DIGITAL CLASSICS ONLINE

Collaborative Mapping in the Age of Ubiquitous Internet: An Archaeological Perspective

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Abstract: Over the past decade, collaborative mapping projects have become widespread, allowing for and promoting voluntary participation in cartographic processes. A major factor in the increasing popularity of collaborative mapping in recent years has been the developments in digital cartographic media in general and internet mapping in particular. In this paper the aim is to discuss the possibilities of online collaborative mapping in archaeology. Following an overview of collaborative mapping and its current state in today's increasingly online and digital world, four potential modes are introduced through which collaborative mapping in archaeology can be carried out: psychogeography, local community involvement, an online archaeology map system and spatial narratives.

1. Introduction

In the last ten years or so, collaborative mapping projects have become popular, enabling and promoting voluntary participation in cartographic processes. Such projects are considered to be inherently emancipatory and pluralistic since they typically allow different groups of people to collaborate equally in a cartographic process.[1] Unlike traditional cartographic projects, collaborative mapping involves more than one person with the power to decide what to put on or exclude from the map. Therefore, archaeological collaborative mapping potentially provides a new set of practices to render archaeology more prolific in the sense of being more multivocal, emancipatory and open to multiple realities.

A major factor in the increasing popularity of collaborative mapping in recent years has been the developments in digital cartographic media in general and internet mapping in particular. Specifically, the user-friendly and efficient nature of digital cartographic media has democratized mapping processes since the 1990s.[2] Such media serve to capture, store, manipulate, analyze and display cartographic information not only by professional cartographers but also others, thereby challenging the authority of professionals in the cartographic process.[3] In the case of internet mapping, many online collaborative mapping platforms (e.g. OpenStreetMap, Wikimapia and Google Earth) use a revolutionary online mapping logic today, mapping 2.0., which provides the means for the visitors of these platforms to participate in the online mapping processes rather than being passive users of the information presented.[4]

In this paper the aim is to introduce the concept of collaborative mapping to archaeologists with the possibilities provided by digital media and internet. As recently highlighted, collaborative

1 Grasseni (2004); Perkins (2014); Sletto (2009).

2 Rød et al. (2001).

3 Dodge (2011).

4 Perkins (2014).

mapping „could be a powerful tool for investigating an archaeology of the present that has political and social meaning; an accessible and richer archaeology that allows everyone to meaningfully contribute".[5] Such mapping projects can indeed challenge established power structures in archaeology and sustain multivocality[6] as well as helping the management of archaeological projects in ways tuned into the concerns, rights and interests of local population.[7] With the increased accessibility of cartographic information and processes provided by digital tools and internet, the stakes are even higher for archaeological collaborative mapping today. The task for archaeologists now not only involves exploring the promises of collaborative mapping for archaeology, which is long overdue, but also to reflect on these promises in relation to the digital and online transition in cartography.

2. Online Collaborative Mapping: An Overview

Western cartography is known by its historians and theoreticians as a practice that historically serves the intentions of powerful individuals and institutes with, for instance, militarist, capitalist, colonialist or nationalist interests.[8] Geographer Brian Harley[9] suggests for the case of colonialism that „[A]s much as guns and warships, maps have been the weapons of imperialism". As elaborated by Kitchin and others[10], Western mapping has indeed played an instrumental role:

> „in imperial exploitation through the erasure of indigenous peoples from the colonisers' maps ... In the partition of India, the annexation of Palestinian land, or the ‚*terra nullius*' of Australia, cartography has been integral to colonial practices, providing both spatial justification and a rationalising tool for colonisers, past and present".

Being such a powerful practice, it is not surprising that Western mapping has remained an elite enterprise throughout modern times.[11] It was not before the 1990s that cartographic skills became considerably easier to acquire (a phenomenon referred to as „democratisation of cartography"[12]) with the coming of age of digital mapping and later on the internet providing increasingly easy access to mapping tools and relevant data as well as the media to circulate maps and cartographic information.[13] This democratization process has improved further in the 1990s in response to the „maps and power" critique within the critical cartography and critical GIS literature.[14] In sum, collaborative mapping practices have their roots in the fertile intellectual soil of critical cartography and critical GIS that started to gain depth in the early 1990s; these practices got further fed in the same period by technical developments in digital computing and computer network science.

5 Lee (2016).

6 See Conkey / Gero (1997), 429; Joyce / Tringham (2007).

7 Atalay (2008); Duke / Saitta (1998).

8 Kitchin et al. (2011).

9 Harley (1988), 282.

10 Kitchin et al. (2011), 389.

11 Jacob (2006).

12 Rød et al. (2001).

13 Dodge et al. (2011).

14 Crampton (2010).

Collaborative mapping started to materialize in the 1980s, with guides explaining how to carry out such mapping projects[15] and the initiation of projects such as the Parish Maps Project (see below). In the years that followed, collaborative mapping was practiced widely especially in the context of advancing territorial and cultural claims of indigenous and local populations, highlighting their knowledge, and designing and carrying out locally-led projects.[16] In fact, the ubiquity of indigenous and „counter" mapping projects that aim to subvert established power structures have caused collaborative mapping to be largely understood in relation to indigenous and minority rights.[17] Two examples of indigenous mapping projects are presented by Wainwright and Bryan[18] who review the collaborative mapping projects of the Maya and Mayangna communities of southern Belize and eastern Nicaragua respectively from a critical perspective. In order to avoid displacement, dispossession and destruction of their livelihoods through state-sanctioned practices, these communities created maps that express and document their territorial claims and used these maps in legal battles with the assistance of organizations such as the World Wildlife Fund (in the case of Mayanga community) and Toledo Maya Cultural Council. As Wainwright and Bryan rightly point out in their study, however, the maps created by the Maya and Mayangna communities fail to transcend typical issues of modern politics, namely territory and property rights. Collaborative mapping with political ambitions has in fact often been criticized along these lines of not managing to subvert established power structures but merely reworking them along the lines of more traditional mapping practices (see below).[19]

Participatory GIS (PGIS) (also known as Public Participation GIS or community-integrated GIS) practices have formed a significant branch within collaborative mapping in North America where GIS technology is largely accessible in the public sphere.[20] The key idea of PGIS is to turn GIS use into a more democratic practice through the active participation of people and GIS communities in the mapping process.[21] In other words, PGIS practices celebrate „the multiplicity of geographical realities rather than the disembodied, objective and technical 'solutions' which have tended to characterize many conventional GIS applications".[22] Among the successful applications of PGIS are Elwood's examination of the impact of GIS use by a Minneapolis (Minnesota) community-based neighborhood organization in urban planning and neighborhood revitalization;[23] Kyem's investigation of how innovative participatory applications of GIS can manage conflicts through a case study on forest resources in Southern Ghana;[24] and Walker et al.'s collaborative GIS project in rural Australia for community-based decision making about sustainable resource use.[25]

Many online applications of collaborative mapping today share characteristics with what is known as „Web 2.0" identified by rich and variable content, enhanced interactivity and user participation. Online manipulation of cartographic data with a participatory map 2.0 logic

15 E.g. Aberley (1993); King / Clifford (1985).

16 Cf. Chapin et al. (2005); Chambers (2006); Perkins (2007).

17 Parker (2006).

18 Wainwright / Bryan (2009).

19 Parker (2006); Perkins (2007), 127; Wainwright / Bryan (2009).

20 Chapin et al. (2005); Perkins (2007), 127.

21 Elwood (2006).

22 Dunn (2007), 616.

23 Elwood (2002).

24 Kyem (2004).

25 Walker et al. (2002).

is referred to as „Web mapping 2.0“[26] or „maps 2.0“.[27] Gartner defines Web mapping 2.0 as „Web 2.0 applications that have a spatial frame of reference“.[28] Among the examples of Web mapping 2.0 applications Gartner counts are geotagging which is geo-referencing digital objects such as photographs, videos, audio files, websites; geoblogging which is geo-referencing information in blog entries and mashups which involves combining cartographic information collaboratively on a web-served base map. While all these applications of Web mapping 2.0 can be considered online applications of collaborative mapping, Web mashup applications are worth highlighting here due to their recent popularity. A mashup application, as Gartner explains, „is a Web application that combines data from more than one source into a single integrated tool“ and is composed of three parts: the content provider, the mashup site itself, and the client Web browser.[29] For the Web mapping 2.0 mashup applications the content provider (e.g. Google, Yahoo, Microsoft) would typically provide geographically referenced raster or vector data, an application programming interface making this data available (e.g. Google Maps, MS Virtual Earth, Yahoo Maps) using various Web-protocols (e.g. GeoRSS and KML) and a standardized user interface.[30] The mashup site will then facilitate mapping of spatial information fed by multiple sources onto the provided base map. The pioneering application for web mashups was called HousingMaps combining all the housing locations fitting certain criteria from Craig‘s List on Google Maps, an essentially collaborative mapping application.[31]

3. Online Collaborative Mapping for Archaeology

Four particular modes in which online collaborative mapping in archaeology can be carried out are discussed in this section. These modes are not mutually exclusive but each has a distinct focus: the psychogeographic exploration of archaeological places, community involvement in archaeological online collaborative mapping, the establishment of an online archaeology map system and archaeological spatial narratives.

Psychogeographic explorations of urban places and related mapping practices have its origins in the practices of the surrealism-inspired movement Situationist International (SI).[32] As one of the founders of SI, Guy Debord introduced the idea of psychogeography and related playful city strolling practices (known as *derivé* (fr.) or drift (eng.)) in the 1950s. *Drifts* involved walking in a city, often not alone but in small groups (hence its collaborative nature), letting oneself to be drawn by attractions and influenced by the ambiances of the city, all the while mapping one’s personal tracks to study „the precise laws and specific effects of the geographical environment, consciously organized or not, on the emotions and behavior of individuals“.[33] Since the 1990s, there has been a revival of psychogeographic urban exploration and related mapping practices

26 Gartner (2009).

27 Crampton (2009).

28 Gartner (2009), 71.

29 Gartner (2009), 71–72.

30 Gartner (2009), 72.

31 Ratliff (2007).

32 Cf. Perkins (2007), 128; Pinder (1996); Pinder (2005); Wood (2010a); Wood (2010b), 171–177.

33 Debord (1955) cited in Wood (2010a), 186.

in Europe and North America.[34] As Perkins[35] explains, participants in such explorations „walk the city in new [playful] ways, following algorithmic patterns (first left, second right, third left etc), solving puzzles, reclaiming places from commerce or surveillance by staged performances, navigating new routes and constructing new maps". More specifically, there are many map art projects[36] that can be discussed as forms of psychogeography today as they aim to map the emotional and sensory engagement of a group of people with a given place.[37] These art projects do not always have an online or even digital component but are nonetheless inspiring for such digital or internet-based applications. Interesting in this context, for instance, is artist Christian Nold's work in which he collaborates with a group of primary school children in Bristol (UK) to map their sensory journeys during their commute between home and school.[38] The children were provided with global positioning systems (GPS) units and asked to press a button on the unit when events that they found important occurred along their path. Each child recorded five locations as the scene of such experiences and these daily travel experiences were collected on a map together with corresponding doodles drawn by the children. In another project, Nold created communal emotion maps of urban areas (e.g. East Paris, San Francisco, Greenwich) using a GPS unit and a „bio mapping device" the artist invented himself. While the bio-mapping device measured and recorded galvanic skin responses (GSR) of the wearers (like a lie-detector), the GPS device recorded people's locations when these responses to the environment took place.[39] In the project, communal emotion maps were created by bringing together tracks and GSR of various people on a single map.

Drifting in archaeological places in a way inspired by psychogeography would open up opportunities for making new types of maps that attempt to catch ambiances of such places as well as collaborating in new types of mapping processes. However, in the today's age of digital media and ubiquitous internet, there are many more possibilities for archaeological practices to expand the psychogeographic collaborative experience. For instance, thanks to new open source map renderers such as Tangram, psychogeographic maps can be created through real-time streaming of automatically geo-referenced images, audio and video data recorded during collaborative drifts at an archaeological place. Other participants around the world can participate in these digital cartographic events through the internet. What is worth noting here is that even though collaborative psychogeographic maps of archaeological places would not necessarily represent a shared vision of these places in terms of their human emotions and behavior, they would provide the opportunity to talk about them in new ways that pay attention to the personal or shared experiences.[40]

A second mode of archaeological online collaborative mapping might have the local community at its core. Community mapping in archaeology can serve to further enhance or at least experiment with the democratization process in archaeology.[41] That is, local communities living in areas of archaeological interest can get involved in mapping which then can serve as a means to have a say in the archaeological process. For instance, Daniel Lee recently carried out a community mapping project in Orkney which he refers to as a counter map „made by residents and visitors from their everyday journeys, favorite walks, island tours, encounters,

34 O'Rourke (2013); Pinder (2005).

35 Perkins (2007), 128.

36 See Obrist (2014); Harmon (2004); Harmon (2009).

37 See Pinder (2005).

38 Nold (2009).

39 Nold (2009); Perkins (2007), 128.

40 Nold (2009), 7.

41 Lee (2016); cf. Parker (2006).

and significant places and objects".[42] The participants were carrying a handheld GPS device or were using their smart phone with a GPS app installed to map their journey and record a „site" (heritage or non-heritage related) of their choice. The result was not a „final map" but several maps showing the selected „site" and the trajectory taken by each participant throughout the day. Participants had the option to write a summary of their day, and record the site with a photo, a sound recording and/or video to add an extra dimension to the mapping process.

While the idea of community mapping in archaeology is new, the Parish Maps Project in the UK can serve as an important source of inspiration for archaeologists in this context. The Project was launched by the charity Common Ground in 1985 to celebrate „local distinctiveness" by encouraging local people map their own parish on the basis of their own set of values rather than that of a, for instance, professional cartographer.[43] The Parish Maps Project typically avoids central standardization encouraging local people to „employ whatever skills were available to create a map of their own place" and „decide what is mapped, who is involved, how mapping should be carried out, the form of the map and its medium".[44] While this quality of Parish mapping is commendable for the considerable freedom it gives to the non-experts participating in the mapping process, digital and online community mapping projects in archaeology may require the involvement of standard media and methods because of their high technicality.

One online application that would serve community mapping projects in archaeology well are the „online mapping sessions" where participants would tag and annotate existing maps on the basis of a very specific (set of) question. Organized by a moderator, these well-defined mapping sessions can help people to think and communicate through a map and would allow recording of the valuable cartographic process through which cartographic realities are negotiated and the community map is brought about.[45] Importantly, such mapping sessions have already been carried out in non-digital environments where participants of the mapping process were divided into groups and received stickers to place on the maps in relation to the cartographic discussion subject.[46] The advantage of online collaborative mapping sessions, however, is the accessibility they provide to different parties across the world who may still not be living in or in the vicinity of the area of cartographic interest but may have the knowledge, experience and memories about the mapped place and, hence, may still be considered as part of the local community.

A third mode for collaborative mapping in archaeology could involve establishing an online Archaeology Map System acting as a global archaeological cartographic movement building on local archaeological knowledge. Much like the Green Map System energizing eco-cultural movements at different parts of the world since the 1990s,[47] a global Archaeology Map System may use common symbols and practices in order to gather locally generated information about archaeological places (e.g. surface remains, location and length of touristic routes, places of accommodation close to archaeological sites). Archaeology maps could then typically represent a variety of archaeology-related points of interest on a map.[48] An Archaeology Map System can be supported by different partners, projects organizations and grants, and maps produced can meet different local needs. As Perkins explains for the case of London's Green Map:

42 Lee (2016), 1.

43 Clifford (1996); Wood (2010b), 143–155.

44 Perkins (2007), 128.

45 See also Kitchin / Dodge (2007).

46 Dreessen et al. (2012).

47 Perkins (2007), 132–133.

48 Williamson / Connolly (2009), 98.

> „the mapping is employed as part of a London-wide Local Agenda 21 initiative promoting local green activity and communicating green issues, by engaging Londoners to build local sustainability and capacity for sustainable future action. This map shows: food growing projects, food coops, farmers' markets, community gardens, scrap banks, computer, furniture and white goods reuse projects, walking or cycling projects, residents [sic] groups with green approach, locations of different local groups, recycling points, health food shops, green businesses, and various council services".[49]

In the case of the Archaeology Map System, the maps can be produced by team members of archaeology projects communicating the results of the project as well as local knowledge about the area gathered from local communities. Such maps can also communicate upcoming events in relation to the archaeological project and local area and, as such, encourage and promote participation to these events by non-local and non-expert groups and individuals. Even though the maps created as a result of the Archaeology Map System may not speak to the interests of all parties engaged with archaeological places, the System would at least serve as a platform where theoretically everybody can have their say on places in relation to archaeology.

An Archaeology Map System would benefit significantly from free and open source software (FOSS).[50] Its availability at minimal or no cost, the experience of substantive online technical support for problem troubleshooting and the possibilities of sharing geospatial data easily are among the main advantages for these software. In cartography, FOSS can avoid discrimination against groups and individuals that lack resources to access commercial cartography and spatial data management software yet want to contribute to an Archaeology Map System. A fully open source cartographic portal is OpenStreetMap (OSM) which was founded in 2004 and provides free geospatial data that could facilitate archaeological collaborative mapping applications.[51] A collaborative mapping project itself, OSM provides free base maps which archaeologists can use to bring together their knowledge of archaeological places from across the world. Among the free and open GIS and spatial data management software and web-based map servers that can be useful for archaeological collaborative mapping applications are PostGIS, QGIS and GeoServer. These software packages would support the online production of, visualization of, interaction with and service of archaeological spatial information collaboratively in an Archaeology Map System. It is certainly worth noting here, however, that despite their „openness" in terms of software development and use, these software programs can be considerably inaccessible to many archaeologists due to the advanced technical knowledge required to use them. However, they can still serve as a better alternative in comparison to their commercial counterparts given that commercial software is not necessarily more accessible than FOSS in terms of technical knowledge. If anything, commercial software maybe even less accessible in many cases due to the monopoly tried to be established for user training by the profitable software development companies.

A fourth mode through which collaborative mapping in archaeology can be carried out is narratives. As Caquard[52] underlines, the relationship between maps and narratives has never been as fully embraced and fruitfully explored as it is today. One of the reasons for the strengthened ties between maps and narratives has been the critical turn in cartography since the 1980s which „has dramatically modified the relations between maps and narratives ... by deconstructing and exposing the metanarratives embedded in maps, and by envisioning

49 Perkins (2007), 132.

50 Crampton (2009), 93–95.

51 Perkins (2014).

52 Caquard (2011).

maps as a compelling form of storytelling".[53] Archaeologists can rely on textual narratives in collaborative mapping practices in the cases where such narratives are, due to their familiarity, a more convenient format to present an archaeological place collaboratively. It is technically possible today to automatically geo-reference place names appearing in texts, images or audio and video files through the process called geoparsing.[54] Places whose locational information is retrieved automatically from collaboratively written or told out archaeological narratives can be mapped out and such a collaborative map would be especially meaningful with its narrative companion. Another possible collaborative mapping practice on the basis of narratives can be carried out using online multimedia storyboard environments (e.g. Prezi, Chronozoom) where collaborative narrative maps of places can be created through access to the same map by multiple users through internet. Prezi zooming presentation platform is worth special attention here. It is increasingly used for telling spatial narratives in humanities thanks to the fact that it allows inserting texts, images, video and sound to the narrative with relative ease.[55]

4. Conclusions

Collaborative mapping remains an unexplored practice for archaeologists despite archaeology's clear aspirations regarding multivocality and involvement of local communities to archaeological processes. With the increasing digitalization in cartography and ubiquity of online mapping since the 1990s, promises of collaborative mapping for archaeology today is even more exciting. Digital transition in cartography made it easier and quicker to produce, manage, explore and circulate spatial information. A major impact of this transition in archaeology has been the introduction of geographical information software, which seems to have finally established itself in the discipline successfully after years of debate. Archaeological internet mapping, on the other hand, is in its early days at the moment and it is likely that the coming years for archaeologists will involve several trials and errors, and related discussions on the topic. It can only be hoped that the increasing incorporation of Web 2.0 to archaeological practices through, for instance, blogging, social media and wiki entries[56] will be mirrored for Web mapping 2.0 and other collaborative mapping concepts, media and practices in the discipline in near future.

53 Caquard (2011), 137.

54 Caquard (2011), 138.

55 Harris (2015), 46.

56 Perry / Beale (2015).

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