9/11 Memorial in Lower Manhattan and use the mobile application designed for the site, the  
54 "9/11 Memorial Guide." This application is available for Apple iPhones, Android phones, and Windows phones.  
55 You must already have your own mobile device capable of accessing the 9/11 Memorial Guide application.  
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3 Study participants will visit the site, then attend a focus group on a Tuesday this summer at 7pm at the {Institution  
4 name and address removed for review purposes}. The date is TBD, but several Tuesday dates will be available.  
5

6 In the study, the researchers are looking for a wide cross-section of New Yorkers. For this reason, we ask that you  
7 fill-out these questions, and if you are selected to participate, you will be contacted (if not selected, you will also be  
8 informed via email).  
9

10 Upon completing the focus group, study participants will receive a \$50.00 bill (cash).  
11

12 Please note that admission to the Memorial is free; however, a ticket is required which can be retrieved from the  
13 9/11 Memorial website. The mobile application is free as well. We ask that you bring headphones on your visit to  
14 the Memorial to listen to the audio content available through the application. The researchers are not responsible for  
15 any cellular carrier data charges that may result from the use of the application.  
16

17 If you have any questions, please feel free to email the researcher {Name and email removed for review purposes}.  
18 Please note that your identity will be anonymized in any publications resulting from this study.  
19

20 \* Required  
21

22 First name and initial of last name \*  
23

24 What is your age in years? \*  
25

26 What is your gender? \*  
27

*Male*

*Female*

*Other:*  
29

30  
31 What is your home zip code (5-digits)? \*  
32

33 What is your ethnicity? \*  
34

*White/Caucasian*

*Black/African American*

*Hispanic/Latino*

*Asian/Pacific Islander*

*Native American Indian*

*Other:*  
39

40  
41 What is the highest level of education you have received? \*  
42

*Did not complete High School*

*High School Graduate or GED*

*Some College*

*College Graduate*

*Some Graduate School*

*One Graduate Degree*

*Two Graduate Degrees*

*Earned Doctorate*  
49

50  
51 Which option below most closely describes your religious views? \*  
52

*Christian*

*Muslim*

*Jewish*

*Hindu*

*Sikh*

*Buddhist*

*Atheist / Agnostic*  
58  
59  
60

Other:

What type of smartphone do you own? \*

- Apple iPhone
- Android Phone
- Windows Phone
- Other:

Occupation

If a student, indicate that you are a student and what you are studying to become.

How many focus groups have you participated in within the last 12 months? \* (If you attended none, enter 0)

Your email address \* (This will be used for contacting you about participating in the study)

[Submit]

*Pre-focus group Survey* – delivered to users via Google forms. Survey respondents agree to a content form, and then fill-out the following survey before beginning the focus group:

**9/11 Memorial Mobile Technology Study - Pre-Focus Group Questionnaire**

\* Required

Please answer the following questions to the best of your ability.

Please enter your first name and last initial \*

I use my smart phone for? \* (Please make a selection)

	Very Frequently	Frequently	Occasionally	Rarely	Almost never or never
Phone Calls	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Texting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Applications or Apps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Games	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

During the visit to the memorial, did you? \* (Select choice)

- Brought smartphone and used headphones for listening to stories*
- Brought smartphone, but did not use headphones for listening to stories*
- Did not bring smartphone or use it at the memorial*
- I did not visit the memorial*

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2  
3 Did you have any family or friends killed or injured during the attacks on September 11, 2001? \*

4  
5 *Yes*

6 *No*

7 *Other:*

8  
9 What city, state, and country were you living in on September 11, 2001? \* (For example: Moreno Valley, CA, USA)

10  
11 Approximately how many stories did you listen to at the memorial: \* (Enter number)

12  
13 If you listened to stories using the mobile app, how do you think it impacted your memorial visiting experience?

14  
15 *Very much enhances*

16 *Enhances*

17 *Neutral*

18 *Detracts*

19 *Detracts very much*

20  
21 Did you use the mobile app functions for navigating the memorial (e.g., finding a name on the memorial)? \*

22 *Yes*

23 *No*

24  
25 How do you think the mobile app impacts the remembrance and memory functions of the memorial? \*

26 *Very much enhances*

27 *Enhances*

28 *Neutral*

29 *Detracts*

30 *Detracts very much*

31  
32 In terms of size of the memorial with respect to the event that is being remembered (attacks on 9/11), and with  
33 respect to other tragedies, do you feel the memorial is? \*

34  
35 *Way too large given what is being memorialized*

36 *Slightly too large given what is being memorialized*

37 *Appropriate given what is being memorialized*

38 *Slightly too small given what is being memorialized*

39 *Way too small given what is being memorialized*

40  
41 What feelings were provoked while at the memorial? \*

42  
43 Can any of these feelings be attributed to your use of the mobile app? Please explain. \*

44  
45 Overall, do you feel like the memorial adequately performs its remembrance and memory function? \*

46 *Very much so*

47 *Mostly Yes*

48 *Somewhat*

49 *Mostly No*

50 *Not at all*

51  
52 Overall, do you feel like the mobile app impacted your memorial visiting experience? \*

53 *Very much enhances*

54 *Enhances*

55 *Neutral*

56 *Detracts*

57 *Detracts very much*

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*Protocol for focus group*

7 [Have participant sign informed consent form online, and take pre-focus group survey online]

8 [Once group is assembled, begin video recording]

9 [Brief introduction from focus group facilitator]: Thank you to everyone for agreeing to participate in this focus  
10 group. The intention of this interview is to collect your feedback on the experience of the 9/11 Memorial. We will  
11 each have a chance to talk about our experiences at the memorial site. Your responses will be anonymous, and will  
12 be used for enhancing our understanding the use of mobile technology at cultural heritage sites. We are being audio  
13 and video taped. Please note that these recordings will only be used for creating a transcript, which will omit names,  
14 and will be destroyed after the study is complete. Only myself and my assistant will have access to the recordings  
15 for the meantime.

16  
17 Maybe before we get started, perhaps we could go around in a circle and say our name, and what were you doing on  
18 the morning of September 11, 2001? I will go first.

- 19 1) Tell us about your experience visiting the memorial? What feeling did it provoke? Can any of these  
20 feelings be attributed to the use of the mobile app?  
21 2) Do you think the mobile app enhances or detracts from the remembrance and memory functions of the  
22 memorial?  
23 3) I was wondering if anyone wanted to make any connections to the political contexts in which the memorial  
24 is situated. I think it would be safe to say the events of 9/11 brought about or at least escalated what is  
25 often called the “war on terror.” For you, does the memorial impact your view of the war? Or does it help  
26 you refocus on the reason for the war? Does the app in anyway influence this process?  
27 4) Some critics have found problems not so much with the 9/11 Memorial, but rather the memorials that have  
28 never materialized. For example, some critics have pointed to the lack of a memorial for the tens of  
29 thousands of New Yorkers who died of AIDS, especially during the 1980s and 1990s. What is your feeling  
30 with regard to this issue of what gets memorialized, and what does not?  
31 5) Do you have any specific ways the app or the memorial could be improved upon?

32 Thank you to everyone for your participation.

33 [Turn off video camera]

34 [Provide participant with \$50 incentive. Have them sign-off a form that they have received it. ]  
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Figure 1. Photograph of the 9/11 Memorial in Lower Manhattan. Photo by {Name removed for review purposes}.  
592x442mm (300 x 300 DPI)

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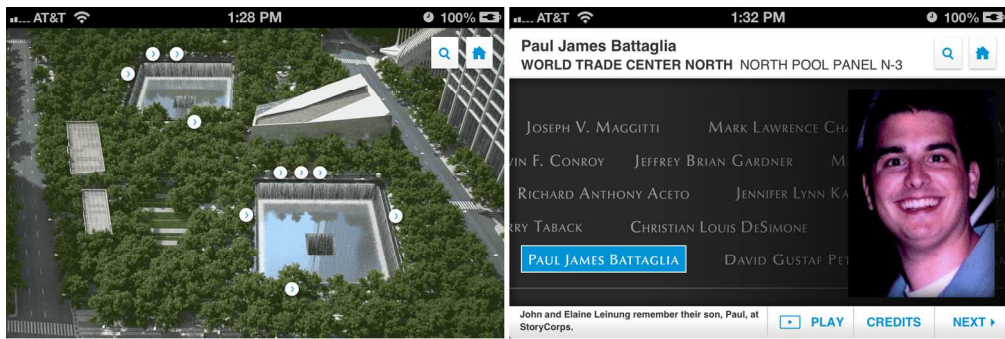


Figure 2. Oral histories are arranged around the memorial fountains. Users can click on a location and see a picture of the named person, and listen to an oral history.  
680x225mm (300 x 300 DPI)

Review Only

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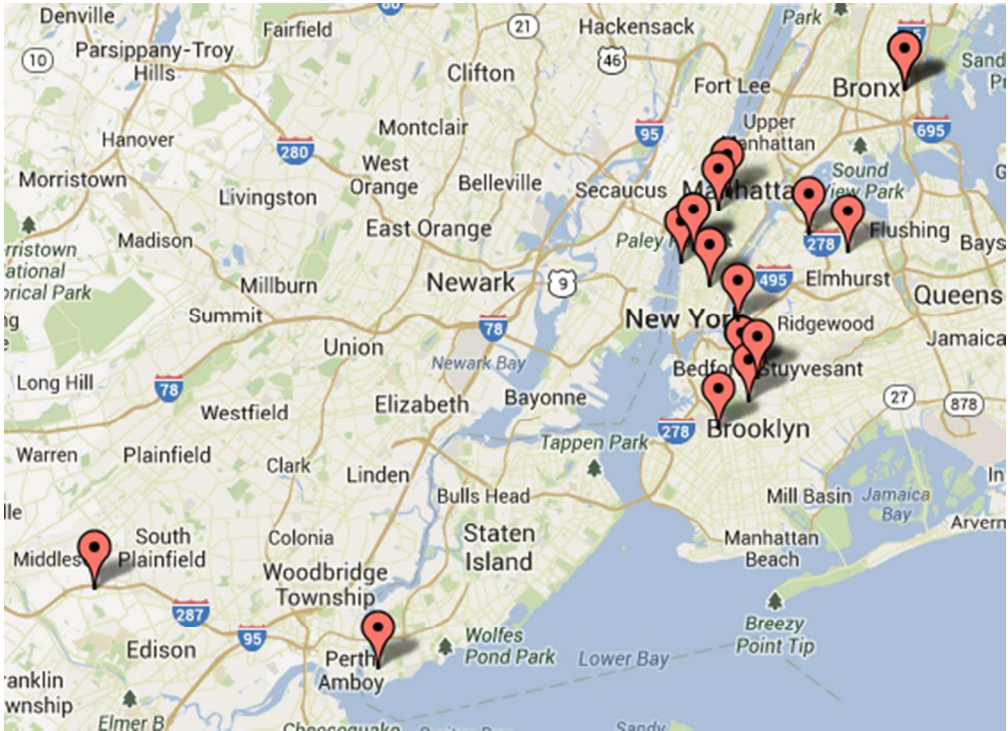


Figure 3. Participant residences based on zip code. Map © Google, Inc. 199x144mm (300 x 300 DPI)

Table 1. Participant response to survey of mobile app impact on memorial experience. Scale: 5 = Very Much Enhances, 4= Enhances, 3 = Neutral, 2 = Detracts, 1 = Detracts very much

Survey question	Apple iPhone (N=14)		Android Phone (N=5)	
	Mean	SD	Mean	SD
App impact on remembrance and memory function of memorial	4.31	0.63	3.17	1.17
Impact of stories on memorial visiting experience?	4.23	0.73	3.33	1.03
Overall, mobile app impact on memorial visiting experience?	4.08	0.64	3.33	0.82

For Review Only