

ArtMaps: A Technology for Looking at Tate's Collection

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Abstract

This article presents ArtMaps, a crowdsourcing web-based app for desktop and mobile use that allows users to locate, move and annotate artworks in the Tate collection in relation to one or more sets of locations. Here the authors show that ArtMaps extends the 'space' of the museum and facilitates a new, pluriperspectival, way of looking at art.



Figure 1. The ArtMaps interface showing the latest comments by users. (© Tate)

ArtMaps [1] was developed as part of a collaborative project between Tate, researchers in Computer Science and Performance and New Media. It consists of a web-based app for desktop and mobile use that allows users to explore artworks in the Tate collection through a Google Maps interface, which facilitates their analysis in relation to the places, sites, landscapes and environments that informed or led to their geotagging. Through using GPS in the mobile device, and IP tracking in the PC, ArtMaps can locate their user and bring up works in the Tate collection that are geotagged in relation to places near them. Users can then look at these works on the map and/or explore them in situ, reflecting on how what they see in the works relates to their surroundings. Alternatively, through a search function (by artist, keyword or location), users can explore works in any locality. If users disagree with the position of a work on the map, they can move the pin to a different location and leave a comment (Fig. 1).

ArtMaps: Research and Development

ArtMaps was conceived in response to the need to visualize Tate's collection on a map and facilitate geotagging-related activities. In 2012, at the time of the redevelopment of Tate's website, Tate had 69,775 artworks in its collection and over 23,000 of these had been indexed with one or more places, including mythical places. Since a number of works could be indexed with the same subject index term, Tate began by mapping them so that all the works indexed with a given term would be located in one go. Before this first phase, Tate had geocoded the bottom terms on the place-names index against a number of available databases to return latitude and longitude information (e.g. GeoNames and Google Places). Whilst this had captured a large number of the relationships between artworks and locations, the location information had often been limited (e.g., 'India', 'London') and many works could not be located in this way. A number of index terms were subsequently mapped by hand, though a large number of works still needed to be geocoded. This prompted Tate to suggest the remaining terms should be crowdsourced. The resulting dataset from this phase was the foundation for the ArtMaps project (2012–2014).

An early experiment drew attention to some challenges, including the fact that an artwork could show a number of landmarks; that there may not be an explicit location; that the location may not be a direct representation of a place; that the perspective from which a work is represented may be more significant than the place represented; and that a work may be associated with a plurality of locations. At the time it was felt that capturing users' reflections about these realizations could provide Tate with insight into how users experience and reflect about the encounter with their collection. This realization shifted the initial ambition and led to the development of ArtMaps as a crowdsourcing *and* a user-generated documentation tool. An additional functionality was then added, making it possible for users to add text freely as well as in response to specific tasks in order to justify why they would move the position of a work from one location to another.

A number of scaffolded public engagement events were held at Tate Britain, which included the testing of ArtMaps at Patrick Keiller's *The Robinson Institute* (2012), *Looking at the View* (2013) and *Wandering Ruins* (2014) exhibitions, which involved art and technology enthusiasts (2012 and 2014) and families (2012). Feedback showed that, through the setting of tasks, ArtMaps could operate as a 'performance' event. Thus participants felt that they could 'perform' 'ArtMapping' and become 'ArtMappers'. They talked about rehearsing, preparing and sharing in a way that is reminiscent of a set of performance rituals. In using the term 'ArtMappers', they indicated that they identified themselves as a group. Participants had felt protected by the event framing and used this to their advantage in their social encounters. Moving between mapping, map making, performing and documenting, they used the performance frame to justify the production of their 'social' actions in this context. This showed the potential for ArtMaps as a tool for group learning as participants noted that the platform allowed for a 'soft' learning approach: 'It's not an instruction, it's an association'.



Figure 2. An ArtMapper comparing an existing location with the one represented in the set artwork. (© Tate)

Feedback also showed that ArtMaps could operate as an orientation or navigation tool. Participants enjoyed searching terms, finding connections, generating routes and exploring those generated by others. More specifically, they found it interesting that they could compare a specific location to what they could see in the artwork (Fig. 2). This prompted reflections on the similarities and differences between places and artworks, the people and objects therein, and the position adopted by the participants themselves in relation to the one taken by the painter of the work. One participant noted: 'I found it interesting because the building is missing. So you are in the right place but you are in the wrong place.' This showed that ArtMaps could facilitate a 'way of looking': by asking users to find relations between maps, artworks and sites, participants felt encouraged to reflect about the role of their own point(s) of view in relation to that of the artist or Tate.



Figure 3. An ArtMapper illustrating his journey to the rest of the group. (© Tate)

Additionally, users pointed out that ArtMaps can lead to an enhanced knowledge of local geography as well as of the artworks encountered. Hence, they indicated that ArtMaps gave them unexpected insights into familiar neighborhoods. They said: 'It's phenomenal cos I'm genuinely surprised there are even two paintings related to this area'. This suggested that tools like ArtMaps can be used to widen participation, and generate and share knowledge about heritage (Fig. 3). Thus one participant noted: 'I thought it would be much more engrossing for the children to be... gazing at the screen all the time, but actually it took you outside of that digital world and to the world around you and we talked about things we hadn't talked about before'.



Figure 4. A family exploring Tate Britain after using ArtMaps outside the Museum. (© Tate)

Rather than constituting a substitute of the museum experience, ArtMaps seemed to complement it, in the sense that participants felt that encountering new artworks through ArtMaps prompted them to return to the museum to have a better look at the original works (Fig. 4). Thus one participant stated: 'Never I was interested in Turner until today. Now I want to study Turner more'. ArtMaps also acted as a sharing tool, setting up the museum as a social space. Thus two participants mentioned that in ArtMaps: 'Everyone's learning together.' Interestingly, participants made use of a whole variety of social media to further disseminate their ArtMaps, and one participant posted their work to Facebook noting that in this way ArtMaps 'takes art to people that would not necessarily access it. It broadens people's horizons. I have got friends on my Facebook that have probably never been to an art gallery so by doing projects like this you are actually taking art to them without them realising it's a big deal going to an art gallery.'



Figure 5. A family working collaboratively to create an installation as part of an ArtMaps task. (© Tate)

Feedback at subsequent workshops showed that families worked collaboratively and enjoyed responding to art creatively outside the museum (Fig. 5).

An unscaffolded gallery observation led by Cristina Locatelli indicated that a greater percentage among the young people who visited Tate Britain in the period analysed, were attracted by the ArtMaps kiosks in comparison to over 60s, hinting at the different interests and level of technological confidence of these two audiences and suggesting that ArtMaps has the potential of reaching younger audiences. Individual feedback indicated that ArtMaps could facilitate the recollection of personal memories of places, potentially fostering a stronger sense of belonging to a place. This in turn could prompt the sharing of personal stories, as in the case of this participant who wrote on ArtMaps: ‘This is “Postmans Park” – the site of the original monument. From an idea by the artist GF Watts to celebrate the heroism of ordinary people you can see lots of plaques to commemorate heroic deeds, and a small model of the man himself. There is also a play by “Lone Twin” TC inspired by this, monument. I was a postman at the once ECDO office which used to be nearby. Be your own hero. marka. 2013.’

The educational potential of the platform was tested at the Pimlico Academy in London, and online three times by Laura Carletti between 2013 and 2014. The latter was part of the Telling Tales of Engagement Prize. The aim of the former was to explore the use of ArtMaps for wayfaring and mapping in a mobile learning context facilitating the generation of different roles [2]. The aim of the latter was to target the digital public and to investigate the crowdsourcing potential of the platform. The 21 participants who completed all the Tasks and the final questionnaire ‘agreed/strongly agreed’ that using ArtMaps facilitated new ways of engaging with locations and artworks (85%); increased their understanding of a particular artist’s work (71%); facilitated new ways of thinking about artworks (85%); facilitated new ways of exploring the Tate collection (95%); and enabled them to interpret artworks in new ways (71%) and learn something new (95%).



Figure 6. Art Mapping workshop participants from the Migrants Resource Centre, Westminster. (© Tate)

The final public engagement event in March 2014 built on findings from the first event and findings from a workshop held by Cristina Locatelli with the Migrant Resource Centre (Fig. 6), re-examining how people can explore places through art by creating mobile journeys for others to experience. This event used another WordPress-based platform developed at Horizon, Wander Anywhere, and structured the event as a collaborative design for user experiences on location. The starting point was the *Ruins Lust* exhibition at Tate Britain, which examined the fascination with ruins of the past, present and future as a subject for art. Participants were divided into interest groups around three London-based artworks, selected from the show: Keith Coventry's *Heygate Estate* (1995), Rachel Whiteread's *Clapton Park Estate, E5* from the series *Demolished* (1996) and Joseph Gandy's *An imagined view of the Bank of England in ruins* (1830). The event confirmed findings from previous workshops and provided further evidence that people's understanding of the locations where they devised their trails, as well as those they explored on others' trails, were subsequently seen in a new light. Participants, who had been prompted to reconsider the overlooked within the urban landscape in light of its (often hidden) history, were then motivated to revisit the work of artists who were the starting point for their ideas. Feedback indicated that participants felt that they were involved in a social activity and employed various forms of social media to plan, share, test, prompt engagement and disseminate experiences throughout and beyond the event.

We have seen how the research and development for ArtMaps showed that the tool can facilitate access to those who do not habitually visit museums, extend the gallery experience outside the museum, allow for encounters with items not ordinarily on display, stimulate collaboration and group discussion, facilitate mobile learning, generate dialogue and interaction outside of the interface and, through crowdsourcing, potentially produce valuable and original knowledge for the museum. Here we suggest that ArtMaps also promotes a new pluriperspectival way of looking at art through its relationships with places, and, vice versa, facilitates the perception of places through their relationship with art. In other words, ArtMaps

encourages the production of relational knowledge through observation (i.e., the viewer is standing in front of a digital work that has been removed from its gallery context and looks at it), immersion (i.e., the viewer is immersed in a distinct but related physical place), and relational mapping (i.e., the viewer is mapping the two distinct fields, an artwork and a place, seeing one in relation to the other and bringing them together onto a cartographic map).

ArtMaps: A New Way of Looking at Art

Over the years, a number of Museums have been inviting their audiences to contribute ideas, recollections and even personal artefacts to enhance and extend the experience of their collections [3,4] and to promote collaborative experiences [5]. With the introduction of ubiquitous computing, more complex participatory encounters have been produced, leading to novel ways of looking at and experiencing art. Apart from ArtMaps, other projects, such as Imperial War Museum's Putting Art on the Map [6] and Museum of London's Streetmuseum [7], to name a few, facilitate novel ways of encountering collections, encouraging users to locate or place artworks on a map and compare and contrast past and present views of them. This spatial form of engagement with art is crucial in terms of how we see ubiquitous computing facilitate a new way of looking at art.

We know from Ross Parry that, ever since the Renaissance, museums are in some ways 'knowledge made spatial', involved in 'spatial architectonics', i.e. 'the systematic construction of knowledge through space' [8]. We also know that because of this, museum visits have tended to be framed in space and time as something separate from the everyday and that with the advent of computers, museums were challenged with the task to reconsider what they were as well as 'when and how a museum visit could occur' [9]. ArtMaps, like Putting Art on the Map and Streetmuseum, is made possible by developments in ubiquitous computing and social media that are grounded in the promise of the delivery of a novel kind of space, a 'mixed reality' [10] that merges physical and digital spaces. Not only therefore do such platforms facilitate visiting a collection from outside the museum, bringing the Museum to the user, they also make possible the juxtaposition of the collection, experienced digitally, with physical environments from the user's everyday life, practiced physically, in space. Through such platforms, museum visits can occur in conjunction with other kinds of mobile experiences, linking physical and digital sites, hence extending the museological experience outside the conventional museum space. The space of the 21st century Museum, herewith, has become juxtaposed with the physical world, which means that the 21st century museum can be experienced everywhere and at any time.

This is not the first time that the discovery of a technology, in our case ubiquitous computing, has changed the way we look at art. We know from Jonathan Crary that during the first few decades of the 19th century a new form of observer emerged [11] who was formed by the introduction of a set of new methods for managing the work of large populations which 'brought in new procedures of individualisation' [12] that were reliant on the accumulation of knowledge about people [13]. For Crary, the invention of a number of optical devices transformed 'the status of the observing subject' [14], informing the course of visual culture in the 19th century. He suggests: 'these apparatuses are the outcome of a complex remaking of the individual as observer into something calculable and regularizable and of human vision into something measurable and thus exchangeable' [15]. An even earlier shift is described by Svetlana Alpers as a move towards a calculable and regularizable visual culture, which, she believes, occurred as a consequence of the introduction of a new style of painting in the Netherlands in the 17 century. At this time, she notes, painters moved away from an imitative, Albertian model, in which a picture consisted of 'a framed surface or pane situated at a certain distance from a viewer who looks through it at a second or substitute world' [16], to a descriptive form of painting from which it is no longer possible to detect the view point of the painter in that there seemingly is no frame [17]. The introduction of a new technology played, once again, a crucial role in this context. Thus, for Alpers, one could, for example, observe 'the effect of nature, seen in a *camera obscura*' in Jan van der Heyden's work and 'a circular field of vision' in the case of Jacob van Ruisdael's panoramic landscapes [18]. The scene is more complex in Diego Velázquez's *Las Meninas* (1656) in which famously the painter represented himself looking out

of the painting toward the position of the looker [19]. Still, from a mirror in the painting, we can see that the lookers captured in their act of onlooking are the royal couple, King Philip IV and Queen Mariana, though some have argued that the mirror in fact reflects what is in Velásquez's painting in the painting [20]. For Alpers this picture captures both the Albertian world model and the one introduced by 17th century Dutch painting, representing, at the same time, 'the world prior to us made visible' and 'we prior to the world and commanding its presence', so that we see, as an un-reconciled image, 'a replication of a world *and* a substitute world that we view through a window frame' [21].

Two centuries later, we are again witnessing the emergence of a new kind of observer who is consuming and generating information [22], and who is looking at art relationally [23], and, increasingly so, by overlaying physical and digital environments in what could be described as a 'mixed reality' [24]. For this 21st century observer, mobility is crucial, as are mobile interfaces' ability to facilitate 'implacement' [25], which, in Jason Farman's interpretation, helps towards locating 'our situated nature and our sense of proprioception with others and with objects in a space' [26], offering 'context for embodied being-in-the-world' [27]. This new kind of observer experiences both the museum collection and the physical environment from which they view the collection by mapping. Through mobile interfaces they can now make maps, i.e. generate objects, as Putting Art on the Map, Streetmuseum and ArtMaps show, whilst mapping, i.e. generating knowledge by looking at the relationships between people, place and art.

ArtMaps: A Pluriperspectival Mapping Strategy

As map making and mapping are sometimes seen as synonymous, we need to pause to describe the subtle differences in the way that scholars have understood these terms and practices, which are significant for what occurs whilst looking at art through ArtMaps. Map-making means creating 'systems of signs' [28] or 'social constructions of reality' [29]; mapping means generating knowledge about the environment while we are 'on the move' within it [30]. ArtMaps aims to facilitate the creation of user-generated documentations of what occur whilst map-making (i.e., creating systems of signs) and mapping (i.e., generating knowledge whilst on the move through a bird's eye, cartographic view). These may confirm, but also destabilize the cartographic, totalizing view of the entirety of Tate's collection visualized through a map, by instead presenting or invoking a plurality of perspectives about the relationships between artworks in Tate's collection and the places that are, variously related to them. While it is indeed Tate's collection, or rather the digitized simulacra, that we see on the map, it is other places, rather than Tate itself, that are foregrounded, so that Tate becomes the frame of the ArtMapping experience. ArtMaps not only facilitates this un-reconciled pluriperspectival experience, it asks of the viewer to map their position within it.

We know from past research that the use of different, often even minimal, forms of role-play constitutes an effective strategy to facilitate the design of and subsequently experience of mixed reality environments [31]. We also know that geographical processes of encounter with art, or what have been described as 'geography-art intersections', can come to form shared practices wherein knowledge is advanced in both fields [32]. Mapping and map making too play a major role in this context, and we can learn more about why this may be so by looking again at what occurred in the 17th and 19th centuries. 17th century Dutch painters, as Alpers notes, developed a fascination with maps that appeared increasingly in paintings as was the case of Jan Vermeer's well known *The Art of Painting* (1666) which, according to Alpers, 'illuminates the resemblance between pictures and maps' [33], defining 'an impulse to record or describe the land in pictures' [34]. Cray too discusses the significance of maps in 19th century art, and cites the example of Jacopo de Barbari's *View of Venice* (1500), which he describes as a bird's eye view or ichnography, a 'pre-Copernican, synoptic and totalizing apprehension of the city as a unified entity' [35]. He then juxtaposes this view to Canaletto's *Piazza San Marco, looking east from the northwest corner* (c. 1755), which discloses, in his opinion, 'a field occupied by a monadic observer, within a city that is knowable only as the accumulation of multiple and diverse points of view' [36]. Barbari's view of Venice is roughly comparable to the view offered by the Google Maps that constitutes the entrance point into ArtMaps. They are both a bird's eye view.

They both promise a synoptic experience of a territory. The works we look at through this process, however, do not conform with the map or the place, Tate, in which they are located as a collection, nor do they necessarily represent a location. To look at an artwork through ArtMaps, the user therefore has to position him or herself in relation to three points of reference: the Google Maps interface; the place in which the artworks are pinned on ArtMaps (the place that may be represented in the work or with which the work may be associated); and the artwork itself, which, like Canaletto's view of Venice, may not be an accurate reproduction of a location, but rather, as we have seen also in some of the feedback offered by ArtMaps users, the product of an (un-synthesised) composition entailing different points of view. To look at art through places means to embrace a variety of viewpoints from which to observe it—the processes involved here are both of displacement, and, to use Casey's term 'implacement'.

To achieve this pluri-perspectival way of looking at art, users may need to adopt different roles and strategies to augment the sense of their presence in both the physical and digital space. Whilst enhancing their being in a set of places, users create environmental relationships between themselves and what is around them [37] because integral to an understanding of what constitutes presence is the relationship between a subject and what is before or in front of them. Presence is always contextual to the environment a subject finds him or herself in and, as no environment is ever complete because they are forged by living things [38], they are best described as processes rather than fixed locations, which means that one is only present in so far as one is part of and in relation with a set of environmental processes. Through ArtMaps, not only does the user position him or herself in relation to a physical environment, they position themselves in relation to an artwork which is in itself absent from that environment in space and time. We know that for John Berger, not only does every image embody 'a way of seeing' [39], but also when we 'see' a landscape, we locate ourselves within it so that if we 'saw' the art of the past, 'we would situate ourselves in history' [40]. The 'presencing processes' that take 'place' whilst using ArtMaps thus allows users not only to re-perform these different ways of seeing an environment, or constructing their space, but also makes it possible for them to connect views generated of this environment by other individuals, primarily artists, at different points in time. ArtMappers therefore perform the presumed act of viewing taken on by the artist. This, in turn, allows them to map the memory of that act onto the 'present' landscape.

Conclusion

According to Crary, each technology produces a different kind of observer: The lack of optical unity in the planar fields of vision generated by the stereoscope produces a fragmented observer [41]. The photography, like the camera obscura, creates an assumed unity of the viewer [42]. Ubiquitous computing produces a pervasive viewer that is capable of persistently overlaying different (physical and digital, geographical and cultural) views to map a terrain through art, and vice versa.

Nicholas Serota draws attention to the fact that since the 1920s, 'artists have created environments which establish independent space to be encountered by the viewer, rather than simply modifying the space which is given by the museum' [43]. In this context, Serota mentions the 'comparative' strategy introduced by Rudi Fuchs for *documenta 7* in Kassel in 1982 and subsequently at Castello di Rivoli in 1984. According to this curatorial view, different works by the same artist are dispersed and exhibited together with works of other artists so that 'works by Baselitz, for example, might be seen initially alongside Beuys, then alongside Chamberlain' [44]. ArtMaps extends this curatorial approach outside the museum.

The internet had always promised 'a museum without walls, with no sense of place' [45]: ArtMaps reverses this position and presents a Museum without walls that does allow users to orient themselves in the physical world through art and in the digital world through associated digital footprints (see also [46]). As users annotate Tate's collection, relating art to places, and places to art, they write the art that is at Tate within the territory they pass through in their everyday lives.

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References

- [1] ArtMaps, <artmaps.tate.org.uk> (accessed 6/2/1014).
- [2] R. Sinker, G. Giannachi, an L. Carletti, 'ArtMaps - Mapping the Multiple Meanings of Place', *International Journal of Art and Design Education*, 32(3), 362-371 (2013).
- [3] G. Black, *Transforming Museums in the 21st Century* (London: Routledge, 2012).
- [4] H. Graham (2012) 'Modesty against the cuts: Museum+public+democracy+personal', <www.opendemocracy.net/helen-graham/modesty-against-cuts-museums-public-democracy-personal> (accessed 8/2/2014).
- [5] M. Caines (2012) 'Museums of the future: Providing the personal, collaborating with the crowd', *The Guardian*, 17th May, <www.theguardian.com/culture-professionals-network/culture-professionals-blog/2012/may/17/museum-development-future-debate> (accessed 15/2/13).
- [6] Putting Art on The Map, <www.historypin.com/project/41-putting-art-on-the-map/#> (accessed 18/9/2014).
- [7] Streetmuseum, <www.museumoflondon.org.uk/Resources/app/you-are-here-app/home.html> (accessed 17/9/2014).
- [8] R. Parry, *Recording the Museum: Digital heritage and the technologies of change* (London and New York: Routledge, 2007), p. 86.
- [9] *Ibid.* p. 92, original emphasis.
- [10] S. Benford and G. Giannachi, *Performing Mixed Reality* (Cambridge, Mass.: MITP, 2011).
- [11] J. Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, Mass.: MITP, 1992), p. 6.
- [12] M. Foucault, *Discipline and Punish: the Birth of the Prison*, tr. Alan Sheridan (New York: Pantheon, 1979), p. 305.
- [13] *Ibid.* p. 224-225.
- [14] Crary, *op. cit.*, p. 16.
- [15] *Ibid.*, p. 17.
- [16] S. Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century* (Chicago: University of Chicago Press, 1983), p. xix.
- [17] *Ibid.*, p. xxv.
- [18] *Ibid.*, p. 29.
- [19] M.M. Kahr, 'Velazquez and Las Meninas', *The Art Bulletin*, 57(2): 225–246 (1975).
- [20] L. Steinberg, 'Velazquez' "Las Meninas" October 19, 45–54, p. 52 (1981).
- [21] Albers, *op. cit.*, p. 70, original emphasis.
- [22] H. Jenkins, *Convergence Culture: Where Old and New media Collide* (New York: NYUP, 2008).
- [23] N. Bourriaud, *Relational Aesthetics* (Paris: Les Presse Du Reel, 1998).
- [24] Benford and Giannachi, *op. cit.*
- [25] E.S. Casey, *Getting Back Into Place: Toward a Renewed Understanding of Place-World* (Bloomington: Indiana University Press, 2009).
- [26] J. Farman, *Mobile Interface Theory: Embodied Space and Locative Media* (London and New York: Routledge, 2012), p. 40.
- [27] *Ibid.*, p. 42.
- [28] D. Wood, 'The fine line between mapping and mapmaking', *Cartographica*, 30(4), 50-60, p. 51 (1993).
- [29] *Ibid.*, p. 52.
- [30] T. Ingold, *The Perception of the Environment* (London and New York: Routledge, 2000) p. 231.
- [31] Benford and Giannachi, *op. cit.*
- [32] H. Hawkins, *For Creative Geographies: Geography, Visual Arts and the Making of Worlds* (London and New York: Routledge, 2013).

[33] Alpers, *op. cit.*, p. 119.

[34] *Ibid.*, p. 147.

[35] Crary, *op. cit.*, p. 52.

[36] *Ibid.*

[37] G. Giannachi, 'Environmental Presence', In G. Giannachi, N. Kaye, and M. Shanks, *Archaeologies of Presence: Art. Performance and the Persistence of Being*, London and New York: Routledge, pp. 50-63, p. 50 (2012).

[38] Ingold, *op. cit.*, p. 20.

[39] J. Berger, *Ways of Seeing* (Harmondsworth: Penguin, 1972), p. 2.

[40] *Ibid.*, p. 4.

[41] Crary, *op. cit.*, p. 76-9.

[42] *Ibid.*, p. 136.

[43] N. Serota, *Experience or Interpretation: the Dilemma of Museums of Modern Art* (London: Thames and Hudson, 2000), p. 27.

[44] *Ibid.*, p. 50.

[45] J. Pratty (2006) 'The Inside Out Web Museum', in J. Trant and D. Bearman (eds) *Museums and the Web 2006: proceedings*, Toronto: Archives & Museum Informatics, <www.archimuse.com/mw2006/papers/pratty/pratty.html> (accessed 4/5/2014).

[46] R. Kitchin and M. Dodge, *Code/Space: Software and Everyday Life* (Cambridge, Mass.: MITP, 2011).

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