Charting the Digital:
Discourse, Disruption, Design, Detours
Conference Proceedings
Charting the Digital Conference 2016
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Whether a navigation device that adjusts its route-display according to where the driver chooses to go, or a map in a computer game that is co-produced by players’ input, digital mapping has transformed our daily lives and how we engage with and shape our worlds. During this final conference of the ERC project Charting the Digital we will share and discuss what this transformation means.

Over the last 5 years, the Charting team has interrogated what this shift entails, taking on board new developments in the field as well as novel technological possibilities. This has encompassed the deployment of theoretical and methodological frameworks in order to analyse a broad spectrum of digital mapping applications, platforms and devices - from the use of mobile apps, such as Google/Apple Maps, Citymapper, Ingress, TripAdvisor, Waze, to revolutionary platforms like Google Earth and OpenStreetMap (OSM), and devices from smartphones and watches to fitness trackers.

Using an interdisciplinary approach, we have examined digital maps in relation to each other, to ‘traditional’ non-digital cartographies and to other media-forms concerned with mapping and navigation. In so doing, we have expanded concepts of navigational interfaces; play, playfulness and playful mapping; casual politics; cartographic reason and logic; and mapping experimentation, risk and failure.

Now it is time to set up the next stage of this inquiry. Through discussion with scholars whose ideas influence, challenge or resonate with our work, we wish to open the question of what digital mapping is, has become, or could become in the future.
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Section 1 - Abstracts

Discourses

The Mental Territory of the Map – Cognitive Maps in Digital Cartography

*Pablo Abend* (The University of Cologne)

**Keywords:** Cognitive Maps, Situationism, Pyscho-Geography, Map Use, Geomedia

Until the interventions of ‘critical thinkers’, the modern history of cartography has generally been told as a success story: a steady refinement of the methods of schematisation, generalisation, abstraction and visualisation of the geographic territory. The concept of the cognitive map, on the other hand, is usually presented as a counterdraft to this objectivistic and materialistic approach within geography to visualise space and place. Instead of claiming mathematical accuracy, cognitive maps render individual perceptions of space visible and, in doing so, generate deep topographies of individual and shared landscapes of experience. Often, these individual mappings have been used to re-map cities with the aim to oppose (Debord’s and the situationist’s maps; see Debord, 1955) or at least reform (Kevin Lynchs cognitive mapping analysis; see Lynch, 1960) urban planning processes, or to give marginalised groups a voice by inserting alternative representations into the cycle of allegedly immutable cartographic inscriptions (counter mapping).

This talk traces the transformations of the cognitive map as a concept in cartography, from its early implementation within behavioural psychology, to its application as a tool in urban planning and as a means of playful resistance within artistic practices. Examples include: cognitive mappings of the city of Cologne drawn by Turkish so called ‘Gastarbeiter’ in the 1960s, the psycho-geographic mappings of Paris in the 1950s and 1960s, and contemporary hand-drawn maps from memory of 1990s computer games. Drawing on these examples as a starting point, the talk looks at the development of the idea and concept of the cognitive map after the digital upheaval in cartography and contiguous fields. What has the digital map to offer the mental mapper?
Following November, Camacho-Hübner and Latour (2010) I suggest it might be profitable to focus on the shift from a mimetic to a navigational understanding of map production. Together with non-representational cartographic thinking in general, this shares certain parallels with the idea of the cognitive map as being opposed to scientific cartographic inscriptions and draws attention to alternative ways of mapping. However, after the digitalisation of map production, the principle of layering space and the playful engagement with digital maps introduce certain challenges and possibilities for the concept of the cognitive digital map as a counter-mapping endeavor. To follow up on this thought, it is argued that the main transformation is the shift from logocentric to egocentric engagements in geomedia (Abend and Harvey, 2015). On the one hand, this shift challenges the role of cartographic inscription as prototypical ‘immutable mobiles’ (e.g. Latour, 1986: 7) by introducing mutable elements (see Perkins, 2014 and Lammes and Hind, 2015), and yields certain Dionysian forms of map use (Kingsbury and Jones III, 2009). It thus offers alternative interpretations and modes of playful, dérive-like, affective forms of interaction. On the other hand, the very same mechanisms are used to ensure a perpetual adherence with the base map as a source of legitimate power over the circulation of cartographic images, by shifting from the politics of representation to a politics of placement and displacement.
From Crypto Wars to Lessons of Love: Contesting Capture Technology

Patricia de Vries [Erasmus University and the Institute of Network Cultures]

Keywords: Capture Technology, Data, Surveillance, Machine Learning, Databases, Algorithms, Dissent, Disruption, Critique, Discourse, Artistic Interventions, Critical Concepts, Digital Activism, Crypto, Materialism, Visualisation, Transparency, Philosophy, Latour, ANT

This paper analyses a developing counter-discourse on 'capture' technology [Chow, 2012]; software that enables automatic collection of data and identification of objects. Over the past years, a growing number of scholars, artists and activists have formulated much critique over the ubiquity of capture technology, such as data surveillance, biometric and object recognition technologies. There seems to be a 'representational' politics at work, engaging with a series of metaphors and theories to represent the perceived implications of capture technology as a mechanism of control. These representations give shape to how capture technology - and the algorithmic and measurement-processes and techniques on which it runs - is understood, criticised and countered. The perceived threats and implications of control resultant from capture technology are often described by critics through the use of comparisons with visual metaphors and ways of seeing (panopticon, Big Brother). Critics also evoke such perceptions through references to 'sweats', 'fumes', 'streams', 'clouds' and 'pools', ascribing smooth, mechanic, natural qualities to capture technology. In turn, the undermining of capture technology is sought in forms of materialisation, visualisations, transparency and invisibility. This includes, for example, by way of anti-recognition face-masks, encrypted communications or, and on the contrary, tactics of radical transparency, and materialising the immaterial and virtual infrastructures of capture technology. The aim of this paper is to examine the ontological, epistemological and political-philosophical underpinnings of these critical counter-practices. What are the ontological, epistemological and political underpinnings of the ways in which critics imagine and counter capture technology? What is being critiqued here? And what discursive logic are they trying to break away from by becoming (in)visible and
Limits of Vision and Criticality in Artistic Appropriations of Photographic Mapping

Gavin MacDonald [Manchester School of Art- Manchester Metropolitan University]

Keywords: Appropriation Art, Remote Sensing Images, Geomedia, Google Earth, Google Street View, Post-Internet Art

As they have been traditionally understood, photography and mapping are antithetical: one involving an abstraction of the world and its contents into symbology, and the other involving a mimetic representation underwritten by an indexical relationship. This relationship has been complicated, although not ruptured, by the transformations of the digital. However, the last decade has seen these two representational modes increasingly bound up with each other within the new navigable spatial media of the geoweb, most significantly in Google Earth, Maps and Street View. An immense techno-social apparatus dedicated to what Joanna Zylinska (2013) calls ‘non-human photography’, brings remote sensing imagery – whether captured by satellite or by Street View camera car – into cartographic interfaces. By offering these two visual modes as alternate views, by blending them and easing the transition between them, the photograph and the map have become entwined in everyday practices and visual culture.

In recent years, artists working with appropriation have exploited photographic mapping in different ways: in curated series that highlight the contingent and curious (Jon Rafman, 9 Eyes, 2009-ongoing); in street-art paste-ups that rematerialise digital captures of people in situ in order to highlight issues around biopolitics and privacy (Paolo Cirio, Street Ghosts, 2012); and in cataloguing the sites of drone warfare infrastructure and attacks (James Bridle, Dronestagram, 2012 and Watching the Watchers, 2013). Work of this sort is photographic and has been exhibited as such in online, print and gallery contexts. It has also been enlisted into curatorial categories, including the new aesthetic and post-internet art. Whilst these photographic mappings and their reception arguably demonstrate an aestheticisation of – and a fascination with – the remote and ‘machinic’ gaze, they also articulate critical attitudes to the techno-social apparatus within which that gaze is produced. Referring to ideas about secrecy and
transparency, in relation to both contemporary culture (Bratich, 2006; Birchall, 2012; Birchall, 2014;) and to overhead views (specifically, remote sensing imagery) (Perkins and Dodge, 2009; Harris, 2011; Beck, 2012), this paper argues that the limits of vision are key to the critical content of these artworks, whether they are inherent to the technologies or imposed by algorithms or state-sanctioned censorship.

This paper examines limits of vision in the photographic mapping appropriations of two artists: Laura Kurgan and Mishka Henner, whose projects bookend the period during which the accessibility of high quality remote sensing imagery has been transformed. In the 1990s and early 2000s, Kurgan worked with commercial remote sensing imagery in projects dealing with military actions, atrocities and contested territories, and thus the limits of information marked by the resolution of pixels to meters in this work is vital to it (*Kosovo 1999: SPOT 083-264, 2000; Monochrome Landscapes, 2004*) (Kurgan, 2013). Since 2010, Henner has worked with freely available photographic mapping on several series that reframe contentious, ethically and politically charged subject matter, including Google Earth-sourced examples of the censorship of military and sensitive installations in Holland (*Dutch Landscapes, 2011*) and Street View captures of sex workers marked by the blurring of face-recognition algorithms (*No Man’s Land I and II, 2011 and 2012*).
Thinking the Smart City through Maps

Tuur Driesser [The University of Warwick]

Keywords: Smart Urbanism, Urban Age, Planetary Urbanisation

Recent theoretical developments, marking a turn away from epistemology and towards ontology across the social sciences (e.g. Woolgar and Lezaun, 2013), have affected the study of maps. In particular, scholars are moving from questions of representation to ‘post-representational’ cartographic approaches, using concepts such as ‘unfolding’ (Kitchin, Gleeson and Dodge, 2012) and ‘performativity’ (Crampton, 2009). However, as will be argued, these developments are not purely theoretical, but also empirical. Trends in the rise of digital maps and data visualisations themselves also call for new methods, methodologies and theoretical orientations. For instance, Rose (2016: 347) argues that with the increasingly ‘mutability, multimedia, and massiveness’ of digital objects, ‘the contemporary task of the cultural scholar...must surely be not to read an object but to navigate that productive network in all its multiple generativity’. Alternatively, Lammes (2016: 11) - in the context of digital mapping interfaces - argues that whilst the images of maps may be changing continuously, their ‘immutability is stored elsewhere in the network’. The point here is then that the textual analysis of images is no longer sufficient to understand the map’s role in society.

Thinking about maps not simply as representations, but more generally as social objects that unfold, connect, affect, relate, invent, perform etc., this presentation asks what is different about digital maps and what does this imply for their study. Practically, it will discuss how one way of attending to the effects of these innovations is to think not just about maps, but through them. This follows the argument made by Henare et al. (2007) about thinking through things, or taking the things-as-heuristic. Thus, the presentation will describe how thinking through maps, as paradigms (Agamben, 2009), can serve to produce a new ‘problematic context’ (Agamben, 2009: 17) in which these socio-technical assemblages can be understood differently. Specifically, in the context of smart cities, it will argue that maps are not so much representative of any smart city movement, but the smart city itself is constituted in its maps. As such, studying specific mapping projects can serve to produce novel understandings of a series of concepts - smartness,
participation and experimentation - that are widely used within the context of the smart city.
Disruption

Loos: The Fallen Fourth - Visualising Community Identity and Loss in the First World War

Iain Donald (Abertay University)

Keywords: First World War, Interactive Documentary, Digital Mapping, Games, Visualisation

Digital mapping allows us to engage and play with historical maps (Black, 2000; Knowles, 2008), especially those that have increasingly become too fragile or too expensive to use in a non-digital setting. At the School of Arts, Media and Computer Games at Abertay University in Dundee, Scotland, we have explored using maps as an informative, interactive and playful means to engage the public with historical research. Using data mining, digital mapping and data visualisation techniques, together with games design and technology, we created the interactive documentary ’Loos: The Fallen Fourth’ as part of the commemorative events for the centennial of the First World War. The project aimed to remember both the participants of the Battle of Loos together with the communities they left behind. The battle is viewed through the lens of the city’s territorial battalion the 4th Black Watch, ‘Dundee’s Own’, and the impact that their losses had upon the city of Dundee.

The interactive documentary uses the Dundee map of 1915 as the core focus for the narrative. This paper explores the creation of the interactive documentary and the public engagement through the wider Great War Dundee project. Emphasis is placed on how the project utilised data-mining, digital mapping, game-design techniques and technology to visualise the impact of a single battle on a community hundreds of miles away. The paper will discuss how using these techniques revealed new relationships, opened new research avenues and how, by placing digital mapping in the wider context of the historical narrative (Holdsworth, 2003; Offen, 2012), the project engaged the public in sharing memories and material that may otherwise be lost or forgotten. The paper will also consider how maps are used to reflect local identity and shape a community’s collective memory. The narratives that developed demonstrate not only the diversity of an industrial city during the First World War, but also how the war mirrored or changed the social, economic and cultural structures of Dundee. The paper concludes
with a consideration of how these narratives formed identities regarding community and our wider understanding of the facts and myths that developed over a century of remembrance.

The work of the Great War Dundee project can be found here: www.greatwardundee.com and the interactive documentary and visualisation *Loos: The Fallen Fourth* can be downloaded from here: greatwardundee.itch.io.
Haunted by the Map: Encounters with the Imagined Ruins of Real Cities in Video Games

Emma Fraser (The University of Manchester)

Keywords: Games, Urban Ruins, Imaginaries, Navigation

Based upon fieldwork conducted in 2015, this paper discusses the relationship between imagined cities in games and their real world counterparts, with an emphasis on the navigable, hypothetical ruins of 3D games as a form of disruptive cartography that augments play in urban space. The bestselling PlayStation® title The Last of Us (2013) depicts a vision of modern Pittsburgh and Boston in a state of ruin. Similarly, Fallout 3 (2008) and Fallout 4 (2015), portray a navigable ruinscape roughly mapped to the real-world cities of Washington and Boston. These ‘maps’ take a number of forms – top-down navigation panes that display familiar urban grids, situating the avatar as a moving dot on a city street; quest maps, or small ‘paper’ maps that support a particular task or activity and are static artifacts; and the grid forms upon which the landscape of the game is overlaid. The navigable spaces of The Last of Us, and Fallout 3 and 4 are therefore maps of a sort, allowing players to find themselves in imagined cities, which are charted from their real-world forms. Such mapping (whether direct, or as visual representation) follows a pattern of cartographic reason that produces space (Pickles, 2004) and includes both real and imagined cities (Harvey, 2000).

The imagined cities in each game, understood through cartographic ways of thinking about urban space (Wilmott, 2012), are explorable and multilayered, oriented along the axes of buildings and city blocks, designed to highlight notable landmarks and transport hubs - just like the cities they are modeled on. Exploration is significant here, not least because it facilitates the demarcation and navigation of the imagined territory, which structures a kind of spatiality through ‘the spaces that images themselves produce’ (Ash, 2009: 2105). As three dimensional versions of real sites, such games engage in a feedback between the urban imaginary that shapes our idea of the city (Donald, 1999); cognitive mapping of urban space that the player can draw from (Mitchell, 2008); and the hypothetically ruined cities in which play
itself takes place. This feedback loop produces an uncanny sense of place, a kind of haunting (Gordon, 2008) through the presence and absence of the real/imagined cities within one another, while the suggestion of urban ruination possesses a disruptive potential that subverts everyday urban experience (Edensor, 2005; Mellor, 2011). This disruptive potential is quite productive when attempting to navigate Pittsburgh, Boston, and Washington using knowledge acquired through gameplay – a project the author undertook in 2015. Guided by maps from *The Last of Us* and *Fallout* (not just the ‘paper’ maps or top-down grids, but the entire 3D space of the city as a map) a player/walker can explore the real-world cities, in real time, encountering them in a revolutionary form through the ruinous counter-spectacle derived from prior encounters in-game (Debord, 1970).

Through reflection on personal experience in each city, and with each game, this paper will conclude that navigating ruined cities in games generates ‘possibility spaces’ of play (Adams, 2003: n.p.) in which the entanglement of space, map, and territory transforms 3D depictions of ruined cities into disruptive cartographies that subvert ‘real’ and knowable sites of experience.
The aim of this presentation is to analyse interactions between the gamescape, avatar and map in digital open-world, mass-market, single-player games (The Elder Scrolls Series, The Witcher 3, Assassin’s Creed series and similar). Starting with Sybille Lamme’s observation about the hybrid nature of game cartography, documenting both the protagonist’s personal journey and pre-determined points of interest (Lamme, 2010), I revisit the issue with two toolsets.

The first of these toolsets is derived from Mary Louis Pratt’s Imperial Eyes in which she studies the imperial period in Africa cartography (Pratt, 1992). The player and the protagonist’s relation to the gamescape is quite similar to nineteenth-century explorers: the player ventures into the ‘Great Unknown’ and creates a personal account of the journey. Simultaneously, she fills the blanks on the map using an exclusively pre-determined set of markers. This motif, quite universal in analysed genres, seems to be closely related to imperial imaginary. The act of discovery, clearly announced to the player, is purely spectacular: the protagonist has to see the place with her own eyes to validate its existence. Moreover, this kind of power is bestowed on the protagonist alone and the presence of another being (or even civilization) does not disrupt the process of discovery. But despite the power to discover, the protagonist and player has little freedom to do so: only places corresponding with pre-determined categories can be permanently placed on the map. Those categories clearly divide elements of the gamescape into noteworthy and insignificant elements: the noteworthy are useful, as even landmarks are placed on the map only when they serve some purpose in the game.

The second toolset comes from an analysis of the maps in Victorian popular prose itself, inspired by Haggard’s King Solomon’s Mines (Haggard, 1907). Clearly inspired by explorers’ journals, such texts simultaneously represent the power the ‘white man’ holds over the world and lure the protagonists into
danger. During the perilous trip, virtues of the Victorian hero are confirmed and his ingenuity established: after all, he is the only one capable of reaching the treasure. The map itself further adds a rational component to the quest: it separates superstition from geographic fact and aligns folklore with science, for instance, when tribal names for landmarks are replaced with 'proper' ones by the hero. This motif is ever-present in the case games, which usually put question-marks in unexplored areas on the map, marking the heroic opportunity. During the journey toward such spots, the protagonist makes involuntary discoveries, neatly combining two vocations of the Victorian adventurer: serving as an agent of the imperial cartographic effort and a fortune-seeker, able to forge his own fate in far-away land.

The pervasiveness of this model is not without consequence. It contributes towards a general tendency within single-player digital games to employ imperial imaginations in developing fictional worlds as something to be wondered, explored, violently conquered and exploited. Describing this phenomenon, employing an 'imperial-studies' perspective to digital games can supplement the already substantial post-colonial analyses of gamescape in strategy games, as already undertaken by Magnet (2006), Lammes (2010), Mukherjee (2015; 2016) and others.
New Combat Cartographies: Dual Mapping Technologies in Military Live Training Centres

Janina Schupp (The University of Cambridge)

Keywords: Military Mapping, Training Geographies, Remediation, Visual Documentation, Virtual Reproduction, Gamification

Since the end of the Cold War, a significant evolution has taken place from a highly criticised ‘military-industrial complex’ towards a ‘military-entertainment complex’ (Lenoir and Lowood, 2003). This notable switch marked the beginning of a constantly-increasing integration of entertainment technologies into the realm of military training. While military technologies had previously fuelled the entertainment industry, new commercial technological advances, particularly from the domain of computer games and mobile technologies, became valuable sources for new forms of military live training and have since defined training mapping strategies.

Drawing on the historical evolution of military technologies in the United States and Europe, this paper investigates new forms of military mapping in ‘live’ exercise centres that aim to enhance command, control and information for perfected battlefield awareness. Akin to Virilio’s ‘logistics of perception’, the military motivation behind the evolution of training mapping is the will ‘to see all, to know all, at every moment, everywhere’ and ‘forever rule out the surprise, the accident, the irruption of the unforeseen’ (Virilio, 1994: 70). Thus, this paper examines closely how the geographies of military training centres are mapped and remediated through a network of technological devices during exercises.

Modern military ‘live’ simulation centres, so this paper will argue, generate a twofold visual and virtual mapping of their combat geographies in order to monitor and optimise tactical procedures and individual combat performance. On one level, a visual mapping of the battlefield is produced through a range of camera types, including amongst others ‘IP’ cameras and infrared cameras, while the footage is recorded and edited in the operational centre. On a second level, a virtual mapping takes place through a digital reproduction of the training terrain, which is generated in 2D and 3D in the
central operating system and is linked to positioning and laser tactical-engagement simulation systems that are attached to soldiers, weapons and buildings. The resulting interactive military map later moves beyond the immediate training space as an export product for virtual training. This new dual logistics of perception now amounts to an all-encompassing vision of the training battlefield in both visual and virtual dimensions.

Examining the effect of the 'Digital Revolution' on the mapping of military training landscapes, this paper particularly focuses on the novel technological elements of remediation that alter the perception of battlefields and warfare. When soldiers are represented by real-time avatars, training sets controlled through twin computer models and death digitised in Os and 1s, how do these new technologies affect and potentially sanitise perceptions of conflict locales and warfare? The analysis explores the ensuing gamification of terrains of violence and how notions of play become an increasing part of military live training.
The Real World in a Geographical Imagery: World of Warcraft as Playful Cartography?

Marco Picone and Giulia de Spuches (The University of Palermo)

Keywords: Playful Cartography, Post-Colonial Studies, Popular Geopolitics, World of Warcraft

World of Warcraft (WoW) is an extremely well-known and wide-spread virtual universe, populated by millions of people living, as of 2014, in 244 different countries, and so coming from different cultures. The game can be considered the final result of a half-century of growing interest in fantasy and virtual worlds; starting from Tolkien’s The Lord of the Rings. In the passage from book to videogame, fantasy has become an immersive experience that captures the player and forces him or her to revise their idea of how the world works. Everyone can read these worlds as simple games or, rather, through multifarious levels that show the connections between reality and virtuality. Our paper aims at analysing World of Warcraft through the points of view of critical geography (Minca, 2001), popular geopolitics (Dittmer and Dodds, 2008) and post-colonial studies (Ashcroft, Griffiths and Tiffin, 1998).

During the last decade, there has been quite a strong interest in the way World of Warcraft shapes social relationships and reflects the social construction of our world (Corneliussen and Rettberg, 2008; Bainbridge, 2010; Aupers, 2015). However, although a few scholars (e.g. Langer, 2008) sometimes used the post-colonial approach to discuss the representation of ethnicity in this game, we believe that further investigations should enquire the relationships between post-colonialism and cartography in World of Warcraft. The main question we want to debate in the paper is whether WoW digital maps are still embedded in a traditional, Western or European cartographic reason (Olsson, 2007) or if, on the contrary, they enable the players to visualise and map the game world of Azeroth in a plural way; according to the post-colonial, feminist and qualitative framework of giving a voice to non-dominant narratives. In other terms, are WoW maps able to represent the cultural complexity of Azeroth, including the often antithetical points of view of each game ‘race’? Do these maps allow players to get a positioning within the geography of Azeroth? We will attempt to answer these
questions through the deconstruction of the narratives of the game and through its visual and cartographic apparatus, along with the use of qualitative techniques of analysis, such as qualitative semi-structured interviews with members of the European community of World of Warcraft.
Playtest

Playfields – Interactive Playtest

Jana Wendler and The Playfields PoC Team [The University of Warwick]

**Keywords:** Fieldwork, Playful Learning, Playtest

The Playfields Proof of Concept is an ERC-funded project to develop a prototype location-based game for fieldwork in Higher Education. Play and games have great potential for innovative and meaningful learning for young adults. Because of the creativity and cooperation they kindle, they are excellent means for informal learning, exploration and team-building. They have the potential to engage and encourage problem-solving, and can address complex issues in accessible ways. Additionally, they directly tap into the lifestyle of young adults who, as digital natives, are more likely to identify with playful teaching tools. Merging this with the playful potential of maps, location-based games suggest an exciting way to re-shape learning and research in the field in a range of disciplines.

During the development process, we are testing different elements of the game in many different contexts. Therefore, we would like to invite you to join us for an interactive playtest during the conference. Following the day’s presentations and after a short introduction, we will give you a challenge that will take you out onto the streets, paths and bridges of Venice. We will come back together over a drink to discuss you experience and hear your suggestions.
Our olfactory sense makes a substantial contribution to our understanding of place. We both delight in localised scents and feel disgust at decontextualized odours. Slight whiffs can enable a ‘pre-visualisation’ of forthcoming activity and also serve as a summary synthesis of witnessed events. Yet smell still remains an under-valued and under-researched sense that possesses the capacity to induce mental time-travel and momentary location-displacement, translating anonymous space into personalised place.

Amidst the complexities of our smelly world, this paper utilises theories of temporality to provide a framework for the analysis of ‘stinky’ human-collected data and its subsequent representation. Using these theories, I propose to generate new types of spatial representation for urban smellscapes, enabling comparisons to be drawn between cities.

Smell is easy to ignore; it has a propensity for absence, manifesting as ‘smell-voids’ that appear as a result of the physiological processes of adaptation and habituation. A smell object is ephemeral, disappearing swiftly, volatilising in the air currents that meander and swirl through the multi-faceted grid of the city.

My research considers the smellscape to be the olfactory equivalent of the landscape - the entirety of what humans perceive via their nose, in the space around them. The perception of a smellscape is more than simply identifying smell objects; it is an immersive experience that possesses qualities of its own. In addition, the potential dataset for smell perception is vast, with up to 1 trillion different smells being theoretically detectable by the human nose, and we sniff an average of 24,000 odours every day. One significant challenge is how to record, share and make sense of such experiences.
Fundamental to the proposed methodology is the participation of a volunteer local population, one that is familiar with their environment, to comfortably identify and describe fragrances and scents perceived when undertaking urban ‘smellwalks’. Such participatory information-collection methods are reliant on the curiosity of the participant in what not only gains some curious looks, but is also regarded as a slightly transgressive behaviour. This paper sets out a context for the work and proposes a phenomenological methodology whereby the urban smellscape may be explored and subsequently recorded for both individual and shared understanding; enabling the fields of architectural design and urban planning to consider smellscapes as spatial forms.

*This paper supplements a 45-minute Venice smellwalk (conducted with conference attendants on Friday 7th October) to demonstrate one element of the methodology.*
Plural, participatory and playful mapping practices

Bieke Cattoor and Chris Perkins
(Univeristy of Leuven and The University of Manchester).

Keywords: Designerly Mapping; Epistemological Plurality; Performative Practice; Playing with Mapping

At a time when writing about mapping is increasingly adopting a relational and processual approach, many studies have either emphasised the need for criticality (Crampton, 2011) or have sought to expose the ontological insecurity and instability of maps (Kitchin and Dodge, 2007). This paper similarly engages in debates around the ontologies and epistemologies of mapping. It adopts a multifaceted discussion of two design-led mapping practices that each explicitly harness mapping-as-a-process. However, our engagement argues for embracing pluralism in map studies, instead of postulating yet another theory.

More specifically, this paper suggests that attending to plural, participatory and playful ways of knowing and enacting the map may generate productive ways forward. Multi-angled, processual accounts and multi-disciplinary critical reviews of the case studies are combined to expose some of the conflicting processes and contradictory meanings that emerge in practice. But, we also highlight how meanings from different realms come to be incorporated and embodied in contrasting projects; designating this process as one involving amplification, and cooperative engagement. Highlighting these paradoxes and amplifications, we make a plea for the celebration of ontological multiplicity.

Case one delves into the practice of ‘smell artist’ Kate McLean, whose presentation precedes our own. The mind-set that privileges non-representational and post-constructivist ways of researching and doing mapping has, paradoxically, also affected what is actually being mapped. Shifts in epistemologies have encouraged an increased mapping of unquantifiable and hidden things, such as emotions (see Nold, 2009), which may be harder to capture because of their invisible, subjective, multiple, experiential, affective or fleeting nature, and harder-still to visualise. Kate McLean has intervened in this field in the years since 2010, producing around twenty different ‘smellmaps’. Her practice relies upon a human-centered view of smell, which
very much regards mapping as processual and performative: she maps perceptions, rather than the existence of smells *per se*, and deploys a changing array of ‘collection activities’, sometimes enrolling smells themselves in the artwork, and often inviting participants into crowdsourced mapping process. Whilst Kate’s work may be processual, ‘things’ are central in the process, but the roles played by her practice morph in a mutable and playfully fluid remapping of sensory encounters.

Case two explores the performative mapping practice of Naomi Bueno de Mesquita. As a central part of her PhD studies, de Mesquita makes playful mapping apps to be deployed in locative games in the city. Like McLean, the assemblage in which mapping is enacted changes according to design. However, unlike McLean, the ludic focus is explicit rather than implicit. Her suite of different games is also strongly anchored in a human-centered view of public space. However, the locative and mobile platform through which gameplay is enacted delivers interactive affordances that are inevitably different from static and frequently paper-based ‘smellmaps’. At times, de Mesquita’s mapping games ‘unmap’ the city whilst encouraging different kinds of interactions between game players. Their ephemerality contrasts significantly with the potential longevity of more artefactual mapping.

We conclude by showing how the two cases demonstrate the benefits of an eclectic, multidisciplinary, bricolage-like approach to map studies. In doing so, we complement recent calls for a broadening of map studies’ methods to include (auto)ethnographic and participatory approaches that follow the-map-in-practice, and which are strongly compatible with a ludic approach to mapping.
Emotional Maps in the Context of Participatory Planning - Examples from the Czech Republic, Spaces Semiotic-Ethnographies

Jirka Pánek (Palacký University)

Keywords: Participatory Planning, Emotional Maps, Local Agenda 21, Sustainable Development, Public Participation GIS (PPGIS)

The UN Agenda 21 serves, among other things, as a cornerstone for the global implementation of sustainable development. This 24-year-old document, adopted as a voluntary initiative, follows the main dimensions of sustainable development and its implementation on a global, national, and local level. Its local and community strategy version (Local Agenda 21) emphasises the central role of local authorities and calls upon them to develop local strategies for sustainable development (The International Development Research Centre [IDRC], 1996). The main reason for this is the added value of the emphasis on communication, participation, and cooperation among various entities at the local level.

Concurrently with the elaboration of concept Local Agenda 21, the concept of the Healthy Cities Programme was also developed and established by The World Health Organisation in 1988. The programme is a long-term initiative, with its main aims being to place health high on the agenda of decision makers and to promote comprehensive local strategies for health protection and sustainable development. It tries to bring the technical language of the ‘Health for All’ strategy into the 21st century, and translate the principles of the Ottawa Charter for Health Promotion [The World Health Organisation [WHO], 2015] into tangible action.

The Network of Healthy Cities of the Czech Republic (HCCZ) was created in 1994 and its mission, which goes hand in hand with the above-mentioned premises, is to goad Czech municipalities into stipulating in their statutes that they will consistently work towards sustainable development, health, and improving the quality of life in cities and regions of the Czech Republic.

In last two years, almost twenty members of the Network of Healthy Cities of the Czech Republic used emotional mapping activity in order to facilitate and
improve the process of participatory planning. The paper positions the emotional mapping activities as a subgroup of Public Participation Geographic Information System (PPGIS). PPGIS research is considered an applied research, as it is driven by the needs to identify spatial information that could be used for participatory planning and decision support (Brown, 2012; Kahila-Tani, Broberg, Kyttä and Tyger, 2015; Obermeyer, 1998). As such, it lacks the strong conceptual and theoretical background of basic research that would guide the empirical PPGIS deployments (Brown and Kyttä, 2014). The measurement and mapping of the social experience with place lacked the technology to capture the subjectivity of spatial information. The author describes the roadmap of implementation of emotional maps as a tool of participatory mapping used by the Network of Healthy Cities of the Czech Republic within their Local Agenda 21 strategies. The paper shows the technological shifts in creating emotional maps in past two years as well levels of utilisation of these maps by various cities. The knowledge of social and cultural aspects of the urban landscape is complex, although information-technology accelerates our understandings. The progress of implementation of the emotional maps in collaborative planning can be seen throughout the time, nonetheless further discussion about the methodology as well and usability of the emotional maps is still needed.
Can map design affect user behaviour?

Jonny Huck [The University of Manchester]

Keywords: Digital Cartography, Location-Based Games, Behavior

As interactive digital maps have increasingly replaced paper maps, they have had a profound impact upon the way in which we interact with the world, particularly through the now-ubiquitous mobile navigation application [e.g. Google Maps] (Ballatore and Bertolotto, 2015). In spite of the proliferation of these maps meaning that more maps are being produced by more people than ever before, their cartography is increasingly generic, providing users with standard feature content that does not necessarily account for their specific needs or preferences (Wilson et al. 2010). An alternatively designed map, however, could have the potential to go beyond the simple facilitation of navigation and actually influence the behaviour of the map user; affecting the way in which they interact with both the map itself and the world around them. This presentation will examine the potential for influencing user behaviour with map design by examining two case studies: with the first seeking to influence the nature of the interaction between the user and the map, and second seeking to influence navigational decisions that are made by users of the map.

The first case study relates to affecting player behaviour in location-based gaming: an activity that has had much media attention recently due to the recent rapid uptake of Pokémon Go and the associated safety implications of people playing the game with insufficient awareness of their surroundings (e.g. BBC, 2016a; BBC 2016b; Rocha, 2016). This condition may be referred to as ‘head down’ gameplay, which arises from the constant division of players’ attention between the device screen and their physical surroundings (Huck et al. 2015). The typical result of this is dependence upon the screen for gameplay at the expense of engagement with their surrounding environment. Cartographic interventions, such as introducing feature abstraction into the game map, however, can control the map’s utility as a navigation device, and so influence user-reliance upon the screen. In doing so, it is possible to encourage users to navigate in a more ‘head up’ manner,
addressing some of the safety concerns as well as promoting user engagement with their surroundings.

The second case study relates to cartographic interventions in a digital tourist map in order to affect route decision amongst visitors to a city. Previous research has demonstrated that map design can have a significant effect on route selection, and that the visual hierarchy is one of the primary influencers (Gill, 1993; Morrison, 1974). Replacing traditional image-based maps with dynamic maps that are able to alter the hierarchical prominence of pathways and points of interest in real-time could therefore permit the designer to directly affect the way in which individual users navigate using the map. In the context of the digital tourist map, aggregated GPS-derived information relating to the real-time location of other users within the city, along with data from external sources, is used to alter feature hierarchies in individual user’s maps so as to encourage exploration and discovery, as opposed to simply following the ‘beaten track’ to the most common attractions.

Through the lens of these two on-going projects, this presentation will seek to examine the potential of cartography to directly influence map user behaviour, before giving consideration to the potential benefits and consequences that could arise from the application of these cartographic interventions in the real world.
Design for Interactive Entertainment: Can a Location-based Approach Lead Us in New Directions?

Max Willis and Huaxin Wei
(The University of Trento and Hong Kong Polytechnic University)

Keywords: Location, Games, Play, Urban Environments, Game Design

This presentation reports on findings from the teaching of a course on location-based games, Design for Interactive Entertainment, at the Hong Kong Polytechnic University's School of Design. Looking at the student deliverables (location-based game creations), what struck us was not just the overall good quality of the games, but also the diversity of projects produced. This diversity greatly helps us to signal how location-based games can be grounded in the real world and adopted for a variety of purposes, beyond pure entertainment.

Figure 1: Playtesting on the Streets of Hong Kong

The course engaged local undergraduate students over 13 weeks in the design, prototyping, playtesting and review of location-based, narrative-driven mobile games. In groups of four, students created playable single-level games with GPS, location-sensing, maps, audio-visual materials, and game mechanics that require players to navigate the real-world environment, guided by mobile devices. During the concept development, students were
exposed to various entertainment systems through playing, including a local carnival, a Geocaching competition, the augmented reality (AR) games Haunted Planet and Ingress. What follows is a selection of the completed projects.

"Lost in Metro" is a single-player, detective-thriller game situated in Hong Kong urban railway stations. Players follow the story of a missing train conductor, gathering clues by travelling through different stations. In the station, players search for AR codes which reveal story segments through graphics and animations.

![Figure 2: Hong Kong Metro Map with Marked Stations](image)

"Red Brick" is an orientation game using GPS and Quick Response (QR) codes as cues to familiarise players – especially new students – to the campus map. The goal is to rescue a missing professor by navigating the campus and at each check point, solve various puzzles with graphics, videos and sound.

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1 ‘Lost in Metro’ was created by students Pan Chan, Wai Kin Chan, Bryan Kuan Ho Ng and Lai Lai Wu.

2 ‘Red Brick’ was created by Yuen Ting Tang, Ka Lo Pang, Chik Sum Wu and Kai Cheung Yuen.
In 'V9Z1', players find themselves battling a virus outbreak. GPS and a custom map help navigate urban locations, where relevant equipment is collected to solve the crisis. At the University’s School of Nursing, for example, players will find a virtual facemask to protect them against the virus. Gameplay ends at the monument commemorating those who died during the 2006 SARS outbreak in Hong Kong.

![Figure 3: V9Z1 Screenshot, Game Map](image)

'Lookkulu' draws attention to small boutiques in local neighbourhoods. Driven by a detective story and navigating a selection of local shops on a game map, players can interact with in-store content triggered through iBeacon sensing.

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3 'V9Z1' was created by Chi In Chan, Hoi Ki Au, Yan Sin Lee and Yuk Man Leung.
4 'Lookkulu' was created by Chi Him Lau, Ka Ki Lee, Sharon Pui Yee Li and Kin Long Yan.
Similarly, the game 'Journey to the Tao' - a ghost story blending Geocaching and puzzles - requires players to travel to a series of local temples. Players search for caches containing a riddle related to the location, which encourages a closer investigation of the environment.

In conclusion, the student games demonstrated several design trends including: 1) the re-purposing of public spaces into playing fields, 2) persuasive design extending gameplay into spatial explorations under different agendas, such as promoting local businesses and cultural attraction, and 3) educating players about spatial or space-related information. Despite the diversity in content and execution, students were all engaged in re-connecting with elements of their everyday environments. They consequently began to use mobile devices not just as the site of virtual gameplay, but as a tool for navigating the urban space and its related content. Unlike Ingress and Pokémon GO, which are more or less technology-driven, or data-driven, to be more precise, we promoted a play-centric and narrative-driven approach to our students. In this way, students strived to create more meaningful locational content for their games, which bring them even closer to the real-world environments. Through the design process and with location technologies, our students, as young residents of Hong Kong, were encouraged to think more broadly about how they can make an influence in a ludic way.

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'Journey to the Tao’ was created by Wai Lam Chan, Jacky Lo Hao Cheng, Hiu Wai Tsang and Miu Ping Yee.
Detours

Maps and Urban Cultures: The Everyday Realities of Digital Mapping Practice

Michael Duggan (Royal Holloway University)

Keywords: Digital Maps, Culture, Space, Place, Everyday Practice, Urban Life

In urban environments, digital maps are increasingly prevalent. They are used frequently for numerous purposes and have become easily accessible across a number of digital platforms, in both the private and public domains of everyday life. There is little doubt that the daily geographies of those using them in the city have been affected by this shift. Indeed, such a trend supports the notion that digital technologies are increasingly coming to produce the spaces and experiences of everyday urbanity (see Thrift and French, 2002; Kitchin and Dodge, 2011). This paper details and describes what it can mean to live in a world in which spatialities and experiences of place are increasingly constituted by digital technologies. It focuses on the everyday realities of a digitalising world: the mundane routines and common practices of daily life, and with specific examples of digital mapping practices taken from an ethnographic enquiry into contemporary mappings. In doing so, I wish to provide some much needed insight into the geographies of those living at this juncture, and thus respond to the broad question of how space and place are experienced in a digitalising world. Specifically, I wish to respond to the question of what digital mapping is and has become at this juncture, as the medium is increasingly folded into the background of everyday life.

Through descriptive accounts of digital mapping practices in urban environments, I will describe and explain how maps have become folded into the minutia of our everyday cultural geographies. Moreover, I will suggest how digital mappings in particular have come to create novel socio-spatial relations, resulting from the co-constituptions of individuals, technology and socio-cultural practice.
Digital mapping, I will argue, has become inextricably intertwined with the embodied and cultural experiences of mobility, sociality, work and leisure. They are also bound up in social, political, economic and environmental understandings of the world. This results in the fact that certain urban experiences - those which my descriptive accounts of walkers, cyclists, taxi drivers, and law enforcement officers will attest to - are always-already augmented by the digital mapping technologies which have come constitute such daily practices. Alongside others in the fields of geography, anthropology, media and cultural studies, this paper’s ultimate aim is to shed further light on the ‘bottom-up’ relationship between maps and culture, something which is often taken for granted in studies which focus on the use of maps in society.
Citizens as Sensors and Beyond: Modes of Engagement in the Production of Urban Information Spaces

João Porto de Albuquerque [The University of Warwick]

Keywords: Volunteered Geographic Information, Crowdsourcing, Urban Resilience, Disaster Management, Smart Cities, Citizen Engagement

The emergence of digital mapping platforms and georeferenced social media has opened up a wide range of possibilities for digitising elements of the urban landscape. In an influential paper, Goodchild (2007) proposed the metaphor of ‘citizens as sensors’, who would be able to take advantage of new geotechnologies (e.g. GPS, smartphones) to produce ‘volunteered geographic information’ (Goodchild, 2007: 212). This term has since been widely used to refer to different forms of information production, leading to the proposition of several related terms – e.g. crowdsourced geographic information, citizen science etc. (Resch, 2013; See et al., 2016) – which indicate different ways with which citizens may produce geographic information related to cities.

However, the ’citizen as sensor’ metaphor has often led to a latent tension in the role played by citizens in the production of urban information. Are citizens instrumentalised as ‘sensors’, with the relatively passive role of ’capturing’ pre-defined environmental variables, or is sensing an ‘accidental’ by-products of their actions (Arribas-Bel, 2014)? Or do citizens take up a more comprehensive role in digital citizenship that conduces to more inclusive and polyvocal information spaces (Dodge and Kitchin, 2013)? This tension between instrumentality and inclusion was also detected in previous analyses of smart city initiatives (Townsend, 2013), crowdsourced maps (Perkins, 2014) and citizen observatories (Wehn et al., 2015).

In this paper, I would like to pursue a specific examination of how this tension is constitutively imbricated within the technological artefacts and collaborative practices used to produce geographic information about cities. This is performed by asking two interrelated questions: (a) what kinds of urban geographic data are created? (b) which modes of engagement emerge? These questions are posed when describing the sociomaterial arrangements around examples of three different types of collaborative platforms in the
context of disaster and urban resilience (de Albuquerque, Herfort, Eckle, and Zipf, 2016):

- **Social media**: Information produced by people about the event in popular social media platforms (e.g. Twitter, Flickr, Instagram, Facebook), such as from eyewitness that exchange and disseminate information about a disaster event.

- **Crowd sensing**: Information collected from dedicated applications and platforms (e.g. Ushahidi) that are aimed specifically at producing information for a particular purpose.

- **Collaborative mapping**: Information about geographic features that is produced by volunteers using mapping platforms (e.g. OpenStreetMap, Wikimapia).

In collaborative information systems, the sociomaterial arrangements of technological artefacts and practices often engender specific data-production spaces and temporalities that entail dimensions with varying degrees of changeability and flexibility (de Albuquerque and Christ, 2015). Therefore, the sociomaterial configurations of collaborative platforms may result in ambiguous ways with which citizens are engaged in sensing, curating and making sense of geographic data about cities. This analysis thus attempts to derive implications for developing future modes of citizen engagement towards the production of more democratic urban information spaces.

Federico Montanari (The University of Bologna)

Keywords: Mapping, Semiotics, Urban Spaces, Ethnography

Mapping, as a practice, today represents a universally-shared experience of everyday life that is increasingly performed by the means of mobile devices, such as: smartphones, tablets, GPS, etc., within the context of a pervasive locative media environment. Moving from these considerations, we will start by presenting some of the results of an ongoing analysis regarding a specific and interesting kind of mapping practice; usually referred to as ‘self-mapping’. Such a practice is identified with the kind of mapping performed by social actors – provided with mobile computing devices – while crossing urban territory. These devices track the user’s movements; geo-tagging places, producing and geo-referring cross-medial contents, which all correlate to their experience of the spaces they are crossing. User’s share and/or re-mediate such content on the internet within a media environment populated by communities of connected ‘mappers’. It is thereby a kind of cooperative, grassroots mapping of urban territory: the expression ‘self’ as prefixed to ‘mapping’.

‘Self-mapping’ is also a way to make sense out of urban territory. The by-product (if not the main output) of this kind of mapping is a sort of dynamic, distributed description of an abstract, intersubjective space, i.e. the complex sociospatial formation embodied by urban territory and its medial representations. The purpose of this paper is to report some of the results of an interdisciplinary and ongoing research project, ran by CUBE (Center for research in ethnosemiotics of the University of Bologna) and Mobile Middleware (a research group which is part of DISI – Department of Engineering of the same university). The project is focused on two, strictly connected aspects.

Firstly, we conducted a theoretical analysis intended to output an accurate description of how the self-mapping practice is structured and how it comes to constantly re-negotiate, re-define and re-instantiate the ever-
changing/relatively stable shapes assumed by the intersubjective space to which the selves of social actors are mapped to. Secondly, with the help of ICT technologists at DISI – experts in the fields of geo-computing and crowd-sensing – we devised a methodological protocol which facilitated our promotion of different ‘remote driven self-mapping campaigns’ within a community of students. Using the student’s mobile devices to collect qualitative/quantitative data related to their experiences and cognitions about the urban spaces they negotiate during everyday life, such data was subsequently rendered into digital maps. These campaigns turned out to be useful, innovative ways to conduct digital ethnographical surveys, focused on acquiring relevant knowledge in order to explore specific themes and issues related to specific urban territories or even to more general, theoretical problems as well.

Finally, in order to render an intelligible picture of how a ‘remote driven self-mapping campaign’ works, we briefly illustrate a recent survey focused on the perceived correlation between urban spaces and the inherent temporality of places.
Disruption

Loos: The Fallen Fourth - Visualising Community Identity and Loss in the First World War

Iain Donald

Keywords: First World War, Interactive Documentary, Digital Mapping, Games, Visualisation

Introduction
Maps connect people, not just to places, but to events, time periods and ultimately other people. The shared connection that maps can provide means that they naturally lend themselves to public engagement activities, especially for local events. On a more individual level, maps help focus interest as people seek out established landmarks, known residences and other places of personal interest. Various calls from scholars throughout the humanities have firmly established the role that digital technologies and media can play in transforming how research is presented (Holdsworth, 2003). The questions that maps raise are often fundamental to humanities research - what remains the same, what has changed and what was it like there and then? In many ways, they provide an accessible gateway to another time (Black, 2000). Maps also lend themselves to presenting complex data simply, allowing for further interpretation of events that unfolded decades or centuries earlier (Knowles and Hillier, 2008). History, in particular, often interprets data from a wide range of sources to develop and map out an understanding of how events unfolded. This is particularly true of military history, where the ‘fog of war’ often results in these interpretations being adapted and improved as additional information becomes accessible through other means, such as: archival research, archaeological surveys and digital archives. Indeed, some aspects of the history of the First World War are still being written with recent discoveries of lost or forgotten graves, adding further to the narrative of specific battles and the war in general (BBC News, 2013). Historical research on the First World War has also been
reinvigorated by the centennial commemorations of the war. This paper explores the use of maps, digital content, and game technology to present historical data and interpretation within the context of the Heritage Lottery Funded (HLF) project (Heritage Lottery Fund, 2016): Great War Dundee (GWD) (Great War Dundee, 2016a), and will place into context the use of game design and digital mapping techniques for public engagement.

Although it hardly seems possible, for the majority of people the First World War is now an abstract concept. There are no living veterans and the complex story of the war is further hindered by general lack of mass media interest [in comparison to the Second World War and more recent conflicts]. What has developed is a narrative that is shaped as much by myth as it is by fact. The effect of this is that the narrative, when understood and appreciated in the context of the times, is all the more tragic in respect to the lives lost. The original proposal for the GWD project aimed to co-ordinate a city-wide approach to the centenary commemoration of the First World War in Dundee, bringing the community together with the city's museums, archives, libraries, universities and societies through a programme of activities that encouraged the broadest possible public participation and collective reminiscence (Great War Dundee, 2016b). The programme of activities included exhibitions, talks, drama performances, film screenings, publications, and the creation of digital content. In doing so, the project intended to raise awareness of the involvement of the city in the war and its people at home and abroad, particularly highlighting less well-known or forgotten stories and subjects. A key aspect to this project was to encourage young people in Dundee to better understand the impact of the war on their own city, via workshops and schools resources, and also to ensure a lasting legacy for the project through the creation of the GWD website, telling the personal stories of “Dundonians” in wartime. The project aimed to encourage the digital preservation of privately owned material which might otherwise be lost. It was a natural step, given Dundee’s expertise in digital media and game development (BBC News, 2009), to include the creation of interactive

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**Dundonians** are the collective noun for of a person (or persons) who are native to or grew up in the city of Dundee.
experiences that would help engage with a wider audience, convey selected historical narratives and establish a digital legacy for the project.

**Project Background and Historical Context**

The First World War tore the heart out of communities across all the countries involved in the conflict and Scotland was no different. For the City of Dundee, over 4000 men died, and the war scarred an entire generation of the city’s youth. The number of those killed represents a devastating casualty rate of over 15% of Dundee men on active service - nearly double that of Glasgow, hitherto thought to be one of the hardest hit cities in Britain (Smith, 2013). Records also show that Dundee gave a huge percentage of its young men to the forces during the war. When the Armistice finally came in 1918, there were 20,990 Dundee men in active service. With the addition of the killed and discharged wounded, the total was conservatively estimated at 30,490 at the end of the war – or 63% of eligible men in the city. This, too, represented a remarkable commitment to Britain’s war-effort by the city’s citizens. One specific example was the local territorial battalion of the 4th Black Watch, 'Dundee’s Own', which was notable for representing all aspects of the city. The battalion arrived in France approximately 900 strong at the end of February 1915 and fought at Neuve Chapelle and Auber’s Ridge (Wauchope, 1926). However, it was to be at the Battle of Loos that the battalion would forever be associated with, as it lost over half its active strength (19 of the 20 officers, and 230 of the rank and file); the majority during the first few hours of the battle. These grim statistics were repeated across cities, towns and villages all over Scotland, but they tell only part of the story. One of the main objectives of the GWD project was a desire to rediscover the forgotten stories of life on the homefront - how people and industries were affected by the war, and how those effects shaped the future of the city for generations to come. To achieve this, the project team needed to actively engage with the community and provide opportunities for everyone in the city, and beyond, to play a part in the centennial. In the longer term, these activities would ensure that the unique stories of Dundee during the Great War were not only told in the most effective way, but would remain accessible for future generations.

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7 See 'Dundee’s Glorious Dead’ *The People’s Journal*, 16 May, 1925.
The ways in which audiences consume content digitally is constantly evolving. There is a growing expectation amongst digital-natives that content is available on demand, on multiple platforms and without cost. One of the challenges for any project where public engagement is crucial is to consider how the project’s digital reach can be improved whilst minimising the costs. From the outset, the GWD partnership had an overarching aim to encourage research and foster learning. The project engaged with local schools and has undertaken various public engagement events with a view to building better links between the city's heritage organisations, universities, press, the local community and wider external organisations, such as the Imperial War Museum. This coordinated response to commemoration has allowed the city to make more effective use of existing resources. One of those resources is the rich digital heritage and buoyant community of digital artists, game developers and technologists. It was these connections that led to the desire to create a digital experience that would engage, invoke and inspire new audiences to participate with the project. One of the core aspects to this digital experience was the need to respectfully commemorate the sacrifices that many families had made during the conflict. This was a theme that was reflected throughout the national commemorative event held on 25th-26th September 2016, for the centenary of the Battle of Loos, in which around 30,000 Scots fought. Although Loos was a British battle, Battalions from every Scottish regiment fought in the Battle and suffered huge numbers of casualties. Of the 21,000 killed, over 7,000 were Scottish soldiers. It has come to be regarded as a Scottish battle and almost every town and village in Scotland was affected by the losses at Loos (Royle, 2011). Six Battalions of the Black Watch, mostly drawn from Dundee and its surrounding counties, took part. Whilst the losses of the 4th Black Watch were significant, with 57% of men killed or wounded on the first day of battle, other regiments and battalions suffered huge losses, especially the newly-formed service battalions of Kitchener’s New Army. The loss to most communities was significant and in Dundee, this became formalised by the beacon on top of the Dundee Law War Memorial being lit annually on the 25th September to remember the fallen.

The fact that the battle has come to be associated with Dundee is largely due to the narrative of the 4th Black Watch. As the city’s territorial battalion, the
outbreak of the war brought a swelling of its ranks as, amongst the patriotic fervour, men signed up to be part of war effort. Indeed, such was the confusion at the recruiting office that many did not realise exactly with whom they had signed up. For a relatively small city like Dundee, the 4th developed similarly to the ‘Pals’ battalions that were being recruited elsewhere. Of particular importance is that the 4th included in its ranks a number of journalists and newspapermen of the publishing giant DC Thomson. These links were to prove vital in establishing and maintaining a regular link between the front and home through correspondence and articles that seemed to be published in a provincial press with a blissful ignorance or wilful blindness to the Defence of the Realm Act. The 4th were not just deeply connected to the city due to the recruitment area, but also because they represented a vertical slice of the social structure and classes of the city. An examination of their ranks shows that they came from all walks of life and whilst some of those class structures remained opaque (with officers being the business and mill owners, non-commissioned officers the foremen and enlisted men the workers), they also transcended these boundaries (Danskin, 2013). The enthusiasm to enlist led to many professionals enlisting as privates and the experience of established territorials resulted in a slightly more fluid hierarchy (Bowman, 2009). Thus, many of the accounts of life in the 4th represented a wide spectrum of views.

The 4th landed at Le Havre in 26 February 1915 and from there they moved to Calonne, assigned to the Bareilly Brigade in the 7th Indian (Meerut) division. This saw them billeted with their sister battalion, the 2nd Black Watch, who had arrived from India in October 1914. As part of the Indian Division, they took part in the Battles of Neuve Chappelle, Auber’s Ridge and Festubert. The last action that the 4th undertook as an independent unit was the battle of Loos. Loos historically has come to be regarded as an unwanted battle (Warner, [1976] 2000), a battle fought more for satisfaction of relieving the pressure on France, together with political and diplomatic expediency of Britain’s role as her ally. For Dundee however, Loos became a defining moment in the war. When the 4th Battalion arrived in France, they were practically at full strength, about 900 officers and men. However, following the various engagements in the first half of 1915, when the order came to
go ‘over the top’ at Loos, its numbers had already fallen to just 423 fighting men.

At Loos, and like many other battalions on the day, the 4th were exposed as soon as they mounted the parapet and they suffered horrific losses. Ellis stated that ‘never had the [German] machine gunners such straightforward work to do…’ [Ellis, 1976: 93]. Out of 20 officers, 19 were killed or wounded and 230 of the 423 men who took part in the attack were killed or wounded. Arguably, they advanced too far, too fast and were an easy target for machine gunners. Like much of Scotland, the losses had a profound effect on the city they had left behind. The myth that evolved was that hardly a household was unaffected by the loss, nor a family left untouched by the men’s sacrifice. What is clear is that it was the end of the 4th as an independent unit, as they were so reduced by the battle that they had to be amalgamated with the 5th [who had also suffered horrendous losses]. It was from the myth that hardly a household was unaffected that the aim of creating a digital visualisation was born. Essentially, the research aim was to test the hypothesis that no street or tenement was unaffected by the battle.

Designing an Interactive Visualisation
The visualisation, entitled Loos: The Fallen Fourth, takes various contemporary accounts and stories published through the newspapers of DC Thomson, and plots the impact of war on the communities that the soldiers of the 4th Black Watch left behind. Taking a 1915 map of Dundee, digitising it and making it a central focus of the wider city narrative, the project mapped the locations of all those that were ‘killed in action’, together with those identified as missing.

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8 In this paper, I have used the term visualisation to describe the digital product created. Arguably the term game could have been used but there remains debate about using the term. On the one hand, the term is widely used to describe digital content that the user interacts with via a control device and a visual display unit. On the other, much of the features that make up a game are distinctly lacking. There was also a general feeling that although the product used game design techniques and technology, the subject matter and how it is treated makes it more of an interactive documentary.
or wounded at the battle of Loos. In testing the hypothesis, the visualisation was designed to document the established historical timeline and to foster a sense of belonging amongst users as they explored the stories of Dundee’s citizens and soldiers during the First World War. It should be noted that the visualisation was part of a wider digital strategy which aimed to encourage new and ongoing research into people and events uncovered by renewed interest in the First World War. More specifically, this wider digital strategy also aimed at encouraging research into family histories through the centennial commemorations. Understandably, there has always been a focus on those who never returned from the war and the history of the returnees and civilians was often overshadowed by the huge losses every community suffered. Designing a visualisation that told the story of Dundee’s fathers, sons, friends and workmates, whilst retaining a focus on the city rather than the western front, was challenging. It required the input of multiple organisations, as well as digital, archival and inter-disciplinary research before the digital product was created. The visualisation design and development was also a unique opportunity to harness the city’s current knowledge and expertise in the digital media and games industry, combined with the expertise of the Great War Dundee partner organisations (Great War Dundee, 2016c).

The visualisation utilised local archives of letters and historical references to the period, and related this to the real people involved. The core interaction consisted largely of player exploration of maps, which then provided information points that delivered additional narrative about a person (or group) and their role in the war. Overall, the interaction is split into three key phases: the city in the first year of the war, the Battle of Loos and returning to the city in the immediate aftermath. The aim was to use the medium to explore the impact on a community of a single battalion in a single engagement. The visualisation thus develops narratives about the community that they left behind, humanises the victims, pays homage to their lives and those of their friends and families. The target audience was broad, covering those with an interest in the First World War, Schools and Museums. As such, the age-range targeted by the visualization reflected this scope; aiming towards those aged five years and older. Although the focus was to be on Dundee for the main story, the themes should work and be applicable to
communities throughout the United Kingdom. The core feature was to foster learning through the use of personal stories, but also to allow these story elements to be reflective of the wider community. As previously stated, the visualisation was just one aspect of a wider digital strategy for the overall benefit of the project and the public. The creation of web, video and interactive content that utilised various storytelling and gaming techniques, sought to bring the story of the First World War home to Dundee. This enabled the stories and history to be treated respectfully, but also allowed the visualisation to be educational, interesting and crucially a growing resource for the public. This overall strategy aimed to provide a digital memorial to those that lost their lives in battle. It equally aimed to provide a digital memorial for those that survived the conflict only to live with the memories for the rest of their lives.

One of the main reasons for developing the visualisation was to raise awareness of the creation of a digital version for Dundee's roll of honour and to invite the public to enhance individual records with additional personal information and picture content (Great War Dundee, 2016d). Given this aim of fostering engagement, it became important to present the broad story of the war to enable all users to appreciate and understand Europe in 1914 and the speed at which the war escalated. It was felt that this would provide a background and context as a means to connect with the people of the period, as well as a sense of what Dundee was like at the time. This wider digital approach emphasised people, place and time. The objective was to combine the background story of the war with the roll of honour; to provide the means to place individuals in the wider timeline and become part of the larger story. The challenge of attaining public engagement in the project and in uploading personal content was mitigated by developing a twin strategy. The roll of honour and the visualisation were developed as a means to encourage engagement by telling the story around the city. The use of a map of Dundee was designed was to bring users closer to the human cost, by focusing on a single battalion, in just one battle of the war and to contrast this with the impact that those casualties had upon the city. The goal was to create a 20-minute visualisation using various narrative techniques to provide viewers with a fresh and dramatic perspective of the war. To that end, *Loos: The Fallen Fourth* begins by placing various groups (war resisters, women, voluntary recruitment, the Dundee Red Cross and the 4th Black Watch) in the context
of the city (see Figure 4). Each group is mapped to a relevant location, and photos and descriptions of their significance provided. For example, Dundee was a centre of resistance to the war and it was felt that identifying core aspects of key groups would tell wider narratives than purely those of the military.

The visualisation then becomes more of an interactive documentary as it starts building up tension through the presentation of the battle location. It uses player interaction to emphasise the length of the front that the battle took place on and give some indication of the order of battle (see Figure 5).

Figure 4. War Resisters Information Point with the Dundee Map in the background. Source: Loos: The Fallen Fourth.

Figure 5. Battle Map demonstrating the Order of Battle. Source: Loos: The Fallen Fourth.
This section then moves into a more detailed battle map which again presents information on the battle for users to interact with. The elements focused on emphasise aspects that impacted on the success at Loos or had a Dundee connection (Gas, Artillery and Wire, Mines, Indian Division and the 4th at War). As before, the design as to encourage exploration and provide information [see Figure 6].

![Detailed Battle Map with Information Point on Mines visible.](Figure 6)

*Source: Loos: The Fallen Fourth.*

Whilst each of these screens help build up the narrative to the eve of the battle, the visualisation returns to the setting of Dundee to introduce the casualties suffered by the 4th Black Watch in the first two days of the Battle of Loos. It does so as if in real time through the plotting of points on the city map [see Figure 7]. After the narration completes, information points are again used to describe the impact of the battle on Dundee (Officer Casualties, Other Ranks Casualties, Effects on Industry, Effects on Dundee and the War Memorial).
Figure 7. Dundee Map – each scorch mark represents a casualty of the 4th Black Watch at Loos. Source: Loos: The Fallen Fourth.

The aim was to provide visually striking moments for viewers to consider, showing the impact upon the communities left behind. The linear narration was enhanced by allowing viewers to pause in order to explore and interact with the map, and consequently to delve deeper into the wider stories uncovered by the project team; focusing on the contributions and sacrifices the city made. To create the visualization, a variety of data sources and mapping methods were utilised. The core sources for the data were acquired through the existing Dundee Roll of Honour (Friends of Dundee City Archives, 2011), the excellent Commonwealth War Graves Commission (CGWC) website (Commonwealth War Graves Commission, 2016) and a supplement entitled ‘Dundee’s Glorious Dead’ published in The People’s Journal in 1925. The roll of honour and CGWC website cross-referenced and verified each soldier that was known to have died. The ‘Glorious Dead’ supplement was primarily used as a means to identify local addresses and cross-reference with the CGWC information, but proved to be the most problematic of the three sources from which to extract data. Without recent advances in scanning and digital imaging, this would have been a laborious task. Ultimately, it was scanned at a high resolution and converted into digital plain text format using a combination of digital image manipulation software and optical

See ‘Dundee’s Glorious Dead’ The People’s Journal, 16 May 1925.
character recognition (OCR) techniques. Using digital image manipulation, the project managed to increase the accuracy of the digitized text to over 95%. The text although legible and accurate, was not fit to be used in the visualization at its current stage. The next step was to convert it to a legible database format which can be processed digitally. To achieve this, a custom script was written which sorted and normalised the text into tables that could be read both by researchers and other software programmes. The combination of the three sources enabled the creation a comprehensive database file which contained a variety of information including name, rank, address, family information and grave location. A similar approach was used to extract data on those who were wounded or missing. The digitised British Newspaper Archive enabled multiple casualty lists to be sifted-through and cross-referenced with Battalion War Diaries. Further research conducted through the auspices of Great War Dundee by Dr Derek Patrick and Dr Billy Kenefick was also essential in tracking down names.

Even with the limited focus on one battalion and a known scope of approximately 250 casualties, the research task was complex. It needed multiple sources and cross-referencing, and still required archival research where gaps in digitised sources, such as the British Newspaper Archive or the National Archives, were identified. The latter was particularly important in adding the personal or more unique narratives used for the interactive information points on the maps; the key aspect of the visualisation.

With the data mined the project utilised maps from the time period to place the narrative in the context of the time. The primary map is from the Dundee Directory for 1915-16, published by J. P. Matthew and Co. The map was digitised at an ultra-high resolution. This digital version of the map has been used throughout the project. However, the original plan to overlay this map onto a modern framework (such as Google Maps API) in order to digitally map the addresses, was unsuccessful. The 1915 map proved not to be accurate enough to use current coordinate systems. In order to place the battle of Loos as it was for the 4th Black Watch in context, we created maps based on those from the Official History of the War that showed the order of battle (Edmonds and Wynne, 1927). Perhaps there was a naivety in thinking that these all existed already, or that so much history remained as mere footnotes.
to grander or more famous actions\textsuperscript{10}. Nonetheless, the lack of high quality maps was the primary reason for creating new ones. This had the additional benefit of enabling the project team to dictate the visual style and colour palette. There was a clear desire that to engage modern audiences and thus the visuals needed to move away from the typical 'stained paper, typewriter font' tropes that many military documentary and entertainment media tend to employ. Instead, a fresh, clean and modern aesthetic was developed to create an interesting juxtaposition with the historical content, and to generate more appeal for a younger audience. Dark greys with lots of contrasting bright colours is a look often employed in games, and this visually striking aesthetic aimed to subvert viewer expectations. In hindsight these design and art decisions seem to be vindicated when looking at new games, such as DICE's Battlefield 1 videogame, that employ a similarly modern aesthetic in its User Interface design.

The decision to use game design techniques and technology was two-fold. The first was purely practical in that using game development tools allowed rapid iteration of ideas into features and to explore a variety of mechanics, refining various elements from animation durations to text lengths. The use of a game-engine also allowed us to deploy the visualisation on multiple platforms; broadening the potential audience and enabling us to focus on developing what worked best for an emotive experience. The second was resultant from consideration of the various constraints of the project. An interactive documentary requires the ability to constantly refine the pacing and other details on each iteration. To create an experience that combined passive and interactive elements, and which could be both interesting to watch and engaging at the same time, required careful pacing and artificial limitation of interaction. The design goal was to engage a viewer, rather than convert a viewer into a player. This was essential given the wide age-range and technical awareness of the audience. There was also a consideration of appropriateness. Progression was therefore conveyed through advancement of the overarching narrative, rather than by various gamification techniques. One of the most important details of the visualisation is the variable pacing.

\textsuperscript{10} In particular, there is a lack of information on the Indian and other Empire Divisions.
The pacing is part of a framework which introduces the viewer to the topic of the visualisation, explains how it works (like a tutorial), then keeps them engaged by alternating between interactive and non-interactive sessions. The progression is tied to the historical timeline which advances the narrative throughout the visualisation. This means that as the visualisation progresses, more events occur and these are illustrated on screen through the core maps and interactive information points.

**Conclusions**

The visualisation revealed new relationships, opened up new research avenues and, in placing digital mapping in the wider context of the historical narrative, engaged the public in sharing memories and material that may otherwise have been lost or forgotten. The poignancy of the fact that Loos itself is often regarded as a ‘forgotten’ battle meant that the subject-matter already provided an emotive topic upon which to focus a visualisation. The fact that the battle was, at that point, the largest of the war and that its repercussions were felt throughout every village and town in Scotland, only adds to the tragedy. For Dundee and the 4th Black Watch, these are written into history as one of the city’s and regiment’s ‘darkest days’. Whether that is an accurate reflection, is all a matter of context. Certainly, the 249 casualties of the 4th were considerable, but compared to its newly raised sister battalions of Kitchener’s New Army, the losses were lower both in numbers and percentage terms. The 8th lost 18 officers and 492 men while the ninth lost 21 officers and 680 other ranks. In the wider context, these were not the worst of the day within Scotland or the British forces overall. However, where the 4th is unusual is that it drew its recruits from the city, rather than other battalions that had a larger geographical recruitment area. The impact of Loos ripped across all aspects of society. From the officers who tended to be from the affluent business and commercial classes (such as the commanding officer, Harry Walker, who was a partner in the Caldrum jute works), through the sergeants and other non-commissioned officers who are often the foremen in the same mills and businesses to the other ranks who are the men who work there. The 4th represented an intertwined community, reflected through the mapping of casualty lists in the visualisation. The Officers often lived outside of Dundee in the more affluent areas along or across the Tay such as Broughty Ferry, Newport-on-Tay and further away
such as estates in Perthshire and Midlothian. The correlation of class and society is further emphasised by the grouping of casualties around areas of local employment, such as the mills and factories. The mapping also helped to establish other relationships that are still being explored, further connecting the economic fabric of the city - where mills or businesses lost the workers, foremen and owners in a single stroke. Similarly, the mapping helped to establish further familial connections. After all, when a wife lost a husband, sons and daughters lost their fathers, mothers lost their sons and sisters their brothers. These connections are more impactful through being visualised. The narratives reflect a bygone age: addresses are often of parents before spouses. But they also reflect a familiarity with modern life: requests for information on those that are listed as missing in action, are similar to missing person reports published today. That the visualisation is effective and the narrative engaging, is demonstrated by the additional information that continues to be added through the digital roll of honour. Encouraging the submission and upload of family stories is uncovering the hidden histories of those that returned or witnessed the war as citizens. Indeed, it is the power of a visualisation and, in particular, the use of maps in engaging multiple and diverse audiences, that is particularly interesting. Loos: the Fallen Fourth has been published as a free download, included in an education pack for schools, delivered to science festivals, family history events, government ministers and royals. Delivering a project about commemoration and loss to veterans and serving soldiers was particularly poignant, and feedback was overwhelmingly positive, especially in bringing the focus to the community. In each case, the use of maps not just adds context, but encourages interest and interaction. The impact of adding visual effects to a map to symbolise the loss and devastation on a community is simple but effective. Allowing users to interact with maps is a core element of driving engagement. ‘Information points’ help direct a user experience, but maps connect people to the time period and the community. The utilisation of maps in providing additional context in books, media and games is well-established, but the use of maps to portray complex and diverse narratives has often been overlooked. Yet maps have always told narratives and using maps is a core part of game design. For academics the ease with which game technology can be used to help reveal new relationships, open up additional research avenues and tell narratives and hidden histories, is worth exploring in more
detail. *Loos: The Fallen Fourth* successfully delivered on collaboration between a wide range of academic, cultural and public organisations. It enabled research undertaken at each of the city's universities to be combined to deliver a more 21st century way of remembering the battle of Loos and its impact on the city. Taking contemporary accounts from newspapers and other records, and mapping the stories to locations around the city, helped greatly to engage with the local community. The information about the people who took part in the battle or supported them helps to emphasise the power that digitising records and using data mining and digital mapping techniques can have in making history more accessible. The project further places digital mapping in the wider context of the historical narrative; how the project engaged the public in sharing memories and material that may otherwise be lost or forgotten.

The work of the Great War Dundee project can be found here: [www.greatwardundee.com](http://www.greatwardundee.com) and the interactive documentary and visualisation *Loos: The Fallen Fourth* can be downloaded from here: [greatwardundee.itch.io](http://greatwardundee.itch.io).

References


Keywords: Digital Games; Open-world; Imperialism; Adventure Novel

Notwithstanding the progress of discovery on the coasts and borders of that base continent the map of its interior is still but a wide extended blank.... Sensible of this stigma, and desirous of rescuing the age from a charge of ignorance, which, on other respects, belongs so little to its character, a few individuals, strongly impressed with a conviction of the practicability and utility of thus enlarging the fund of human knowledge, have formed the plan of an Association for Promoting the discovery of the interior parts of Africa. (extract from the African Association manifesto)

Travels in the Interior of Skyrim Province

I found myself standing at the grotto entrance, trembling with fear and blinded by the sun - a prisoner miraculously saved from the executioner’s axe. After my daring escape, I navigated the narrow and poorly-lit corridors of an underground complex, and have reached a den of spiders of enormous size. The bronze-colored female laid four to six eggs from which younglings hatched after several days of incubation. In the same cavern, I encountered an enormous brown bear, hibernating for winter – the spiders, although carnivorous, left him alone.

Bypassing the bear, I turned left and reached the surface. In a blink of an eye, my fear and worry was gone: at my feet, the beautiful valley opened, rich with dark fir trees, colourful flowers and meek, lush grass. In the background, mighty, snow-covered peaks were rising above clouds, gleaming in the sun. Such was the beauty of this wild, untamed place that I shook of all my previous tribulations and merrily followed my native guide into the inviting mouth of the valley. Within minutes, I made at least three important discoveries and marked them on my map.

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The short piece above is a summary of my memories of the first few minutes with *The Elder Scrolls V: Skyrim* (Bethesda Game Studios, 2011). It provides quite an accurate account of the experience offered by the game. I have tried to maintain the conventions of the ‘19th-century explorer’s diary’ literary genre; accounting journeys, discoveries and observations of naturalists travelling around African and South-American interiors, or trying to penetrate North-Western Passage. Despite the obvious shortcomings of my prose, there are several similarities between John Barrow’s ‘Mungo Park’s’, or Richard Lander’s journals, and the way the first experience with the world of Skyrim is framed: there is a solitary explorer, high on a hill, gazing at the landscape opening before him and describing it in a picturesque style. The landscape is used to paint convention as an aesthetic base for his narrative and although the topic is living nature, the account is more of an *ekphrasis* than plain description. If there is any sign of a native population present, it either becomes part of a picture and dissolves in the natural world or is mentioned only when it directly serves the explorer (Pratt, 1992). In the case of my journey through *TESV: Skyrim* tutorial, there was a mandatory non-player character (NPC) companion - yet, in my narrative he appears only once, when he guides me toward the first place of ‘discovery’.

The only role of such a native guide, a person who obviously knows the area the explorer is going to traverse, is to lead the European toward an important land-formation and to allow its discovery. This is precisely what the guide in *TESV: Skyrim* does - he explains the world to the Dragonborn, the protagonist, and leads him or her towards important places and landmarks. Soon, discoveries are made: the player is informed (by sound and text appearing onscreen) that he has just discovered Spirit Stones, the Village of Riverwood, the Ruins of Bleakfalls Barrow and so on - even the cave Dragonborn emerges from after the tutorial sequence and is marked as ‘discovered’.

It is obvious that the guide knew all those places before, as he explains all important details. The village is populated. Yet, the knowledge of the indigenous population means nothing: only the protagonist [and the player] has the ability to make discoveries, as the act is directly related to marking newly-located places on the map that only the player can access. Again, the similarity is striking: discoveries made by European explorers were directly
correlated with the process of adding a place (or a plant, or an animal, or a natural phenomenon) to a supposedly positive, objective scientific knowledge - geography and natural history. As this kind of reasoning was unavailable to the natives, they were unable to discover anything; despite their apparent knowledge of freshly discovered phenomena. This was no coincidence as Mary Louis Pratt claims the apparently benignant anti-conquest of naturalists was sprung by Carl Linnaeus’ work on universal systematics, which in turn initiated a new kind of distinctly-European science-rooted awareness (Pratt, 1992).

My aim in this paper is to analyse ‘in-game’ maps as used in open-world games; conceiving these maps as tools of anti-conquest and framing player-activities in such games as similar to the 19th century exploration of African or South American interior. Therefore, I will analyse the relations between the gamescape and the map to explore how both of these elements are constructed in open-world single player games. I shall argue that such a setup is a derivative of an imperial worldview and is rooted in imperial fantasies of controlling and exploiting the world. To do so, I will employ two important contexts: 19th century maps and travelogues, analysed by Mary Louis Pratt in *Imperial Eyes* (Pratt, 1992), and the use of maps in Victorian adventure prose, especially in Henry Rider Haggard’s *King Solomon’s Mines* (Haggard, 1907). My objective is to present a connection between in-game cartography and imperial imagination, although I am less interested in colonial issues of dividing and settling the land or moving borders. For this reason, I am focusing on protagonist-driven single-player ‘open-world’ games and I omit strategy games about ruling and dividing the land. I understand ‘imperialism’, after Edward Said, as ideology justifying the superiority of stronger culture over weaker; more connected to the series of images than to practice of settling and ruling over foreign land (Said, 1993).

The connection between video games (in a much more general approach) and travelogues is far from new. In dialogue between Mary Fuller and Henry Jenkins, both authors claim there are several similarities between the way gamescapes and recollections of exploratory journeys are experienced (Fuller and Jenkins, 1995). Fuller compares the eagerness to find new digital land to the urge driving 16th century sailors, and Jenkins uses the comparison to
paint video games as an American form of narrative (ironically, he is interpreting Super Mario Bros). I wholeheartedly agree with the main argument of this very insightful text: the drive to travel, discover and experience yet another brave, new world seems to be one of main reasons behind video-gaming. It therefore can be identified as one of the potential motives behind the high prestige of open-world games and ‘Massively Multiplayer Online Role-Playing Games’ (MMO RPGs) within games culture. Yet, there are two crucial differences I wish to point out. First, Fuller and Jenkins address ‘platformer’ games; a fascinating, high-speed genre that does not allow to move back. In an open-world, the player can revisit already discovered areas (and sometimes is forced to do so). He or she has more time to appreciate the surroundings and can potentially even take some screenshots. Therefore, the player interacts with the gamescape in a quite different, more reflexive, manner. Moreover, the urge to press forward is not motivated by the game engine alone: occasionally, the player needs to decide where they will go next, into which cavern she will descend, which mountain to will climb. The second difference between genre analysed by Fuller and Jenkins and open-world games is even more crucial: in contrast to platformer games, open-worlds have a map already in place. It usually presents major landmarks and - most importantly - borders of the area which the player can explore. Distance is not measured only in the number of levels finished, it is documented on the map by the appearance of more and more markings; denoting various places already visited (and discovered). The protagonist in the genre I am discussing is not only a relentless explorer, pressing forward - he is also a cartographer, documenting his journeys on the map.

**Involuntary Cartographer**

Existing analyses of video game cartography, undertaken from the post-colonial perspective that I am interested in, focus mainly on historical strategy games. This choice seems to be motivated by two interwoven reasons. The first reason is somewhat obvious: there is a rather straightforward relation between the concept of warring nations claiming more and more land, until the saturation of available territory, and the inevitable conflict that results between imperial and colonial ideologies. As Souvik Mukherjee observes, some strategy games address ‘Empire directly in...title and content’ (Mukherjee, 2015: 306). But there is another fascinating aspect to those
games in relation to cartography: as Sybille Lammes and Shoshanna Magnet point out, the gamescape is simultaneously the map (Magnet, 2006; Lammes, 2010).

Both those aspects of strategy games go hand-in-hand with the imperial metaphor of dividing the real land by map only - as was the case with the Great Survey in India or division of former Ottoman Empire into Arabic states after The Great War (Mukherjee, 2015). In case of real empires, this practice can serve as a grim memento to Baudrillard’s famous observation on maps predating and shaping the territory (Baudrillard, 1994). In case of strategy games, the distinction between map and territory is nonexistent as the gamescape constantly re-shapes to reflect player’s will, imprinted upon the game world. As there is no territory behind the map, each aspect of the real, historical land that the gamescape is modeled upon lacks any details unknown or unaddressed by the designers: they simply do not exist within the game. This is why areas further from the mainstream ‘Western’ historical narrative are usually portrayed with less care for historical accuracy and primarily serve as places to act out fantasies of exoticism (Mukherjee, 2016). Such is the case with the Tropico series of games employing stereotypical Latinidad fantasies, complete with military coups and cigar factories; a player’s playground (Magnet, 2006).

The relation between map and territory in character-driven games receives significantly less critical attention. Existing analyses lean toward de Certeau’s division between the map and the route (de Certeau, 1984). Stephan Günzel mentions the auto-filling map of Doom in such a context, claiming that it tells more about the player’s movement than about the world itself (Günzel, 2007). Sybille Lammes observes that ‘right through this explorative journey [...] the player both develops a spatial story with her- or himself as the main character, as well as being an imaginary [military] cartographer who interacts with maps and changes them according to the spatial advancements that are made’ (Lammes, 2010: 2-3). However, as Lammes (2010: 3) stipulates just a few sentences later, ‘this is rather different from how maps have figured in colonial ideologies’, as such maps were ideologically constructed as transfixed and eternal depictions of the ‘true’ state of the world (Lammes, 2010: 2-3). According to Lammes, the mutable nature of the map in strategy games is
at odds with the way the colonial powers wished to present themselves (Lammes, 2010).

The correlation between an individual player’s choices and the way the map fills with symbols is undeniable. Perhaps this aspect of playing with a map in avatar-based open-world games can thus be interpreted as the ‘tour’, in the de Certeauan sense. Yet, there are several important factors that I would like to take into account. In said games, the map itself usually predates the act of playing. In *TESV: Skyrim, The Witcher III* (CD Projekt RED, 2015), *Assassin’s Creed* series (Ubisoft Monteral, 2007 and subsequent) and even *Grand Theft Auto* (GTA) (DMA Design 2001, and subsequent), the map is available immediately after the tutorial section, showing most of the game landmass and its borders. It is usually free of any markings, but shows major landmarks, rivers and other prominent geological features, according to the game setting. In more recent *Assassin’s Creed* games, there are no mountains, but most prominent monuments of city architecture are depicted right away. Similarly, in GTA, the player can see highways as well as natural phenomena. The land is partially discovered; its ‘coastal line’ is established, so the player knows, more or less, what to expect. Their task is to find the fine details and fill the map with exacts: reshaping it from vague to precise. The situation echoes the mission of African Association that I quoted as the motto at the start of this paper: at the dawn of the 19th century, the shape of the world was more-or-less known and it was time to pay attention to details.

The map can be seen as a tool that the player requires in order to fill the outline of the game world, to plot the desired route toward whatever goal they desire. In an open-world, the map is the only way to coordinate traveling. But there is also an obligation toward the map: during their travels, the player fills it with various markings, denoting important places within the game world. The player can stumble upon them by pure chance, but many games subtly point the player toward important, ‘map-worthy’ spots. In *TESV: Skyrim* there are contours of such places appearing on the compass at the center of the screen, inviting player to detour and add it to the collection of places mapped. The *Assassin’s Creed* series lets player add several such places at once, on condition that the protagonist climbs a vantage point (I will come back to this motif later). But there are more perverse examples: Geralt the Witcher can
approach a notice board in any human settlement to add several question marks to the map - they mark places worth visiting, clearly stating that the discovery is just systematisation of local folk’s knowledge. In *Rise of the Tomb Raider* [Crystal Dynamics, 2015], Lara Croft follows the footsteps of her predecessors; explorers of bygone era. To gain access to cartographic knowledge, she has to locate murals, lost journals and even abandoned maps to absorb findings of explorers who tried to map the area before her.

No matter how the discoverable place is found, the process itself is almost always the same: the protagonist needs to approach it and, when within range, a sound and text are displayed onscreen to announce the discovery. At the same moment, a marker is added onto the map at this location. In this brief and seemingly natural moment, the complex issue of imperial imagination underlying the relation between the game-map and territory, unfolds. The process itself is purely spectacular: to make the discovery, the player needs to navigate the protagonist into the proximity of an object and establish a visual contact. Then, everything happens automatically, usually without any intervention, although in some cases (i.e. in *Assassin’s Creed* or in the *Tomb Raider* series) a ‘special gaze’ must be activated. This echoes the process of making discoveries within African or American interior, dubbed by Pratt (1992: 201) the ‘monarch-of-all-I-survey scene’, after opening line of the poem *The Solitude of Alexander Selkirk*, by William Cowper. The only necessary condition for the explorer was to see the phenomenon: ‘In the end, the act of discovery itself, for which all the untold lives were sacrificed and miseries endured, consisted of what in European culture counts as a purely passive experience—that of seeing’. (Pratt, 1992: 203-204). The act of discovery can be deliberately staged, if the explorer is actively pushed towards the discovery, or it can be coincidental, when the player simply stumbles upon an interesting or important landmark previously unknown. However, in both cases, it is unavoidable and there is no way to unsee what was once seen. Games discussed follow this pattern quite literally and there is nothing to block the marking of the object on the map. In both cases, the player/explorer seems to be only an extension of some higher entity, the one who decides what constitutes discovery.
The spectacular aspect of ‘monarch-of-all-survey’ scene is particularly intense in *Assassin’s Creed*. In most of the series, the map is initially clouded and needs to be revealed - only the general outline of the area is known. Later, in the last two games, the map evolves into a 3D model of a city, but it is still deprived of useful information. To access it, the player needs to climb a high point in the city or countryside, marked by the presence of a large eagle (it is hard to imagine a more heavy-handed metaphor for seeing) and activate so-called ‘synchronisation’. The perspective shifts: the camera slowly recedes, encircling the assassin. In this way, several effects are produced. Firstly, the landscape is presented to the player - thus, it can be mapped. Second, the moment of discovery is framed in a heroic, almost god-like aesthetic: the only constant point onscreen is the protagonist, a solitary figure standing high above the ground. The act of looking at the city from above, as Michel de Certeau observes:

‘transfigures him into a voyeur. It puts him at a distance. It transforms the bewitching world by which one was "possessed" into a text that lies before one's eyes. It allows one to read it, to be a solar Eye, looking down like a god. The exaltation of a scopic and gnostic drive: the fiction of knowledge is related to this lust to be a viewpoint and nothing more’.

(de Certeau, 1984: 92).

But there is even more in said scene: if the assassin is given god-like qualities to transform the world into a text (or, to be precise, a text of a map), what of the player’s gaze, transfixed in watching the protagonist who watches the city? From the player’s perspective, it is more important to observe the act of seeing, than to see for themselves. Thus, the synchronisation in *Assassin’s Creed* serves not only as the apotheosis of the assassin, but also as the commentary on the power of imperial gaze; transforming a chaotic, incomprehensible gamescape into cartographic order.

*Assassin’s Creed* (and the franchise as a collective) is one of very few games to employ such a subtle and subversive metaphor to problematise the spectacular trope of discovery. Most games tie the act of mapping the gamescape to the eyes of the player: she is the one who needs to see certain areas or objects. However, it is worth noting that despite being free to roam the open-world, the player has nothing to say regarding the discovery. Not only are objects put onto the map, regardless of the player’s actions and will, but
also the player usually has no say about which objects are map-worthy. Usually, the player can put only one temporary marker on the map, denoting the place she wishes to go. Ironically, when a goal is reached, the marker disappears - it renders the marker as a direct opposite to permanent icons for various categories, denoting important places already discovered. The importance of a map-marker in the game itself is pre-determined: even if the player pays no attention to a cartographic category (for example the user never sharpens Gerlat’s swords in The Witcher III), it is always marked on the map and the best the player can do is to temporarily filter it off.

**Player as Naturalist**

When discussing the beginning of modern travel narratives, Mary Louis Pratt stresses two important events: [1] the launching of the first international scientific expedition, and [2] the publication of Carl von Linné’s *Systema Naturae* in 1735 (Pratt, 1992). The first affirmed the conviction that scientific expeditions are independent from the political interests of particular empires. The second, provided what Pratt (1992: 4) calls ‘global or “planetary” consciousness’: a distinctly modern ability to perceive whole world as single entity governed by systemic rules of nature. Moreover, despite being ‘global’, it resulted in the interpretation of Northern Europe as the center of the natural system, against which all other phenomena are measured. The basis of such a belief was rooted in Linné’s universal classification, as it allowed the inclusion of any plant (and later - any beast), no matter how strange, into the rational and scientific taxonomy. To prove its usefulness, Linnaeus’ disciples travelled all around the globe, collecting specimens from unknown species and relentlessly indexing them into their master system.

The Player’s position as an in-game involuntary cartographer, seems to be similar. Their task, regarding cartographic taxonomy, is to find phenomena belonging to a certain category, usually sharing visual qualities, and to mark them onto a map using said category. For example, in The Witcher III, among various markings shown on the map there is the ‘monster’s den’ category: this is where monsters are born. It is universal, regardless of the monster type. Therefore, dens of puny nekkers and mighty griffons are marked with the same icon, showing the general category and foregoing any specifics. Categories are completely universal, arbitrary, unambiguous and external.
The player cannot determine the classification of certain places or objects; it is done automatically. Moreover, one phenomena can belong to only one category and can be marked on map as such. Finally, not all specimens are included in the category: sometimes, especially during longer quests, objects normally marked on the map are discarded without effect. There is also the possibility to encounter an object possessing all visual qualities of a certain category, yet still not belonging to it as it lacks certain functionality – after all, usefulness is the most important cartographic criterion. The only agent capable of dividing objects into categories and putting them on the map is the player: NPCs lack access to the whole area of cartographic knowledge. The issue is sometimes commented on within the game narrative - Geralt of Rivia or Lara Croft are agents of rational, scientific reason, constantly battling folklore superstition. But even without such commentary, the distinction between player’s and NPC's capabilities are in place: simple denizens of Skyrim Province probably cannot distinguish between a Dwemer ruin, a Nordic barrow, a mine and a simple natural cave; an act the player does without even looking inside the place. The whole mechanism exemplifies the naturalist’s dream fulfilled: everything can be divided by categories so precise and objective, that there is no room for human initiative and interpretation. When a specimen is observed, it is immediately classified.

Yet, not every phenomenon is map-worthy and the game makes a distinction between those places and objects that should be marked and everything else. The line of division is clearly visible in *The Rise of the Tomb Rider*: the only geographic features marked on the in-game map are cave and tomb entrances. Overwhelmingly, the majority of objects with special icons are collectibles: byzantine coins, hidden survival packs, artifacts, documents and similar items Lara should find and excavate. When they first appear on the map, they are pure white. When found, they become slightly greyish and transparent, but they do not disappear. This way, two ends are met: firstly, the duty towards the archeological theme of the game is satisfied. Secondly, useful resources are separated from everything else: landmarks, ruins, places of human activity, or of great natural beauty, are all distinguished, although because the aforementioned categories cannot be exploited, they are of no consequence. In this way, the main connection between scientific naturalism and imperial interest is exposed. Although the cartographic
endeavor is seemingly morally pure and knowledge-oriented, it is a vanguard of violent exploitation of a described region. Even Alexander von Humboldt, with all his selflessness, described various American natural phenomena with utilitarian categories:

‘the canna, the heliconias with fine purple flowers, the costuses, and other plants of the family of the anomyms...form a striking contrast with the brown colour of the arborescent ferns, the foliage of which is so delicately shaped. The Indians made incisions with their large knives in the trunks of the trees, and fixed our attention on those beautiful red and golden yellow woods, which will one day be sought for by our turners and cabinet makers’. [Pratt, 1992: 130]

This strange mixture of scientific and utilitarian approach found its way into maps of the imperial period. When discussing imperial and colonial cartography, Jeffrey C. Stone points out their main difference - maps of the imperial period ‘were based on instrumental observation which added a scientific dimension to the travellers’ records, an important “civilising” clement in legitimising the European penetration, presence and even interference in Africa’ (Stone, 1988: 58). Stone further states that such imperial-period maps simultaneously served to promote private, commercial or missionary enterprises on the continent: therefore, they depict not only natural landmarks, but - for example - ‘the farming and ranching potential of various parts of the country’ [Stone, 1988: 58]. They are directly opposed to colonial maps, preoccupied mostly with political divisions of the land - provincial and national borders - and forfeiting scientific observations almost completely. Regarding video games, such a distinction can be made between maps in character-driven open-world games, slowly filling with icons denoting various useful places (and their current state, if they can be depleted), and mutable maps in strategy games, preoccupied with shifting borders and areas of influence.

Uncovering all markings on the map - turning the ‘white spot’ into a fully mapped area by discovering all its secrets - is usually promoted by the game itself. Some games that do not emphasise exploratory effort, like the GTA series, simply correlate the game ending with a complete reveal of their maps: when the plot reaches an end, there is nothing more to discover. But in most
cases, there is no direct relation between the plot of the game, tasks given to the protagonist, and mapping the game terrain: Lara Croft is probably the only character with any real interest in cartography - although even in the case of *Tomb Raider* it is possible to finish the great adventure without completing the map. The encouragement for discovery is purely player-oriented. In the case of *Tomb Raider* or the *Assassin’s Creed* series, there is a percentile meter of game completion - it cannot reach 100% without cartographic obligation being met. Different titles, like *TESV: Skyrim*, reward the diligent naturalist with an achievement visible on their player profiles on ‘Steam’ or the ‘Playstation® Network’ (PSN). All those rewards are inaccessible to the protagonist and means nothing for the game narrative. Moreover, in-game cartographic tasks are usually directly at odds with the game story: to make discoveries, the player needs to steer the protagonist away from the plot objective, ignore the supposed urgency of a task at hand and wander the land in search of makeable places and objects. The cartographic duty is the player’s and the player’s alone: the protagonist is just a medium for making discoveries; the focal point for player’s gaze. In no other part of an open-world game is the difference between the player’s and protagonist’s objectives so apparent. But there is a third layer to this relation, as the player is also a servant of the system. Play entails a universal and infallible cataloguing, a relentless division of the game world into things that are useful or useless, worthy or unworthy, waiting to be marked onto the map.

But the heroic narrative of the game is crucial for the imperial ideology to hold. Contrary to open colonial imaginaries of strategy games, most open-world single-protagonist titles (*GTA* aside) depict a lonely hero, usually a newcomer to the explored land, who travels around the country and faces many dangers just to selflessly help native population. This help comes in various forms, be it: freeing defenseless peasants from terrors lurking in the countryside - bandits and monsters, as is the case of *TESV* or *The Witcher III* - or defeating an external evil invading the land in *Dragon Age: Inquisition* (BioWare, 2014) or *Rise of the Tomb Raider*: Each time, the protagonist goes to great extent to justify his presence in the area as useful and benevolent. Without this kind of external help, the native population would be doomed. Sometimes, the protagonist is victimised: Lara Croft takes a great deal of discomfort, from nasty puncturing wounds to hunger and cold, just to reach
the goal. *The Witcher III* serves as an even more colorful example: Geralt is a true naturalist, recognising monster species from their tracks, and the markings left on victims, lonely feathers and such like. In his battles against monsters, he constantly reflects about proper taxonomy, differences between subspecies, and the idiocy of folk wisdom. In return, he is shunned by the very people he is saving, his benevolence and selflessness is rewarded with harsh words of rejection.

This kind of narrative constitutes what Mary Louis Pratt (1992: 8) called ‘anti-conquest’: the ideology of a morally pure and benignant imperial agent, motivated by curiosity and willing to sacrifice himself at the altar of science. When confronted with the ignorant stupidity of natives, he is always ready to help, especially with his Western medical knowledge. Despite being constantly harassed by hostile warlords, shamans and greedy native women, he remains paternalistically clement towards ungrateful natives, pointing out their several virtues in his journals. This kind of narrative is very characteristic for both travelogues and adventure novels set in Africa. Even though John Barrow, Hugh Clapperton and their ilk express usually sincere opinions, their ideological background serves as justification for taking symbolic possession of explored land (Pratt, 1992). Geralt of Rivia and David Livingstone each believes they know the land better than people living on it for hundreds of years, and hence can make things easier for native populations - if only they can return home with the knowledge necessary to improve the land they traverse.

Once discovered and put on the map, marked places can be exploited: sometimes, as is the case in *Rise of the Tomb Raider* or *The Witcher III*, they are even divided between still useful and depleted, as already discussed. But there is also another important aspect of game cartography: it makes the world smaller. Discovering certain places allows the player to fast-travel between them - the protagonist is teleported to the other part of the world, without any risk or effort. This is for the good cause, as areas already known are deprived of their alluring power and there is nothing interesting in crossing them back and forth. From lands of danger, they are transformed into the mundane subject of imperial control, interconnected by means of quick and efficient journey. The opposition between hazardous and heroic
exploratory travel, and fast, efficient trips to different part of the empire is, as Edward Said claims, essential for exporting imperial ideology (Said, 1993) - and through its connections to imperial views on cartography in general, seem to effortlessly influence open-world games poetics.

**Toward King Solomon’s Mines**

There is one kind of icon on an in-game map that defies the logic of rational discovery sketched before: it is a gleaming circle showing the place protagonist should visit to move the plot forward or resolve a side-quest of some kind. In modern games, which always mark the goal region on the map, it is probably one of the first cartographic symbols the player will see after the game starts, luring him or her into the wild. This icon seems to defy all rules established above: it appears on the map without the moment of spectacular discovery. It is temporary and disappears as soon as the requirements of the quest are met, or player turns her attention elsewhere. Instead of the fixed certainty of a cartographic system, it denotes the unknown and the player usually learns that their initial impressions about the place they need to go through are wrong. Therefore, it does not quite meet the criteria of a rational world the rest of the in-game map denotes. Yet, despite the difference, this kind of relation between the map and the territory occupies an equally important position in an imperial code, as related to two very influential adventure novels: R. L. Stevenson’s *Treasure Island* (Stevenson, 1883) and H. R. Haggard’s *King Solomon’s Mines* (Haggard, 1907).

Both books, extremely influential and well-researched, share similar narratives: an English gentleman is in possession of a map leading toward untold riches and embark upon a dangerous journey for reasons other than greed. According to W. Z Katz, this kind of narrative provides space to show virtues of English gentlemen: ingenuity, courage and purity in a testing setting (Katz, 1987). It can be also perceived as an open invitation to private investments in colonies, as it offers great opportunities for courageous businessmen (Daly, 2007). If read as a didactic children’s novel, the narrative turns into a lecture on capitalism, virtues of prudence and diligence, and English claim to the world’s treasures based on the character’s merit - only in hand of capable British people can the riches be put to good use (Mathison, 2008). There is also a prominent reading of the map and terrain from *King
Solomon’s Mines as a depiction of the female body, violated by male Europeans (McClintock, 1995), already employed in the reading of strategy video games by Souvik Mukherjee (Mukherjee, 2015).

Regardless of the reading, some tropes remain constant: maps are ‘blueprints leading to treasure, fame and fortune’ (Mathison, 2008: 179) and represent a rightful entitlement to the riches for whoever finds the map. Maps are also ambiguous and imprecise. For instance, although Captain Flint’s map precisely locates the island, the route to the treasure itself is incorrect; the pirate’s gold was relocated and the map itself became useless. Similarly, in King Solomon’s Mines, the map was painted with blood by a dying Portuguese explorer of old, who used native, non-scientific names of geographical features and does not show the exact route to the land of Kukuanaland, nor the precise location of ancient diamonds. In both cases, the protagonists need to form an alliance with local people to uncover the secret. The procedure is quite similar to the usual structure of an open-world game quest: the player starts in a well-known area, ventures into unexplored wilds guided by the map that shows general directions, but lack details. The protagonist then fights off countless dangers and, upon arriving, learns that things are not as simple as it seemed. To receive the prize - in a form of treasures and experience points - the protagonist needs to appease the local population by presenting herself or himself as a savior and protector.

In the process, both heroes of adventure novels and players of video games verify the map. Although Captain Flint certainly knew his way around the map, he was not a naturalist: his map is a curious mixture of precise, scientific information and practical advice formulated like riddles:

‘the doctor opened the seals with great care, and there fell out the map of an island, with latitude and longitude, soundings, names of hills, and bays, and inlets, and every particular that would be needed to bring a ship to a safe anchorage upon its shores. (...) Over on the back the same hand had written this further information: “Tall tree, Spyglass shoulder, bearing a point to the N. of N.N.E...”’ (Stevenson, 1883: 20).

The map Allan Quatermain possesses is even more suspicious - the great white hunter even wonders if the drawing can be called a map. The process
of treasure-hunting is also a test of maps. In both novels, the maps pass it only partially: they contain relevant geographical information but they are wrong about the place the treasure is buried at - or they turn out to be irrelevant in the search for riches. Cartography and exploitation are suddenly distinguished from one another: geographic reason remains pure, unassociated with greed, as it turns out a native guide must replace the rationality of the map in order to capture treasure.

Complex interaction between cartography and treasure-hunting translates more or less directly into an interaction between exploration and resolving the plot in a typical open-world game. During the perilous trip toward the goal, new discoveries are made and marked, and then, during quest resolution, the map becomes useless, with the freedom of travel suspended until a plot point is resolved. Then, the problem disappears, as was the case in the cited novels: after removal of the treasure, mystic aura is removed from the place and it can be included in the order of cartographical knowledge. Open-world games treat their gleaming quest marker in a very similar fashion. After the task is resolved, the marker is removed - but all discoveries made during the quest remain. The lesson is that adventure and treasures fade away, but rational taxonomy of geographical knowledge is eternal.

The process of finishing single-player open-world games is similar to the final period of an adventure novel genre. With each player-move and each quest resolved, there is less and less exciting ‘new space’, full of new challenges. The player and the protagonist both serve as involuntary cartographers, exploring, mapping and usually exploiting new land to the point where no stone is left unturned. In the process, the narrative justifies the procedure with the story of a savior, who destroys those who threaten the indigenous population, and a naturalist, collecting and cataloguing various phenomena for greater good. The in-game map serves as journal of those endeavors, filling with icons as the game progresses. At the end, there is nothing more to do: explored and exploited land offers only the mechanical order of simulated NPC life, repeating meaningless actions without any obstruction. There are no more enemies: all creatures opposing the player are slain. There are no more desires: the player has fulfilled all personal NPC quests. There are no more treasures: each chest was searched, each vein of precious metal dug out,
each rare herb harvested. The naturalists task is finished, as anti-conquest turned the land into a self-regulating machine.

In the analysis of in-game cartography, I have attempted to show an issue central to video games. As the popularity and prestige of open-world games grow, the ubiquity of imperial imagination stays strong. The main model for building the relation between the human and the world is domination, masked as rational, paternalistic benevolence. With each world designed to be simultaneously saved and mapped, the specter of Allan Quatermain continues to haunt the media and, it seems, there is a long time before this will be finally put to rest.

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**Design**

*Emotional Maps in the Context of Participatory Planning - Examples from the Czech Republic, Spaces Semiotic-Ethnographies*

*Jirka Pánek*

**Keywords:** Participatory Planning, Emotional Maps, Local Agenda 21, Sustainable Development, Public Participation GIS (PPGIS)

**Introduction**

In the Czech Republic, the decision-making process at local level has been historically very often elitist; closed to the public and non-participatory. At the same time, citizens have often been a neglected part of the planning process and considered only prior to elections (Galdós, 2010). Distrust of politicians has increased due to corruption scandals, mainly in the 1990s, and membership of political parties has never reached the levels of their Western counterparts (Howard, 2003). The neglect of citizen participation is slowly changing as local political representatives start to understand that citizens have a relevant role in the processes of town planning and administration (Čermák and Vobecká, 2011).

There has been limited research in the region of Central Europe concerning subjective and emotional maps as part of the processes of local planning, and almost no practical implementation of such approaches in local government administrations prior to 2010. Nevertheless, some examples of citizens acting as an advisory body in an e-planning process were observed in Poland (Jankowski, Czepkiewicz, Młodkowski, and Zwoliński, 2015), Hungary (Pödör, 2016) or Czech Republic (Pánek, Pászto, and Marek, 2016).

Reflecting on the historical context of the planning process in the Czech Republic, the author supports the idea that new participatory institutions could help to regain people’s trust in democratic government. A set of innovative instruments, such as: participatory budgeting (Bhatnagar, Rathore, Moreno Torres, and Kanungeo, 2003; Cabannes, 2004; Shah, 2007; Sintomer, Herzberg, and Röcke, 2008), emotional maps (Pánek *et al*., 2016),
participatory urban planning (Kahila and Kyttä, 2009; Kahila-Tani, Broberg, Kyttä, and Tyger, 2015), open data (Jäppinen, Toivonen, and Salonen, 2013) and other measures to enhance transparency, could all contribute to democratic renewal across European cities. They could also lead to a fulfilling of the ideas set out in 'Local Agenda 21' (The International Development Research Centre [IDRC], 1996).

Concurrent with the elaboration of Local Agenda 21, the concept of the ‘Healthy Cities Programme’ was also developed and established by The World Health Organisation [WHO] in 1988. The programme is a long-term initiative with its main aims being to place health high on the agenda of decision makers and to promote comprehensive local strategies for health protection and sustainable development. It tries to bring the technical language of the ‘Health for All’ strategy into the 21st century and translates the principles of the Ottawa Charter for Health Promotion (The World Health Organisation [WHO], 1986) into tangible action. The Network of Healthy Cities of the Czech Republic (HCCZ) was created in 1994 and its mission, which goes hand in hand with the aforementioned premise of Local Agenda 21, is to goad Czech municipalities into stipulating in their statutes that they will consistently work towards sustainable development, improving health, and improving the quality of life in cities and regions of the Czech Republic. In 2014, HCCZ started to test implementing emotional mapping into their methodology for Local Agenda 21 workshops. The author of the paper works as a subcontractor for HCCZ and coordinates the emotional mapping workshops. Hence, the paper combines subjective testimony and experience with descriptive analysis of the process behind the development and deployment of emotional mapping in selected municipalities of the Czech Republic.

Emotional maps and Public Participation GIS (PPGIS)

Since behavioural geographers started working with place perception, and Peter Gould (1974) and Kevin Lynch (1960) used mental maps to explore city visualisation and spatial preferences, participation has become an integral part of the geographical research. Later, when Robert Chambers

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11 The Forum of the Healthy City activity is the first annual meeting between the local administration and citizens.
and others introduced maps into ‘Participatory Rural Appraisal’, ‘Participatory GIS’ and ‘Public Participation GIS’, maps became further recognised by quantitative geographers as research methods and visualisation tools. Nowadays, with smartphones and global Internet coverage, applications like FixMyStreet, ArcGIS Online, CartoDB and Maptionnaire allow users to cross the technology gap and become neocartographers without the need for coding or even GIS knowledge. GeoParticipation, based on using spatial tools in order to involve citizens in community participation, can herald the future development of Public Participation GIS (PPGIS). This is because such a form of GeoParticipation provides social engagement and an easy-to-use environment, whilst creating the feeling of belonging to a certain social group or community (Pánek et al., 2014). PPGIS research is considered ‘applied’ research as it is often driven by the need to identify spatial information that could be used for participatory planning and decision support (Brown and Kytta, 2014). As such, it sometimes lacks the strong conceptual and theoretical background of basic research that would guide the empirical PPGIS deployments. Prior to the platforms mentioned above, the measurement and mapping of social and subjective experiences with place lacked the technology to capture the subjectivity of spatial information.

PPGIS started to emerge on the late 1990s with the first workshop on Public Participation in GIS organised in Maine (USA) and with the University Consortium for Geographic Information Science (UCGIS) meeting in 1998. In this period, the linking of GIS and Society entered the thus-far top-down and quantitative world of automated geography (Dobson, 1983) - later called GIScience (Goodchild, 2014). The scope of socially-related GIS applications broadened after the publication of thematic books such as: Community Participation and Geographical Information Systems (Craig, Harris, and Weiner 2002), special issues of academic journals (Cartography and Geographic Information Systems 1998, Cartographica 2001; Environment and Planning B, 2001, Journal of the Urban and Regional Information Systems Association, 2003) and conferences (Urban and Regional Information Systems Association [URISA] Annual Public Participation GIS Conference or International Conference on Participatory Spatial Information Management and Communication).
According to Dunn (2007), participatory approaches to GIS were also used in new areas such as: landscape planning and the revitalisation of public spaces (Craig and Elwood, 1998; Casey and Pederson, 2002; Elwood, 2002a, 2002b; Ghose, 2002), conflict resolution, land disputes and the exploitation of natural resources (Weiner et al., 1995; Harris and Weiner, 1998; 2002; Kyem, 2002; Weiner and Harris, 2003; Kyem, 2004), entitlement of First Nations to land and access to public services (Bond, 2002; Laituri, 2002), environmental protection (Meredith, Yetman, and Frias, 2002; Sieber, 2002; Tulloch, 2002), and land-use and protection of natural heritage (Ventura, Niemann, Sutphin, and Chenoweth, 2002; Walker et al., 2002).

Emotional maps can be considered as a subgroup of PPGIS (Brown and Kyttä, 2014) and at the same time, as a tool of GeoParticipation (Pánek et al., 2014). Emotional mapping has the tools to support the ideas of Mody, Willis and Kerstein (2009), who state that emotions, spaces and places are interconnected, with every location capable of evoking an emotion. Places can thus be seen as attractive, boring, dangerous or scary, among other perceptions (Korpela, 2002). One of the first examples of emotional cartography in urban visualisation comes from the book of essays entitled Emotional Cartography: Technologies of the self (Nold, 2009). The book was described as ‘…a collection of essays by artists, designers, psychogeographers, cultural researchers, futurologists and neuroscientists, brought together by Christian Nold to explore the political, social and cultural implications of using technology to visualise intimate biometric data and emotional experiences’ (Nold, 2009: 3). Surprisingly, the publication has no essays by cartographers or city planners. This is despite the strong influence emotions have on how the [urban] environment is perceived and their effect on the spatial layout of the people’s perceptions (Zadra and Clore, 2011).

Emotions are one of the defining characteristics of every human being and yet their presence in maps and spatial data is uncommon (Griffin and Mcquoid, 2012). Some may argue that ‘emotional mapping’ is not the correct term, as it is not exactly emotions that are mapped, but merely people’s perceptions of and experiences in a place. Users are often asked to identify
places on the map where they feel afraid (mapping of safety), where they ‘like it’ (spatial preferences), where they spend their free time (leisure time activities planning), and where it is ‘dirty’ (environment pollution, etc.). This variety of spatial perception questions can hardly be considered as a homogenous emotional response to the place, but the umbrella term could be an emotional mapping. Some authors use terms such as sentiment mapping (Caragea, Squicciarini, Stehle, Neppalli, and Tapia, 2014), hedonic mapping (Ennis and Ennis, 2013), ephemeral mapping (Art and Cartography: Commission of the International Cartographic Association, 2015), perceptual mapping (Doran and Burgess, 2011) and many others. The theoretical discussions and uncertainty about the terminology show that emotional mapping research and practice is not clearly defined or anchored in its respective disciplines. Nevertheless, the author has decided to use the term ‘emotional mapping’, based both on the argument of Perkins (2009: 130), who states that ‘...emotional maps...chart human feelings onto a cartographical landscape...and allow users to devise and customise their own emotional landscape, to choose what kinds of thoughts and experiences, feelings and passions, to map...', and also as a legacy of the Emotional Cartography book by Christian Nold (2009).

Emotional mapping workshops organised by the 'Network of Healthy Cities of the Czech Republic'

The idea for the implementation of participatory map based questionnaires came during the meeting of HCCZ network representatives with the author in 2014. The original idea was to develop a method that would allow participants of the Forum of Healthy Cities activity to spatially express their needs and ideas about city development. Later on, it turned into an emotional mapping workshop and web-based application that complemented each other and allowed the collection, analysis and publication of georeferenced subjective data as a part of the participatory planning/decision-making process.

During the process of testing, developing and deploying the emotional mapping workshops, the author tried various mapping techniques that

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12 Later this developed into the emotional mapping workshop.
produced a range of results. The very first map was created using six large crayons and one A1 map of the city (figure 8). The idea of using crayons came from the influential book by Robert Chambers entitled: *Whose reality counts? Putting the first last.* (2003). In this publication, the author argues, that development experts should *hand over the stick* [that which empowers] to let people draw their own maps. It was observed that it might be easy for a facilitator to hand over the stick to the participants, but it is not an easy move to share the crayon among the participants. There is always somebody who wants to take control of the tool and respectively, to take control of the map. The second disadvantage is the *overlay issue*.

![Figure 8. Example of the analogue emotional map created on the first emotional mapping workshop in 2014.](image)

The second version of emotional mapping involved coloured pins (figure 9) that participants inserted into the cork-board with a map. It solved both the *overlay issue* as well as the *hand over the stick* problem. Participants can take as many pins as they want to, while several pins in the same location reveal hot-spots that are easily visible and also create a 3D effect on the map. Using different coloured pins, each colour represents a different emotion that when digitised into the georeferenced format, each coloured pin is represented as

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13 If three or more colours are overlaid, it is merely impossible to identify the original colours.
a single point. This contrasts to the previous example, where combination of points, lines and polygons had to be used. The deflection from multi-format representation towards a points-only approach was based on difficulties with combining multi-feature datasets in GIS. It was also based on the experience of other authors’ research where up until now, the predominant methods for spatially-explicit preference mapping have been marking points for locations or sketching polygons annotated with expressions of preference (Jankowski et al., 2015). Brown and Pullar (2012) provided one exception to this in their suggestion that points instead of polygons be used in future PPGIS applications, although their study was focused on mapping large-scale landscape values. Furthermore, there was a possibility to use fuzzy multi-point features (Huck, Whyatt, and Coulton, 2014) to collect the information, but the author decided to use single points only as he experienced that points are often more specific and place related than polygons or multipoint features. The author also anticipated that it would be technically very complicated to do fuzzy-multi points with pins in the analogue version.

Figure 9. Example of using colourful pins for creating the emotional map in 2016.

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14 Combination of points, lines and polygons.
The latest improvement in the emotional mapping workshops organised by the HCCZ is linking each pin with its author via numbers on pins (figure 10) and comments, written with same number code on the side. Thanks to this improvement, the data gathered via the online tool and data from participatory mapping meetings are almost fully comparable; hence they can be integrated into one large dataset.

Figure 10. Colourful pins with numbers used to identify the authors and link them with respective complains.

Besides the participatory emotional mapping workshops, the author created a single-page web application (figure 11) using two main open-source JavaScript libraries; jQuery for basic user interactions as well as app control, and Leaflet as a library for map interactions. For production, the modules are concatenated with other libraries by Grunt Task Runner. The application can be configured with a JSON file containing basic map views, app steps and popup form content. The configuration file can be hard-coded or generated from a database at backend. The results from the frontend are sent asynchronously to the backend where it uses the authors’ own simple Model-View-Controller (MVC) framework written in hypertext pre-processor (PHP) script language. The MySQL database is used for storing metadata from users and geodata are stored in the GeoJSON format. The administration is

15 Together with programmer Ondřej Růžička.
created with the help of the Cascading Style Sheets (CSS) framework Bootstrap and administrators are allowed to download the full metadata from MySQL, concatenated with GeoJSONs.

![Web application environment](image)

**Figure 11.** The environment of the web application created for the neighbourhood revitalisation plan participatory consultation in Příbram, the Czech Republic in 2015.

**Results utilisation by city administrations**

The author asked municipalities that recognised the emotional mapping workshop in previous years to fill in the evaluation form in order to gather their knowledge and experience with the process. The response rate was 50%\(^6\) and the responses covered the period of 2010-2016\(^7\). In total about 2,500 participants\(^8\) took part in the workshops and based on the answers of administration representatives, the main motivations for cities to organise the workshops were for example:

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\(^6\) 14 responses from 28 addressed municipalities.

\(^7\) One map is from 2010 (this map was not organised by the HCCZ), one map is from 2014, 6 maps from 2015 and 7 maps from 2016 (one city organised the activity in both 2015 as well as 2016).

\(^8\) Some cities estimated the number of participants.
• To find out how citizens perceive various places in the city, to determine which sites should be equipped with elements of leisure and where we need to focus on cleanliness and safety of the citizens.
• To ensure public participation.
• To use a new tool for finding the opinion of the population.
• To specify the places that citizens concern about.
• To reach out to the citizens in an innovative manner and to get one of the inputs for the implementation of the development strategy of the city from 2015 to 2020.
• To communicate with the public.

The emotional mapping workshops fulfilled the expectations\textsuperscript{19} of the municipality representatives who perceived the tool as suitable\textsuperscript{20} for participatory planning and decision making. Most\textsuperscript{21} of the municipality representatives agreed that the emotional mapping workshop should be repeated every two years\textsuperscript{22}. So far, the results or planned results from the emotional mapping workshop are/will be included in \textit{Conception of urban transport}, \textit{Strategic plan of the city development}, \textit{Local Agenda 21 plan}, or \textit{Action plan of Strategic development}.

The broad deployment of participatory geospatial tools in the Czech Republic is still an open question, although there is a legal and political framework for such actions. The first support for public participation came through European Union initiatives which promoted public involvement in local governance, including the 1998 Aarhus Convention (1998) and subsequently, the 2007 Leipzig Charter on Sustainable European Cities (European Commision, 2007). In the Czech Republic, participation is granted

\textsuperscript{19} 43% strongly agreed and 57% agreed with the statement “the emotional mapping fulfilled our expectations”.
\textsuperscript{20} 64% strongly agreed and 36% agreed with the statement “the emotional mapping is a suitable tool for participatory planning and decision making on a local level administration”.
\textsuperscript{21} 10 out of 14.
\textsuperscript{22} Answers varied from every year to five-year period, but on average the answer was every two years.
by the Constitution of the Czech Republic as well as the Act of Parliament 128/2000 - Act concerning Municipalities (Czech Republic, 2000). Furthermore, some EU granting mechanisms even demand active participation during community planning process (such as Environmental Impact Assessment [EIA]). Nevertheless, based on the author´s experience with organising emotional mapping workshops, the deployment of geoparticipatory tools often depends on the personal activity and involvement of municipality representatives and/or Local Agenda 21 coordinators.

**Conclusions**

In 2016, fifty members of the 'Network of Healthy Cities of the Czech Republic' organised the *Healthy Cities Forum* activity and 14 of them (28%), implemented the emotional mapping workshop within the event. This represents an enormous increase in interest in the mapping activity among the municipalities. HCCZ has 130 members, with regional influence on the 2105 towns and cities where 5,454 million inhabitants of the Czech Republic live (52% of the total population). The potential of the emotional mapping workshop as a participatory planning support activity is therefore vast. Although the methodology may need improvement in academic grounding, it proved to be a playful and yet effective way to increase citizens´ participation in the consultancy and/or decision-making process.

The methodological shift from crayons to pins in the analogue version of mapping was followed by technological improvements in the web-app. The crowdsourcing platform was continuously tested, de-bugged and re-programmed. During several case studies, the authors found bugs in: (1) the saving mechanism, which was not built for sending larger amounts of data (solved by improved caching settings), (2) drawing algorithms, which caused the unavailability of the *move* function once the *draw free hand polygon* function was used, and (3) the visualisation algorithm was not built strong enough to handle datasets comprising of thousands of points.

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23 Besides cities, also regions, micro-regions and local action groups are members of HCCZ.
The initial idea of using the heat maps for visualisations also proved to be inadequate, as these maps often covered vast areas of cities and did not provide specific information. The most important findings were sometimes merged and in some cases, created continuous areas that did not reflect the specific and unique findings. Therefore, another method was adopted concerning the visualisation of findings, and the hexagonal grid with spatial join function is currently used as main visualisation approach. This improved visualisation so far offered an increasingly clearer representation of the perception results. Furthermore, implementation of advanced geostatistical tools, such as non-parametric Kendall’s rank correlation (Abdallah, Chorowicz, Kheir, and Khawlie, 2005), global Moran’s I spatial autocorrelation (Moran, 1950) or local indicators of spatial association (LISA) methods (Anselin, 1995), may bring further insight into the data and provide even more specific answers on citizen perceptions of the city. The author believes that the demographics behind the data can reveal further information which would be relevant for e-planning research. The whole project of emotional mapping workshops works with open-source software\textsuperscript{24} and open-data\textsuperscript{25} only.

The roadmap and examples presented in this paper reveal both the development of the new methodology of participatory planning via map-based questionnaires, as well as opportunities and challenges that still lay ahead of its author[s]. Besides the case-studies presented above and usage for participatory community planning, the tool has been deployed for: the mapping of bikers’ satisfaction with transport infrastructure in Reykjavik, Iceland; mapping of safety perceptions in Olomouc, Czech Republic; and examination of geographical knowledge about the Middle East among university students. The author is confident that there are numerous utilisations and improvements for the tool, and invites various stake-holders to take advantage of the tool for their own research as well as participatory planning activities.

References
Aarhus Convention (1998) \textit{The United Nations Economic Commission for}

\textsuperscript{24} QGIS
\textsuperscript{25} OpenStreetMap printed via http://print.mapwebbing.eu/service.


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Maps and Urban Cultures: The Everyday Realities of Digital Mapping Practice

Michael Duggan

Keywords: Digital Maps, Culture, Space, Place, Everyday Practice, Urban Life

Introduction
We are often led to believe that everyday practices and experiences of place, and particularly urban places, are becoming increasingly interwoven with digital technology; whether this be the technologies that run in the background of daily life, or those we grasp in our hands in the foreground of our daily routines. In many ways this is undeniable. Cities are now bound up in a vast ecology of algorithms, codes, software and digital devices, all of which come together to co-constitute the many spatialities of our urban experiences. The beeps, swipes and taps of city life have become the norm for a great many of us, as has the immediate access to vast amounts of digital information available to us on personal devices. For those of whom this is not the case, city life is increasingly marginalised; as access to digital information and digitalised services are today’s metaphorical passports to the prevailing socio-cultural and economic flows of the city.

Certainly, whether city-dwellers are active, passive or reluctant users of digital technologies makes very little difference to the notion that digital technologies have thoroughly shaken-up the geographies of everyday urban life. This is happening, and is likely to continue to happen, whether we like it or not. As a result, digital technologies need to be taken seriously when thinking about how the geographies of the city unfold and indeed they have been by a number of geographers working in this field. It is now accepted that digital technologies are used to produce the spatialities of the city, occurring often automatically from positions of power and implemented without contestation (Thrift and French, 2002; Graham, 2005; Kitchin and Dodge, 2011; Kitchin, 2014; Leszczynski, 2014, 2016; Shelton et al., 2015; Kitchin and Perng, 2016). However, where we must be cautious is in making grand assumptions about
the ways in which digital technologies have, and will, come to affect our daily experiences of urban places. While the top-down perspectives detailing the impacts that digital technology has on the spatialities of cityscapes have been much at the centre of debate, relatively little investigation has been carried out from a bottom-up perspective; that is, from the point of view of those living these experiences day in, day out.

What I intend to demonstrate in this paper is that the urban experience is not (yet) universally defined by the proliferation of digital technologies alone. I will argue that there is no single framework which can be used to qualitatively assess the ways in which digital technologies have become intertwined with place, for place (and particularly urban place) is an inherently messy concept constituted by the messy entanglements of spatial, socio-cultural and socio-technical forces (Cresswell, 2004; Massey, 2005). What I will do is provide one way in which we might make sense of this effect of technology of place, which is to look at how digital mapping technologies have become embedded in the practices of everyday life. In examining the mapping practices of everyday life, we can garner a better understanding of how the complex configurations of place unfold for those involved. What I argue will emerge by doing so is a fuller understanding about specific ways in which digital technologies are coming to complicate the relationships people have with place in contemporary life.

Geography, and particularly ‘Cultural Geography’, has long been interested in understanding the relationships between people and place (Jackson, 1989; Crang, 1998; Cresswell, 2004), and more recently, between people, place and practice (Lorimer, 2005; Nash, 2013). By focusing on the cultural processes of contemporary mapping practices, I make an argument which suggests that the constellations of place (Massey, 2005; Cresswell, 2010) remain open and subject to socio-technical changes, despite the all too common notion that digital technology increasingly determines people’s relationships to place. The main goal of this paper is to highlight a bottom-up perspective of a world constituted, in practice, by the unfolding socio-technical constitution of cultural processes and digital technology. In examining the minutia of everyday life, I will show how digital mapping practices, and ultimately digitally-augmented urban experiences of place, must be
understood from the specific contexts in which they unfold. By doing so, I aim to contribute a holistic contextualisation of everyday life in a digitalising world that brings a complexity and a little doubt to the notion that digital technology is revolutionising the geographies of everyday life.

In the first section, I take note from theories of the interface to outline a theory of *mapping interfaces*. I argue that a theory of *mapping interfaces* could be used to give us the vocabulary and theoretical framework with which we can understand the complexity of everyday encounters with digital maps. Applying this framework, I use the second section of the paper to illustrate how everyday experiences of navigating the city using digital maps, produces novel, but always context dependent, spatial practices. I highlight specific cases of how digital mapping technology has affected these spatial practices; the reason being that navigation was commonly cited as a primary reason for using digital maps throughout the research. In making these arguments, I draw from empirical materials taken from an 18-month ethnographic study of contemporary mapping practices. For the purposes of this paper, I will refer to my time spent with two participants who navigated the city of London using mobile mapping technologies. Specifically, I make comment on the navigational practices of Johnny, a 27 year-old living in London and Tom, a 25 year-old living in the Greater London area."

Ultimately, this paper sets out to provide the much needed empirical detail that is often called for in geographical studies of digital technology and place (Ash et al., 2015; Kitchin and Lauriault, 2015; Rose, 2016), and in geographical studies of everyday mapping practices (Dodge et al., 2009; Kitchin et al., 2013).

**Interfaces**

The vernacular understanding of an interface is the point at which two entities meet and interact. In contemporary parlance, this has often come to mean the point of interaction between bodies and the surfaces of digital technology, otherwise known as the Graphical User Interfaces (GUI’s). These are the means by which we interact with a variety of digital devices and includes, for example, touch screens, keyboards, control pads, buttons, and mice. Within

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26 These names are not those used by my participants. I do this to protect the anonymity of my research participants.
geography [see Ash, 2015; Rose, 2015] and beyond [see de Souza e Silva, 2006; Bolter, 2007; Cramer and Fuller, 2008; Kirschenbaum, 2008; Nusselder, 2009; de Souza e Silva and Frith, 2012; Drucker, 2011, 2013; Farman, 2012; Galloway, 2012; Verhoeff, 2012; Hookway, 2014;]. The concept of the interface has similarly become a favoured tool to frame interactions with digital technologies. Moreover, in thinking about the conceptualisation of the 'digital' and 'data assemblages' more widely, theories of the interface have also been a useful tool to explore the human-facing [or perhaps 'end user'] element of digital stacks; that is the multiple layers which make up the assemblage of digital objects, ranging from algorithms, to codes, software, platform, operating system and GUI's [Kitchin, 2014; Ash et al., 2015]. Antic and Fuller (2011) have also discussed how interfaces can be theorised to understand how computing devices interact with one another, without any human interaction. For instance, in the case of automated computing systems, interface theories may be used to understand how the softwares working within these computing assemblages interact with one another.

Nevertheless, Drucker (2013) has argued that because the metaphor of the interface as a surface of digital objects is so familiar to us, we forget the proper function of the interface. The function of the interface is to account for relational occurrences beyond the physical interaction between two facing surfaces. The surfaces of interfacing encounters are important to consider, but they are not interfaces 'in and of themselves. They are simply the outward facing exteriors of the entities involved in an inter(facing) encounter. Hookway (2014:13) claims 'the interface may be distinguished from the surface in that it does not primarily refer back to a thing or condition but rather to a relation between things or conditions, or to a condition as it is produced by a relation'. As Drucker (2013: 4) argues, the interface is an environment, 'a space of affordances and possibilities' that structure how people interact with things. It is a 'set of conditions, structured relations, that allow certain behaviours, actions, readings, events to occur' (Drucker, 2013: 4). Further still, Galloway (2012: 33) defines the interface as not a thing, but as a 'process or a translation' which is more than the sum of its inter(facing) surfaces. For Galloway, an interface draws from the entities it's translating between, but it also has its own properties and structure which are independent from the
entities involved. The interface is not then, *exclusively* the point of interaction between bodies and digital technology. Instead, the interface accounts for the entire dynamic context of interactions which unfold between inter(facing) entities.

Hookway (2014) understands inter(facing) encounters as zones of possibility and limit. He suggests that interfaces have many capacities which can be realised to produce action in the world. Yet these possibilities, he argues, are always limited by the affordances of the entities involved. In short, the capacities of an interface cannot be realised, or actualised in practice, unless the entities involved have the capacity to be affected by one another (after DeLanda, 2006). This is an important note to make about theories of emergence, including that of the interface, because it allows us to speak about emergences as dynamic coming-togethers which have a capacity to produce multiple outcomes; without suggesting that the coming-togethers of entities can produce any old outcome. In this regard, the capacities of an interface, although plentiful, remain limited in their actual realisations by the capacity that its assembling entities have to be affected by one another. The result is that interfaces are paradoxical; for they exist at once as both open and yet closed emergences, constrained by their own dynamics of interaction.

**Mapping interfaces**

In this paper, I argue that interactions between maps and map users can be understood as *mapping interfaces*. Every instance of map use is a novel one, however subtle, based upon a dynamic range of socio-spatial factors which come together ontogenically in the practices of using maps (Kitchin and Dodge, 2007; Perkins, 2008; Kitchin *et al.*, 2013). Using a map does not simply mean responding directly to the representational properties of maps. It is a far more complicated and context-dependent practice, which is open to the possibilities and subject to the limitations set by the entities involved. As I will demonstrate, there are multiple elements which have a bearing on how the possibilities and limitations of mapping encounters unfold. Understanding these encounters as mapping interfaces is useful in that the framework is set up to examine dynamic forms of interaction. Whilst this framework does recognise the importance and power of a maps’ representational properties - a maps surface - it encourages a holistic contextualisation of mapping

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practices which goes beyond a representational analysis of maps. In developing this framework, I intend to move the conversation about mappings away from the common analysis of mappings as representational artefacts. Instead, I move the debate into the recently established domain that seeks to understand mapping encounters from multiple perspectives, which include the more-than-representational work of mappings and the cultural contexts in which their use unfolds (Kwan, 2007; Perkins, 2008; 2009; Della Dora, 2009; Kitchin et al., 2013; Caquard, 2015; Lammes, 2016).

**Practices of Navigation**

The mapping interface framework offers a particularly useful toolset for examining the impact that digital maps have had on our everyday practices. In focusing on the relations between entities as they unfold in practice, the framework can be used to suggest that digital maps are *surfaces* and not interfaces, as they are commonly assumed to be. This allows us to explore what the affordances of the digital mapping technologies are, how they are different from other forms of mapping, and how they interact with the socio-spatial contexts in which mapping practices take place. Sequentially, the framework allows us to understand digital maps beyond the representational form that they take.

In the following, and with reference to urban navigational practices in London and New York, I suggest, as others have, that digital maps do produce novel forms of socio-spatial experience (see Verhoeff, 2012; Wilmott, 2012). However, I also suggest that such novelties cannot be understood in isolation as a direct consequence of using digital technology. Ultimately, I argue that we must look at the context for navigational practices, for life in the digital age remains a socio-technical constitution.

The arrival of maps on computers and personal digital devices, often in the form of GIS or popular web and app-based mapping softwares, has affected the ways in which people use maps in everyday practice. Maps are now more dynamic [or ‘slippy’], personable and portable than ever before (Haklay and Weber, 2008; Crampton, 2009). Digital maps open users up to a plethora of immediately accessible and interoperable spatial information, much of which has not been available before (Graham *et al.*, 2013). Moreover, in practice,
digital mapping technology has affected the way in which the performances of mapping encounters unfold (Brown and Laurier, 2005; 2012; Della Dora, 2009; Lammes, 2016; Roberts, 2016).

Everyday practices of urban navigation have not been left untouched by this shift (Milner, 2016). Indeed, it would not be untoward to suggest that practices of navigation have been significantly affected by digital mapping technology, and particularly mobile mapping technology. Smartphone map applications, in-car satellite navigation systems and bike mounted GPS devices are all commonly used for the purposes of daily navigation. Much of my fieldwork looked directly at how these devices had become embedded in everyday practices of navigation, and ultimately, in the everyday experiences of the city. In the following, I use the mapping interface framework to examine how the navigational practices of Johnny, whilst on foot, and Tom, whilst driving into London, were affected by digital mapping technologies.

Digital maps which display location, route, end point and estimated travel time are now commonly used in the practices of navigation. Smartphone applications such as GoogleMaps®, AppleMaps® and CityMapper®, and GPS devices such: as Garmin®, TomTom® and Strava®, are all digital mapping technologies designed to make the often complicated practices of navigation a little simpler. Many of my participants frequently cited these technologies as indispensable aids that they used daily to get around the city. However, it was GoogleMaps® which was seen to be used the most frequently. Referring to GoogleMaps®, Johnny went as far as to suggest that:

‘London [his home city] would be a different place without it’.

Moreover, and with reference to navigating whilst driving, Tom stated that:

‘driving would be so difficult without using this [pointing to his phone displaying Googlemaps®, attached by a bracket to the windscreen of his car]. To be honest I don’t think I’ve ever driven for very long without it...that could be tricky.’

For both Johnny and Tom mobile mapping technologies were perceived as essential tools used to augment their navigational practices. They provided a reliable source of spatial information that had become deeply embedded in
their experiences of navigating the urban environment. For much of the time that I observed the navigational practices of Johnny (on foot) and Tom (in the car), digital maps were used in some respect or another; either as essential guides used to get them around unknown parts of the city, or as useful reference points that they could check intermittently. Whilst a challenge to navigate without using these technologies proved that they could both manage to get from A to B without them, it was not something they were inclined to continue doing once the exercise was over. This was despite their suggestion that they enjoyed the challenge as a break from the norm. Both cited convenience and ease of use as the primary factors for why they used digital maps in a navigational context. As Johnny stated:

'It's like everything else now. It's on your phone with all the other stuff I use all the time... It just makes sense to use it [GoogleMaps®] because it's there and works really well.'

Another time, Johnny noted how he no longer had to make separate searches for each individual segment of a journey. No longer did he have to check one app for the bus, one for the tube, and one for the train; GoogleMaps® gave him all that information in one search. When asking Tom why he preferred using digital maps over other forms of maps whilst driving, he similarly added:

'come on, why would I bother with a paper map now!? Maybe I’d use one when walking, like proper walking, but there’s no point when driving in a city where I know this map will be fine. It just makes it so much easier.'

The frequent mentions of convenience and ease of use could well be attributed to the busy lives that Johnny and Tom appeared to live. Both had ‘professional’ jobs in which they were required to travel a lot, especially between events and meetings with clients at various locations around London. Using digital maps was said to reduce the time it took them to navigate between these locations. In practice, digital maps did not necessarily reduce the actual real-time it took them to navigate across town, but the technology did provide them with a fairly accurate step-by-step guide to which routes they might take and the estimated time it would take them to complete these journeys. As Wajcman (2014) has noted, a busy, work-heavy and often stressful lifestyle can be a form of status amongst professionals in
contemporary capitalism. It may not be the case that Johnny and Tom’s use of GoogleMaps® was a direct way to achieve such status, but it should not be ignored that these professionals were often using digital mapping technologies in order to be more efficient navigators for the purposes of work.

In detailing my observations of Johnny and Tom’s navigational practices, I can unpack and describe their navigational practices as mapping interfaces. They unfolded within a zone of possibilities and limitations placed upon them by the objects, people, places and processes that came together to constitute their being. For the purposes of this paper, I focus on the possibilities and limitations related to the map.

One of the most common things that Johnny did when following a route displayed on his smartphone was to check his location intermittently. Every few minutes he was seen to reach for his phone to check that he was on the right path to his destination. When questioned on this, he commented that this practice had become the norm. Not only did such actions allow him to check his location, it also permitted him the chance to check for notifications on his phone; an email, a message, an alert of some sort. Sometimes checking his location became an afterthought to these practices - if he was already responding to a notification on his phone then he may as well check his location, he said. Such instances were also an opportunity for Johnny to manage why his navigations were taking place. In my experiences with Johnny, he was often navigating himself across the city in order to socialise with friends. In addition to intermittently checking his location, Johnny was also seen to be messaging friends to enquire about where they were in relation to him, to exchange messaged ‘banter’ with friends and to seek information about the venues to which we were headed. He did all of this on the go, rarely taking the time to stop.

Digital maps are part of interoperable digital systems, and I found that they were rarely, if ever, used in isolation for Johnny. To study his use of digital maps in everyday navigations was therefore also to study how his smartphone had become deeply embedded in his daily social practices. This finding chimes with Miller and Sinanan’s (2014) theory of Polymedia in which they argue that we must pay attention to the interoperability of digital media because the
dynamics of cultural practice demand that we use different media for different purposes at different times. As a self-confessed ‘techy’, this was obvious to him:

‘I’m constantly switching between apps trying to multitask...I’ve got my work email open one minutes and then I’m replying to Whatsapps’. Maps just become another thing to go between.’

Digital maps were clearly important in the constitution of Johnny’s navigational practices, however, they were used only in response to the context in which his navigations took place. To navigate through the city was not simply to make a journey, it was to journey for a reason. That GoogleMaps® afforded Johnny novel possibilities in navigating his way across town cannot be separated from his reasonings to do so at the outset, nor can they be separated from the other social processes unfolding alongside.

It is true that the possibilities and limitations of these mapping interfaces were subject to the affordances of the mapping technologies involved. These practices would simply not have been possible without a smartphone, software and the codes which run then. Nor would they have been possible without the broader reliance on GPS technology and the phone companying providing the service. Moreover, these practices would not have been possible were it not for Johnny’s [tech-savvy] ability to carry them out whilst traveling through a bustling city. For others, such physical and cognitive dexterity in traversing the city whilst switching quickly between apps, tasks and social situations, may not come so easily. On the other hand, Johnny’s navigational practices were also limited by the digital mapping technology he was using, his own capabilities, and the place in which they factors came into play. All maps limit the possibilities of mapping interfaces in that they can only show a representation of the world; heavily skewed by the rationale of the map maker (Crampton, 2001; Wood, 2010). Johnny’s reliance on GoogleMaps® for navigation limited his experience of traversing the city in other ways.

The context for Tom’s navigational practices had a different affect on how digital maps were used. For Tom, driving was a meditative exercise of sorts. He was aware of his actions but used the practice as a way to switch off from almost everything else. A typical journey usually involved him turning the radio
on and tuning-out to the rhythms of driving. In addition to noting the convenience of GoogleMaps® for navigation, which was presented on a smartphone attached to the windscreen in front of him, he also commented on how the device helped him to achieve the ‘driving zone’ he wanted to be in when making a journey by car. In using the device, he turned off the voiced instructions and chose the most basic view, which showed his immediate route and the time it would take him to arrive at his destination.

Driving gave Tom the necessarily escapes he wanted in everyday life. It was a time in which he was forced to focus his attention on the road and not on work, or similar stress-related areas of his life. In essence, the enclosure of the driving environment was used in conjunction with the technology available to create a desired zone in which he could escape the world, whilst simultaneously passing through it, between meetings. Using digital maps for navigation, he said, meant that he did not need to worry so much about which route to take as all this information was given at a glance. It was one less thing to think about in his efforts to create his desired driving zone. Whilst digital maps were only one of the technologies used by him (we might also consider the digital radio and the car itself), I suggest that this mapping technology was actively used to tune his own driving experience. By using it, Tom was able to assemble an embodied sense of driving that was, partly, of his own making. To use a paper map would not have given him the same affordances, nor would it have created the same sense of place that he wanted when driving. If nothing else, this shows how, for Tom, navigation is a socio-technical practice that is also bound-up in his desire to achieve a particular embodied state of being.

The context for Tom’s practices of navigation is key here, as is his personal preferences for driving. Not all drivers would drive for the same reasons using the technology available to them in the same way. As a mapping interface, it can be said that digital maps afforded Tom the possibility to tune his driving zone in the way that he wanted. Nonetheless, much like Johnny’s navigational practices Tom’s practices were also confined by the representational limits of the maps in question, as well as his ability to use them. For instance, at junctions with diversions in place, Tom was forced out of his ‘zone’ to juggle between viewing the map and looking for road signage. Moreover, because
Tom was colour-blind, it meant the map colours used to indicate levels of traffic meant very little to him. As a result, he would often find himself backed-up in a traffic jam that may otherwise have been avoided. Furthermore, these mapping interfaces were subject to the possibilities and limits of the practices of driving. In well known parts of town, the presence of digital maps made little difference to creating these desired zones. Such zones were often illusive and easily broken by elements beyond his control. For example, by the inappropriate behaviour of other motorists.

Conclusion
Digital technologies are increasingly coming to affect the spatial practices and everyday experiences of place, yet there has been relatively little research which describes these experiences from the perspective of those living them. In an effort to rectify this, I have used this paper to give an insight into how common practices of navigation have been affected by digital mapping technology. Highlighting a holistic understanding of navigation in the digital age, I have used a framework called mapping interfaces, developed from recent theories of the interface. By doing so, I have argued that the affects of the digital should be understood from the perspective of culture and practice.

*Mapping interfaces*, I have argued, can be defined as dynamic zones of possibility and limit that unfold ontogenically between users and maps of all kinds. They are produced by the coming togethers of inter(facing) surfaces, but they are not to be confused with the material and representational surfaces of maps.

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27 Whilst I use this framework in relation to digital maps for the purpose of this paper, it is also applicable to mappings of all kinds. *Mappings* take into account a wider range of spatial representations than simply those which are graphically represented in the typical fashion commonly understood as maps (Cosgrove, 1999). I define mappings as all of the possibilities of knowing and representing the spatialities of the world. These include those represented by speech, gesture and practice as well as those represented more formally on paper and screen.
In unpacking two instances of navigational practice through the *mapping interfaces* framework, I have examined the role that digital mapping technologies play in everyday experiences of place. Digital mapping technologies clearly have an affect on how such mapping interfaces unfold, and indeed on how everyday experiences of place unfold. They offer affordances to navigational practices which would not be made possible by other forms of mapping. The form, dynamic properties, interoperability and GPS capabilities of digital mapping technology offers users possibilities that were once limited by analogue mapping technologies. Nevertheless, as I have also shown, practices of navigation do not unfold in isolation. They are socio-technical practices in which digital maps play just one part. Why people navigate, who people navigate with, and where people navigate to are but three of the factors which contribute to the unfolding of *mapping interfaces* around the practices of navigation.

**References**


