LITERARY GEOGRAPHIES

Linking Text and Maps: Annotation as a Critical Tool for Teaching in the Spatial Humanities

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Abstract:
In this paper, we explore the technical and educational possibilities of text annotation as a means of enabling students in Higher Education to explore the spatial and geographic information, references and knowledge contained within text. We base this on a comparative discussion of two teaching methods, one using analogue annotation using pen and paper to produce visual maps, and one using digital tools and methods for the same purpose. We show that both methods highlight that maps based on text are products of structured information, and that developing practices for correspondingly structured annotation helps students to interrogate this process. We argue that structured spatial annotation in a digital environment provides a highly effective means for students to explore textual spatiality beyond simply pinning its toponyms to a map as points, thus encouraging critique of the kinds of digital map they are familiar with in their daily lives; and that using digital gazetteers for teaching enables powerful new forms of collaborative teaching.

Keywords: Spatial Humanities; pedagogy; annotation; gazetteers.

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Introduction

The use of maps to explore text, and to explore geographical information contained within text, is a major subject of teaching and research in the Digital Humanities. In fact, the relationship between maps and text forms an elementary strand of the 'Spatial Humanities', a field closely related to Digital Humanities, which is usually related to the use of digital methods and technologies such as Geographical Information Systems (GIS) to explore the spatial dimensions of humanities research materials, of which text is predominant (Murrieta-Flores, Donaldson and Gregory 2016). The term 'Spatial Humanities' first appeared in a major publication title in 2010, *The Spatial Humanities: The Future of GIS in Humanities Scholarship* (Bodenhamer, Corrigan and Harris 2010). Following Bodenhamer et al, we consider the Spatial Humanities to encompass the methods and techniques which enable research into the geographical aspects of text, visual and material culture and, more recently, human creativity; especially when these are integrated with digital technologies including, but not limited to, GIS. Conceived in this way, the Spatial Humanities have become increasingly visible in Higher Education, and the question of how it should fit into the pedagogical structures of HE discussed (Bodenhamer and Gregory 2011).

Place and text, including the reading of place in textual sources and the geographies of text production, is a key concern of Literary Geography (Hones 2008: 1302). In the traditions of Digital Literary Geography, these processes can be viewed reductively as the mapping of place references as coordinate points, or 'georeferencing' (Fleet, Kowal and Pridal 2012), or the digital analysis of text for its literary, critical and discursive significance (Cooper, Donaldson and Murrieta-Flores 2016). Three closely related methodological questions cross these applications (and more strands of the Spatial Humanities besides): how can geographic references in text be *identified*; how can they be *represented* and how can they be *interpreted*? The first step of all of these is the process of *annotation*: reading the text, identifying references to place (or space), and then performing some form of intervention on the text to make it possible to retrieve, analyse or visualize the references. We argue that these are not just key questions for Spatial Humanists, but that the ability to approach and solve them are also key theoretical concepts and practical skills for students (and practitioners) in all fields of Digital Humanities. Annotation is always a product of reading; and reading a map, after all, suggests that the reader is equipped to make use of the grammars and vocabularies of cartography, and that they can draw on the map to generate the same kinds of information, knowledge and interpretation that, in other contexts, are associated with reading. In other words, just as one must first learn how to read before one can first browse, and then understand, the plays of Shakespeare (for example), one must first understand the mechanical processes of how places and spaces are constructed, imagined and communicated in text before one can explore the values, messages and interpretations behind them. As well as being a method which (potentially) crosses both maps and texts therefore, annotation is a key – and complex – skill in the Spatial Humanist's toolkit. Here, we seek to place this skill in a pedagogical context, and to explore how it can be developed using Linked Open Data (LOD) gazetteer approaches.

As in Digital Humanities (Hirsch 2012), teaching in the Spatial Humanities has not historically been accorded the same importance as research. As a result, a formal set of frameworks for Spatial Humanities pedagogy is lacking. The development of such a pedagogy is further constrained by the practicalities of institutionalization in DH and SH, which strongly reflects resources and priorities at a local and institutional level, where the use of technologies such as GIS at both postgraduate and undergraduate level is deployed in support of practice-based teaching (Chen 1998; Mcginn and Duever 2018). In that sense therefore, it is impossible to discern a distinction between *training* in the skills needed to execute spatial annotation tasks correctly, and *education* in the broader and more discursive sense, which deals with the processes of identification, representation and interpretation.

Training versus education

The distinction between *training* in the use of technologies such as GIS, and *education* in the Spatial Humanities, where the theory and background of how these technologies can be used to understand and theorize textual space, is essential to this discussion. We take the former to refer to technical proficiency in digital tools and their application, with a certain agnosticism as to how the analysis is used or applied. The latter, on the other hand, refers to the capacity for critical interrogation of the spatial aspects of humanities material such as text, images etc, as described above. Both bring distinct classroom challenges, which fundamental definitions of the terms involved bear out. 'Training' is defined in the *Oxford English Dictionary* (sense II.c) as '[s]ustained instruction and practice (given or received) in an art, profession, occupation, or procedure, with a view to proficiency in it'. The emphasis on 'increased proficiency' suggests the acquisition of specific skills and activities which results in the trainee having increased ability in the use of those skills. 'Education', on the other hand is defined (sense 3) as '[t]he culture or development of personal knowledge or understanding, growth of character, moral and social qualities, etc., as contrasted with the imparting of knowledge or skill' (Oxford English Dictionary 2021, emphasis added). Most studies which explicitly address teaching within the Spatial Humanities acknowledge that successful practice requires both educational and training components, whether implicitly or explicitly. For example Bodenhamer and Gregory (2011: 244) define the optimal outcome of spatial pedagogy as the fostering of 'spatial thinking', which is: '[v]aluable for humanists because we are drawn to issues of meaning, and space offers a way to understand fundamentally how we order our world'. Thus, 'spatial education' in the humanities is not merely concerned with developing technical skills in the use of GIS, or other mapping technologies, or even a greater technical insight into how geographic data works on the Internet. Its aim is to foster the critical frameworks needed to interpret and understand place as expressed, recorded and constructed in the human record.

A critically-grounded understanding of place mediated by the Internet, based on the acquisition of both technical skills and critical capacities, is linked to the broader idea of *spatial literacy*. Spatial literacy is a person's ability to navigate and understand their physical or informational environment using location-based information from both formal and

informal sources. It is particularly important in the digital age, where much day-to-day decision making, including consumer behaviour, navigation and social relations are informed, one way or another, by locative media. Spatial literacy is cited by official agencies as a desirable benefit for those at all stages of their education, from pre-university to postgraduate. Spatial literacy features in analyses of school curricula strategies, for example the US National Research Council's 2006 report Learning to Think Spatially: GIS as a Support System in the K-12 Curriculum. The report proposes spatial concepts, tools of representation and reasoning processes as the 'components of spatial thinking' (Bednarz and Kemp 2011: 20), which spans conceptual, theoretical and practical approaches to understanding location, and location's significance within human media of discourse such as text. This is important for a range of life scenarios, with undertones of social, cultural and even moral values. Bednarz and Kemp (20) state that 'spatial literacy is becoming tightly linked with citizenship', a view which implies that a citizens' own 'complex and culturally relativistic view of space' (Bodenhamer and Gregory 2011: 244) is an important part of a of their ability to navigate, and contribute to, their culture and society.

Teaching students the practice and theory of interrogating text, and the geodata text contains, via annotation mediated both digitally and non-digitally is therefore both a key educational outcome and, less directly, of benefit to society. In this paper, we compare two classroom techniques for generating and representing spatial data from text using annotation. The first, a module of the Digital Humanities MA programme at King's College London, asks students to construct visual maps from text containing complex spatial information by critically evaluating the information and its nature. In this exercise, the students develop annotations of a given text, and process these into visualizations with pen and paper. The second case we examine employs annotations generated semi-automatically and linked to a digital suite of tools and data infrastructures. This is the *Recogito* platform, a collaborative, digital text-to-map annotation tool (Barker et al. 2019) which has achieved significant traction in Spatial Humanities research. In developing this comparative discussion, we draw attention to the ways in which digital research infrastructures can be drawn in to the service of Spatial Humanities pedagogy for both theory and practice by expanding scope for collaboration in (and beyond) the classroom; and making available to students a wide range of formal analytical functions which they can use to relate text and maps together. However, we stress the need to retain the critical discursive frameworks which have been produced in the Spatial Humanities in such teaching. We thus highlight the importance of allying 'spatial thinking', in Bodenhamer and Gregory's phrase, with agile digital infrastructure as a key component of the emerging Spatial Humanities teaching agenda in Higher Education. Finally, we present an argument for how digital infrastructure, in a Spatial Humanities context, contributes to the development of students' critical spatial literacy.

Both our case examples stress the nexus between theoretical and practical learning: in the vision of Spatial Humanities pedagogy for which we argue, the two are indivisible and mutually reinforcing. This is supported by more general observations on laboratory teaching. Empirical research on practical pedagogy has shown that students who are

enrolled in laboratory style classes perform better overall than ones who enrol only in lecture classes – 21.1% according to Nelson, Huysken and Kilibarda (2010), who argue that approaching and solving practical problems better equips students for the more 'traditional' forms of learning which take place in theoretical/lecture-based courses (47-49).

Below, we describe how the practical and creative advantages of the laboratory-style classroom can be linked to theoretical approaches relating to textual research questions. In both cases, there is a functioning visual output of one sort or another, which students can then document, discuss and reflect on. Furthermore, the intellectual relationship between lecture and laboratory fosters a culture of self-reflective feedback for students, both individually and in the group, and capitalizes on the power of laboratory sessions (seminars) to deepen theoretical understanding.

Close reading with pen and paper

The first case, based on manual annotation, draws upon travel literature as its subject material. Travel writing is a genre which, perhaps unsurprisingly, has particular currency as a subject of study for spatial humanities scholars. After all, a text with an authorial voice whose primary aim is to capture and convey the experience, geography, physical characteristics and human phenomenology of place is bound to raise interesting questions about the relationship between that text and visual maps of the places it describes (Murrieta-Flores 2010). One example of the travel writing genre which has been widely discussed in the spatial humanities literature is William Least Heat-Moon's *PrairyErth* (1991), a detailed account of daily life in Chase County, Kansas, written as Heat-Moon travelled through and observed it. It takes the form of a set of interviews, descriptions, travelogues and reflections, with the narrative moving through a series of 'quadrants', square areas of the region defined arbitrarily. Heat-Moon describes this text as a 'deep map', although whether such a description best applies to the text itself, or to the processes through which it was created, is an open question (Roberts 2016). To consider the text as a potential vehicle for cartographic information, students are pointed towards the distinction identified by Caquard (2011: 2) between 'grid maps', which display the geographical/cartographical structure *of* place, and 'story maps', which relate events that happen, or happened *in* place. The discursive and site-specific nature of the Heat-Moon's writing provides an ideal environment for students to explore this distinction, and to consider the following questions, which they are set at the start of the class:

1. What places/spaces does the narrative describe?
2. At what points is this narrative told, and how might these affect the way we (as least Heat Moon's readers) understand these places and spaces?
3. How might we apply Caquard's distinction between "grid maps" and "story maps" in this passage?

These questions guide and direct students in the setting up of a 'schema' for approaching the text, throughout the range of sub-questions they are designed to provoke. What kind of places might the text be describing? Will there be dialectical or linguistic variations in the terminologies used? What is meant by 'points at which the narrative is told' (this question is designed to encourage students to consider that the acts of reading and writing represent stages at which cognitive spatial knowledge is created – and that the representation and interpretation of any one place is likely to change significantly as it moves through these points). The schema helps to frame these questions.

The passage students are given is Chapter LVXII, *Matfield Green*, which describes an interview with a retired worker on the Santa Fe railway called Fidel Ybarra. In recounting the history of his life, Ybarra draws a map, a process which Heat Moon describes in the narrative. The notion of a map which is conceptualized from memory in the mind of an actor, drawn by that actor, and the process of drawing described textually by a second actor, is a multi-layered source of material with which to examine the process of visualizing space with, by and from text. The aim of the exercise is to set up a critical explanation of this process (see Dunn 2017 for further discussion of this passage).

At the start of the exchange, Ybarra decides it would be easier for him to recount the story of his life by drawing a map. Heat Moon describes the process thus:

> He draws and loses himself in the map, and he forgets to speak, sometimes only nodding an answer, sometimes writing it as part of the drawing … I watch the map fill in. Artless and accurate but for its scale, it is a portrait of sixty years spent along the skinny rail corridors of the county, but it is a trackman's picture: bridges without rivers, curves without trees, villages only sidings with labels lick trackside signs, and Chase with hills, a level place of inclines you can't perceive'. (Heat-Moon 1991: 233-24)

The analysis of the text is carried out collaboratively. Groups of students close read the account of Heat-Moon's conversation with Ybarra and, working together, they discuss the main narrative points in the text, and what makes these points interesting from a spatial point of view. Having closely read the full text of the chapter, students are asked to parse it and identify the key segments which correspond to descriptions of different places in Ybarra's narrative. They agree these collaboratively among themselves, in groups of three or four. Each group then draws the map, as they interpret it, on a large sheet of paper. This provides students with a multidimensional challenge of how to visually annotate the text, which narrates the process of a map being drawn to illustrate personal memories, and how visual mapmaking can help them distinguish the different narratives therein. Using their collaboratively agreed spatial segmentation of the text, the students 'recreate' Ybarra's map (Figures 1 and 2, which illustrates the outputs of this exercise, from a class that ran in the 2015/6 academic year).

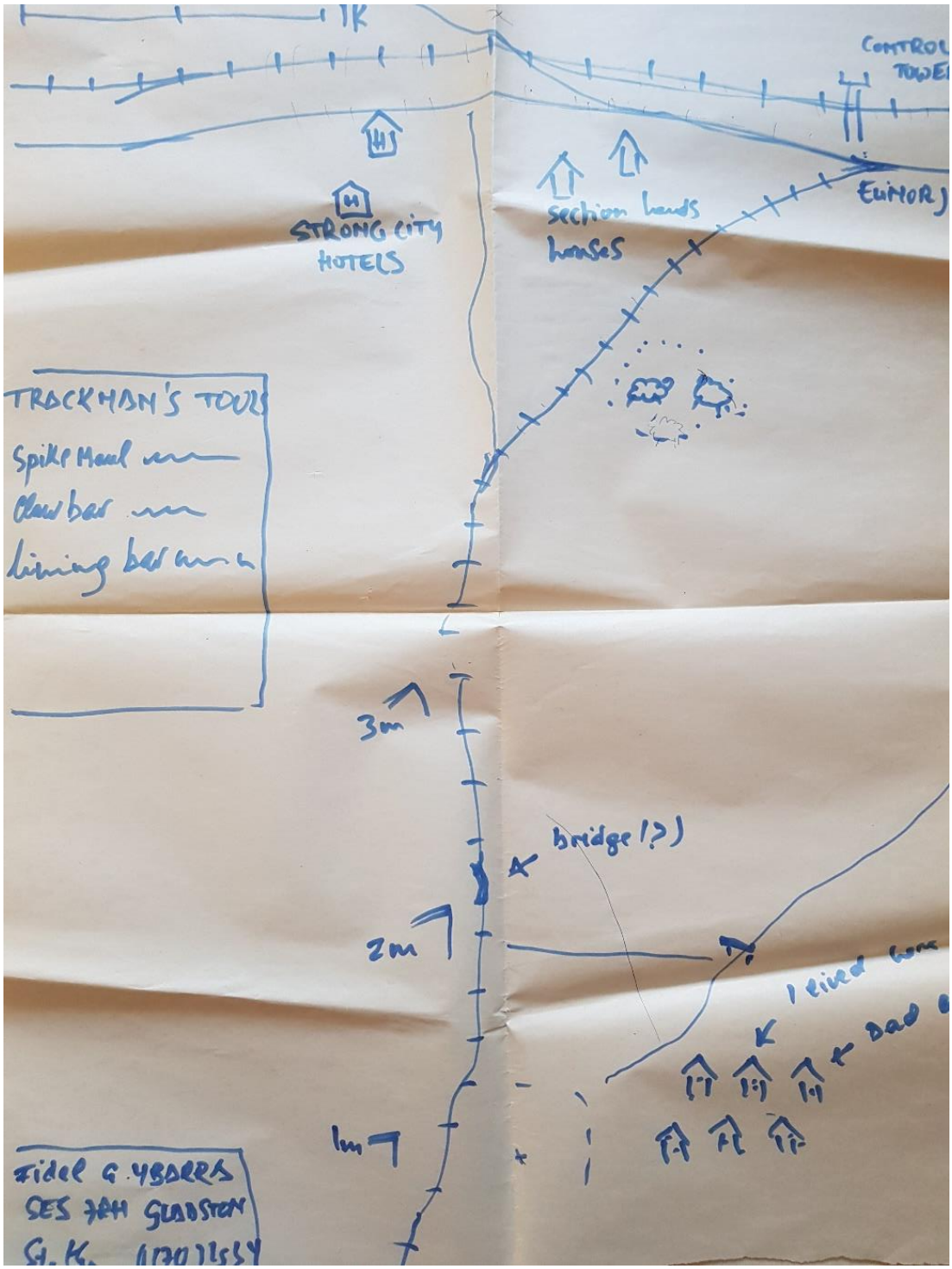

Figure 1. Visual reconstruction of map of the Santa Fe railway by KCL students.

They are asked to think of the process of creating this map as a series of visualization decisions (see Beacham, Denard and Niccolucci 2006), and are subsequently asked to justify these. In this exercise, students are required to think about how they might categorize different 'spatially significant' sections of text. Do they refer to a direct reminiscence or observation, is it a general spatial observation or a specific one; does it

involve Ybarra himself, or someone else (such as a member of his family); or does the segment relate to particular types of landscape feature? In figure 1 for example, it is possible to see where the students have begun to develop a rudimentary feature typology ('bridges', 'houses' etc). This has assisted the students in framing and presenting their map.

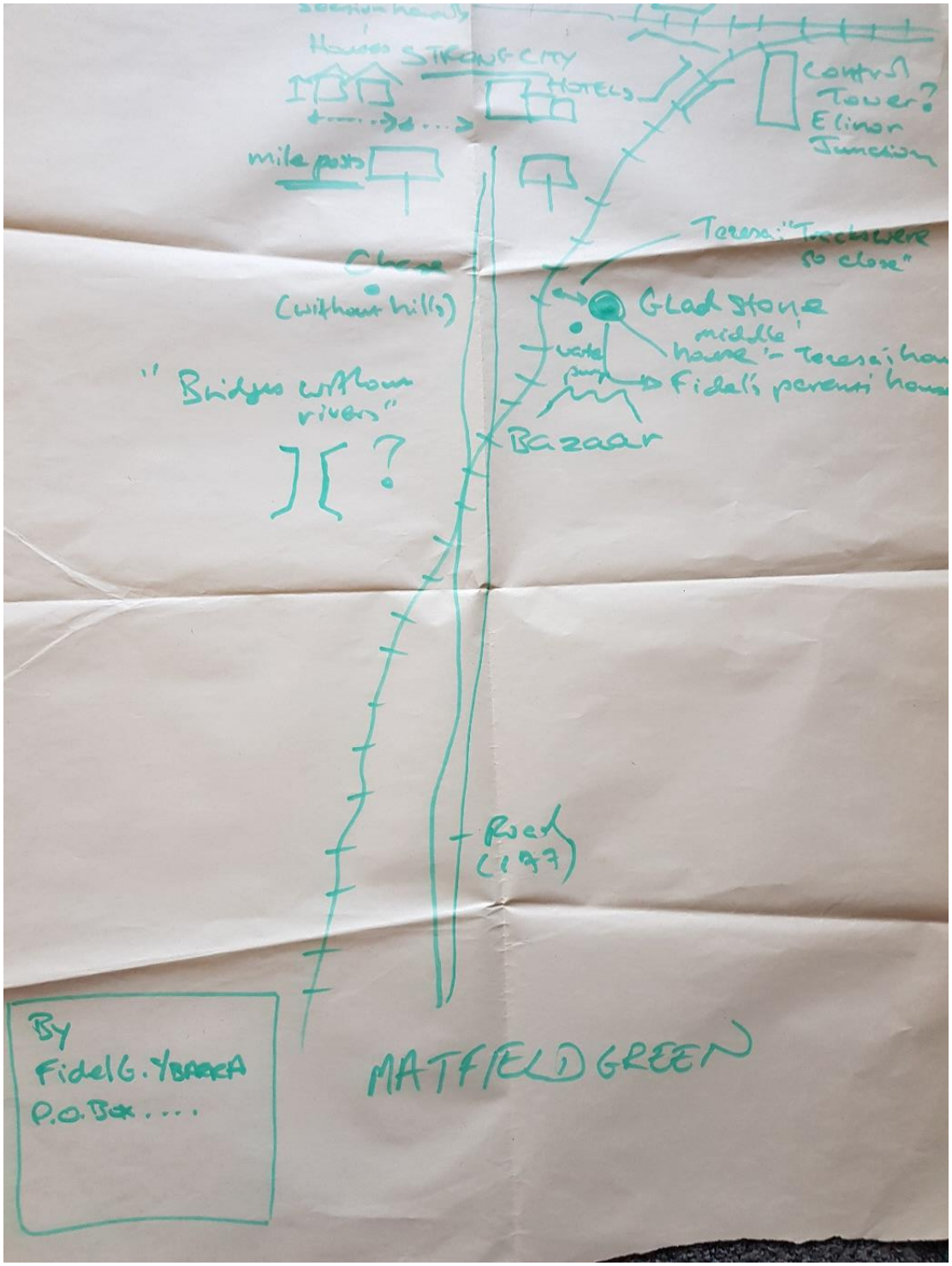

Figure 2. Further example from the same exercise.

Afterwards, they are asked to justify each segmentation decision and interpretation they made to the class. This exercise demonstrates, at a minimum, that spatial annotation of a text is a complex cognitive process. The first question posed, what places are described in the narrative, corresponds to the process of segmentation, encouraging the participants to think about how places might be described abstractly and without, as well as with, place names. The second question encourages them to think of the chain of narrative in terms of at least three points of relating: the drawing of the map by Ybarra, the observation of this process by Heat-Moon, and their own reading of Heat-Moon's narrative. The third question encourages them to challenge the 'measurability' of the places described. All of these are crucial critical points to consider when they come to construct their own cognitive visualizations of the narrative.

Some further broad observations, drawing on the process, and on figures 1 and 2, can be made. Firstly, it is significant that students tend to structure their interpretation of the map, as conveyed in words by Heat-Moon, around references to the railway track, rather than the named locations Ybarra describes from his life. This is evident from the way in which the track's linear form dominates each of the maps, with descriptions (which are often textual, drawn via direct quotation from the prose itself) appear around it, as annotations. They draw on the visual imageries where Ybarra describes hammering in the spikes to repair the track, and places he has lived, 'he touches his pen to the building and leaves a mark, and soon they are full of inky points like little residences' (Heat-Moon 1991: 233). Yet it is clear from the text itself that the focus of Ybarra's own recollection shifts between such places and the places where he had certain eventful, or event-laden experiences in the course of his 60-year career as a railwayman. The process of segmenting and categorizing the text, and focused reading based on the sequences of experiences described, exposes students to the need to perceive both the physical linearity represented by the railway, and the events linked to it by the narrative. Raising distinctions such as this in the discussion afterwards highlights the tensions that extracting geographical information from a text can create during the process of reading and encourages students to think more critically and deeply about their own reading practices.

Recogito

This exercise, while interesting as an introduction to the nuances of thinking texts through spatially and forging collaborative agreement as to the spatial meaning of text, has several practical and pedagogical limitations. For example, it is not easily extendable to larger sets of participant, so the concept of 'collaboration' is limited to small groups working synchronously. Nor can the results of the exercises be stored or re-used: every interaction of close reading and visualisation decision making must begin from scratch. Being pen and paper analogues, the output maps cannot be analysed as formal data structures, or linked to other, possibly relevant, representations, whether visual or otherwise.

This is where we bring online text-to-map annotation platform Recogito into our discussion. Recogito is well-known both as an example of a Linked Open Data generation

infrastructure, and as a digital annotation tool. Such infrastructures can be employed to enhance and deepen the learning practices addressed in the Matfield Green exercise, both in terms of the scale of what is possible, and in terms of formal analysis. They significantly increase the scope for *collaborative* annotation which is (or should be) key for the acquisition of spatial literacy, and which opens up classroom exercises to larger and more analytically formal learning practices. While the three questions which students are set at the start of the exercise are discursive and critically oriented, at a mechanical level, the exercise itself simply requires students to identify places mentioned in the text as points on a map. The critical complexity, and linking of the process to theoretical grounding in the literature, such as the grid map/story map distinction, is developed in the context of the class discussion and reference to the lecture that preceded it. The process is thus highly site and context specific. The Recogito platform starts from a similarly simple premise: it supports classroom-based mapmaking exercises, where sections of text which contain a spatial reference – such as a toponym - are identified and linked to an equivalent piece of geodata, such as a gazetteer entry, which might (but which does not have to) include the attributes of a latitude and longitude. However, it supports linkable and storable annotations of text, which allows it to go further. The spatial information can be created, captured, structured and – above all – represented as data through the implementation of more sophisticated and nuanced practices of textual annotation, which require deeper thinking through of what a place is, what the author might have intended, and how it might be visualized beyond a simple map marker. Furthermore, learning how to undertake deeper explorations of textual spatiality of this kind, to augment or explore text rather than simply represent it, requires more sophisticated, and potentially 'non-representational' approaches to mapmaking (Rossetto 2013); whereas in the non-digital Heat-Moon exercise, the map produced is *purely* representational. We argue therefore that the use of digital tools considerably expands the pedagogical potential for exploring text-map links with students.

Recogito in the classroom

The use of Recogito in the classroom to annotate historical text is also based on collaboration, that may take place either synchronously or asynchronously. In Recogito-based exercises, students are divided into smaller groups, where they have to take a number of preliminary decisions that are both methodological and practical. First of all they need to identify what aspects of the text they are interested in investigating. Secondly, they reflect on how they can express such information using the means that are available in Recogito including tags, comments, relations, and visualisation options. For example, reading historical travel literature, the students may use tags to distinguish between places visited and places remembered in the narration; or relations to express movement to and from one place to another. During the exercise, students also have to decide how to split the tasks between them, and agree on details such as what is the standard spelling of a tag or what vocabulary to use.

Case examples illustrate that with time and application, user/students can significantly deepen their engagement with the textual material they work with, focusing more critically on the document they are analysing. For example, one graduate student in the academic year 2017-2018, Rueken Nesli, has used Recogito, in combination with GIS technologies, to explore spatial dynamics in gender studies (Figure 3). She annotated and visualised the letters sent by readers to the *Kadınlar Dünyası*, a magazine active in the early 20th century that promoted itself as open to the participation of 'the women of all sorts'. The 136 letters to the magazine were divided by the student into four categories, according to different relationship with the publication, mapped geographically and last, overlaid.

In the words of Nesli:

> In the course of this project my impression turned to be that when we look at the pages of *Kadınlar Dünyası*, we are actually looking at an overlapping spatiality, constructed by separate variables, indicating different intentions and presences. Mapping, in this sense, helped me to think about space and spatiality. And I think it won't be misleading to say that constructing these maps, trying to visualize the spatial dispersion of the magazine and deconstructing and thus reconstructing the maps according to the context in which women express themselves, and step in to this realm in different ways indicate that they experienced the emergence of the magazine, or this public space, differently.[1]

Nesli's concern was to assess how women of 'different sorts' received and *interpreted Kadınlar Dünyası*, which was the first periodical in the Ottoman world exclusively aimed at women. She continues:

> While this study is still in progress and very abstract, I perceive Kadınlar Dünyası as an exclusively female public space that was constructed by the act of publicly writing and being women, which indicates corporal (bodily) space. As a result, being women there and then, reveals the agency of corporal space, female body-being on the ground of the dialectic unity of physical, mental, and social space; perceived, conceived, lived.

This perspective captures the key element which, we argue, emerges from both of these case studies, which is the encouragement to 'think about space and spatiality'.

Another example of annotation leading to new insights comes from a graduate student (academic year 2018-19), Sefer Soydar, who has used Recogito to investigate the spatial information in a corpus of historical documents. Pious endowments (*vakıfs*) are a significant institution in Islamic culture, with social, economic, religious and intellectual dimensions. They often acted as legal tool to offer protection from the possibility of confiscation, thereby creating quasi-private property. The records in the *vakıfs* provide elaborate data about the fixed and liquid assets and donations of the endowment, such as

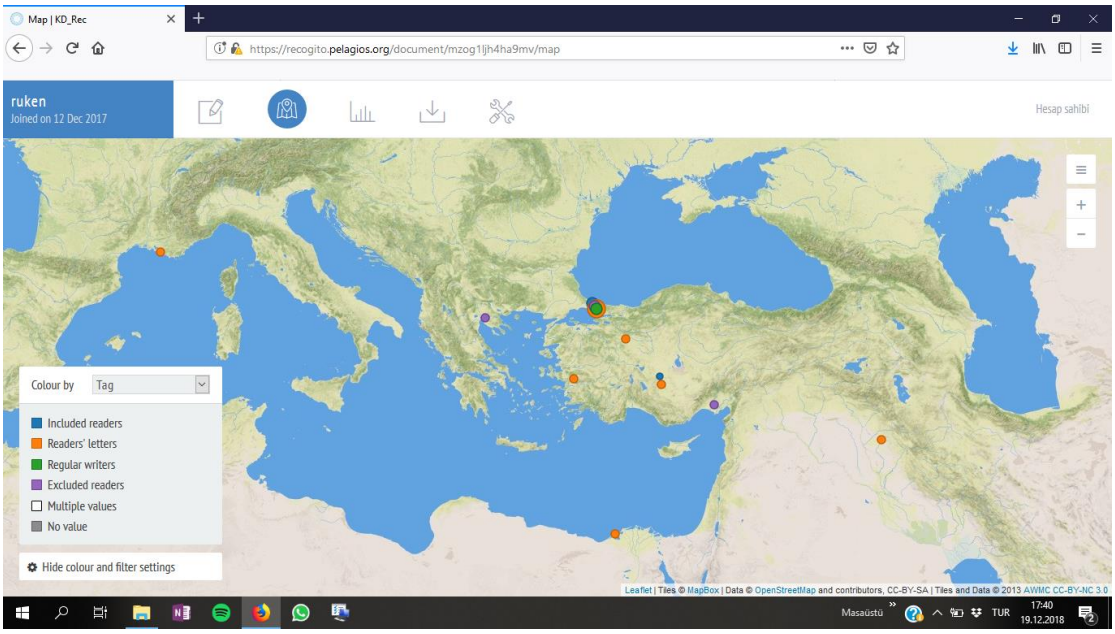

Figure 3. Mapped visualisation of letters sent by readers to the *Kadınlar Dünyası*.

bridges, mills, fortresses, or shops. They also include revenues and expenses like salaries to various professionals: teachers, imams, cooks, or workers. As described by Soydar:

> One of the key research questions was rethinking centre and periphery as analytical categories, thus challenging traditional understandings of the relationship between the two. In this spirit, it enquires into the choices of places made by Köprülü Mehmet Pasha for his donations, investments, or expenses, and tries to understand their spatial logic. In this sense, the distribution of the wealth of the endowment will be examined in terms of space and spatial relations. What kind of structures did the endowment build and in which provinces, districts, or villages? Were these endowments addressing the needs of different places or were they simply means to provide political capital for Köprülü in the eyes of local societies or indeed the imperial centre, thereby protecting him from his rivals?

There is clear evidence that the combination of collaborative reading, access to federated digital reference material and – above all – a critical approach to creating, critiquing and analysing formal spatial annotation leads students to engage actively, and more critically, with the analysed text or corpus (Figure 5). Spatial humanities laboratories, involving either or both traditional and digital approaches, enable and encourage students in the higher education classroom to look beyond spatial annotations as a simple representations of toponyms as map pins, and experiment with 'post representational' structure, facilitated by the power of the Internet, which allows deeper and more critical exploration of the text itself.

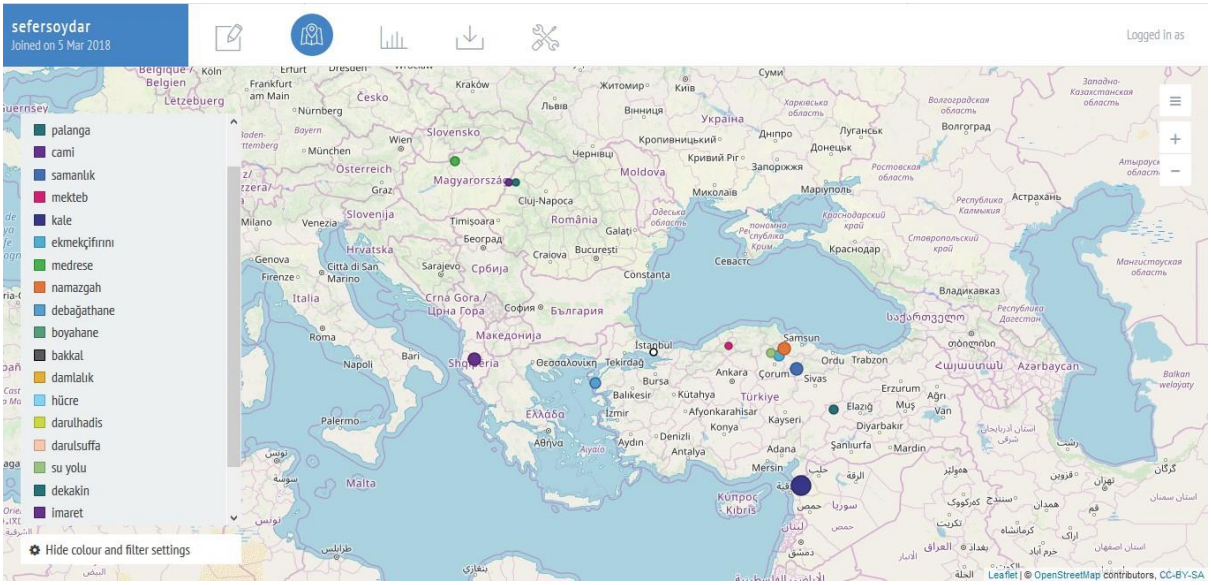

Figure 4. Annotated map of *vakıfs*.

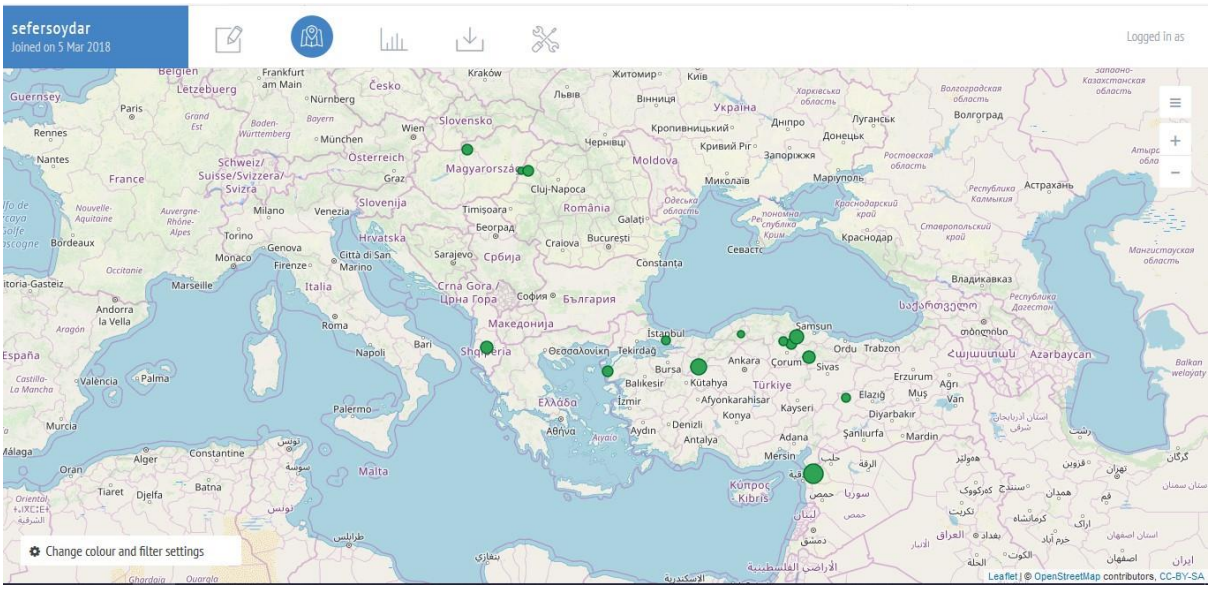

Figure 5. Map output from the same exercise.

Segmentation, categorization and georesolution

As we outlined in the Matfield Green case, assigning categories is a crucial component of the creation of digital annotations. It requires reading the sources in a different, closer way, looking at it not only with the eyes of a reader but with the eyes of a researcher and explorer, requiring close reading and decision making. Recogito enables students to address the issue of segmentation in a far more critical manner. The experimental work with Recogito by a group of graduate students in Classics in the University of Zagreb (under the leadership of Neven Jovanovic), showed, for example, that even the initial task of disambiguating entities, assigning them to the 'people' or 'places' category, proved less

straightforward and trivial than students expected, and made them engage more critically with the ancient source. This unexpected issue generated a debate around the disambiguation criteria during the annotation process, that evolved into a methodological analysis of the concepts of «place» and «person» in ancient texts, with specific attention to all those liminal cases that the semantic annotation highlighted, like, for example, the personification of places or the use of place-names to indicate a group of people (and vice versa). According to the video the students and their teacher recorded for the Sunoiksis Digital Classics programme[2] discussing their experience with Recogito, creating semantic annotations provided them with a better understanding of the text they were using as case study, as well as ancient philosophy in general.

The creation and application of different categories is highlighted in another exercise in Recogito, which compares different textual perspectives and representations of the same place. In one example of this comparative approach, students are tasked to analyse and annotate both Livy's and Polybius's accounts of the Hannibal wars, or five different ancient texts[3] that describe Arabia and its inhabitants. Recogito can create a meta-document that groups together a number of files, enabling comparison. The annotations coming from the various sources are collated and visualised together on the map view. Selecting the 'by part' visualisation option, though, the users can see the provenance of the annotations and associate each of them, by colour coding, to the original file. Places that show a white dot have received annotation from more than one source, thus prompting easily at the comparison of different viewpoints (Figure 4). Applying the same categories to related texts facilitates their compared study and prompts questions about differences and similarities, and about the motivations that have driven the different spatial approaches of the various authors.

Mapmaking is the third crucial step of these case studies. When users annotate a place in a digital source, Recogito will suggest possible matches from the various available gazetteers that are embedded in the system. It would be then up to the students to decide which, of the suggested choices, is the most appropriate to represent the idea of place that appears in the text. As discussed before, the annotations produced in Recogito are created, and visualised automatically, thanks to the immediate and seamless access to a arrays of federated data from elsewhere. Therefore, rather than creating a map in isolation, as a result of annotation resulting from a group-based close reading of an individual text in class, as with the Matfield Green exercise, they are able to explicate, exploit and interact with spatial dataset which already exists within the Recogito/Pelagios ecosystem. This highlights a significant advantage which linkable digital infrastructures bring to teaching annotation and mapmaking skills: instant referencing. A problem which students in the first exercise had to contend with was that they were (usually) unfamiliar with the Chase County geography which the passage deals: Gladstone, Matfield Green, Strong City etc are settlements of which they had not heard, and whose locations they do not know. In most cases therefore, they have to resort to searching mapping platforms such as Google Maps or OpenStreetMap in order to establish the locations of the places referred to in Ybarra's narrative, even relatively (for example where Matlock is in relation to Strong City).

Recogito, however, draws on federated gazetteers to allow students to search existing datastes for such places through the process of *georesolution*, in real time.

Georesolution is a major topic of research in the spatial humanities (Hill 2009); and it is the most interactive function in Recogito. It involves the association of a place reference, in historical literature or on an image–like a map for example–with an entry in one of the available gazetteers, such as the Pleiades Gazetteer of the Ancient World[4], GeoNames[5] or the China Historical Gazetteer[6]. When annotating places, students often are prompted to select the most appropriate option from a list of possibilities, that are deemed the most likely to be correct by Recogito internal algorithm. To facilitate and guide the choice, the various possibilities appear also as points on a map. Especially when working on historical sources with users that are not specialist of that time period or geographic area, the identification of the most suitable gazetteer entry for a place reference includes a component of exploration and discovery that borders with playfulness. As seen with the previous example, the search for the right past place often becomes a collaborative small 'investigation' that involves disambiguation by proximity with other more familiar places, some historical reasoning and, most of all, furious Google searching. All these activities seem to enhance the engagement of the students with the historical sources and, indirectly, contribute to better position those sources into a geographical and historical context.

The georesolution process, including its challenges and the consultations around it, helps the students, especially those at an earlier stage of their education, to better perceive the link between places of the past and places of the present: where the continuity lies as well as where the most apparent changes happened. Also, in particular when looking at ancient places, the process of assigning them coordinates makes them less vague and 'distant' both in time and space, and more part of a continuous process of change and evolution.

Compared to the process of placing places on an existing map, as it happens with GIS applications or APIs like Google Maps, the information in Recogito's geo-visualisations are almost gradually 'unveiled'. The map is progressively filled with the references that appear in the historical source and that are 'discovered' by the users. The map-based visualisations in Recogito also offer an 'at a glance idea' of the relevance of a specific place in a particular source, showing different sizes of the dots on the map, according to the number of annotations they received. Recogito's maps always maintain a very strong relationship with the annotated source, that can be accessed from the map itself, connecting the user directly with the annotations related to a specific place. Clicking on the dot, the students can discover how many annotations of that place appear in the document, see a preview of all the annotations, browse them one by one and to go back to the original annotation to check or edit it.

Discussion and conclusion

In this brief survey, we have explored two parallel cases below of how students' capacities for exploring and understanding the spatial components text can be enhanced, both with and without digital tools. We have highlighted the significance of structured spatial annotation as a means of exploring a text's spatiality beyond simply pinning its topnyms to a map as points, and the importance of collaboration and categorization in forming an enhanced spatial understanding of a narrative. We also highlight the advantages of a digital tool which simultaneously facilitates these processes and allows the annotation exercise to draw on existing gazetteer datasets. Most importantly, we argue that bringing digital tools and infrastructures, linkable gazetteers, and annotatable online maps into the classroom, opens up a wide range of possibilities for broader collaboration, structured data analysis and the methods needed to undertake it. There are of course many differences between making maps with pen and paper, and making maps with computers, some obvious, some less so. As Ingold (2016: 85-87) points out, the sketch map is the product of a gestural trace upon a surface, built up as the line flows over the page; whereas a cartographic map produced mechanically is imprinted. However, when the map is based on the narrative, or events, described in a text, then there are significant commonalities between sketch maps (of the type produced in the first example) and computational maps (of the type produced in the second). Both are based on *structured information*. In both cases, we show how students can acquire both discursive and technical proficiency, given the right kind of laboratory teaching environment.

Learning how to formulate a spatial schema for a text, and then annotate it based on that schema, is a highly effective route towards understanding its spatial significance. Although annotation long predates digital approaches as a methodological practice, with digital tools, annotations can be counted, analysed, visualised, collated and compared, providing a whole new set of lenses to analyse documents, and enrich our understanding of the text-map categories described above. In a *semantic* annotation context, more specifically, an annotation involves creating a connection, that is both technological and informative, between something in a document that is human-made and, therefore, ambiguous, to an authority outside the document, such as a formal list of place references (a gazetteer) that is unambiguous. However, a such a link/statement merely affirms the annotator's confidence that the gazetteer/authority is trustworthy, it does not, in and of itself, confer any greater level of confidence or accuracy beyond that, in much the same way as a citation of secondary literature in an article affirms, rather than proves, the point being made.

The range of possibilities afforded for teaching by infrastructures such as Recogito are both an opportunity and a challenge. As the *yafkis* and *Kadınlar Dünyası* examples described above both show, the use of digital annotation and georesolution provides for the serendipitous discovery of spatial themes and knowledge within text. However, both cases are driven by user/students who were already familiar with the material and accomplished in the historical method and theory needed to interpret it, and with the

language skills necessary to work with the sources. To maximize the impact of digital gazetteer tools for formal pedagogy (and to avoid technological determinism) for students with less previous grounding in the material, the capabilities of the tool must be placed in the context of a theoretical grounding and literature - as with the 'grid map/story map' dichotomy given to students before the Matfield Green exercise.

Teaching Spatial Humanities therefore does not equate to mere training in the available digital technologies, but requires the technical skills to be encased into a meaningful methodological context that exploits the digital means in order to ask humanities research questions. This cannot be done in a vacuum. The Spatial Humanities disclose their full potential when they are related to other disciplines and applied to relevant source documents. Finally, learning Spatial Humanities skills and methods gives students useful tools to investigate spatial and historical phenomena, but is also a means to gain a more critical understanding of sources and to develop a more engaged approach to textual analysis.

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Notes

[1] Both Soydar and Nesli presented their research at the Linked Pasts Symposium in Mainz, in December 2018. Invited by the authors, and with the approval of the module's lecturer, they have kindly agreed to share via email their thoughts on the use of Recogito to investigate historical documents.

[2] See https://github.com/SunoikisisDC/SunoikisisDC-2016-2017/wiki/Annotating-Aristophanes-Ovid.

[3] The ancient authors Ammianus, Strabo, Cassius Dio, Herodatus and Procopius.

[4] https://pleiades.stoa.org.

[5] https://www.geonames.org.

[6] http://chgis.fas.harvard.edu.

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