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Technology, Maps, and Teaching Classics

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INTRODUCTION

The relationship between place and event is critical to the study of antiquity, yet at times this connection is left unexamined by students in Classics courses. Instead maps are employed as a type of decoration to help situate a student within the narrative or philological debate, and discussions of space become secondary to the examination of literary and archaeological evidence. But why and how things happened are fundamentally entwined with where they happened; place and space, that is, help to explain events. By examining the relationship between geography and history, students can and do gain a deeper understanding of the Classical world and thus this approach is beneficial and rewarding¹.

Students in my courses often bring with them a variety of knowledge and assumptions of ancient history recalled from their past studies or popular box office screenings (such as the recent Warner Bros. Pictures, *300: Rise of An Empire*). Too often, however, students do not bring with them a strong awareness of the geography of the Mediterranean World. In addition, they are uncomfortable with using maps as a tool to examine history and when faced with historical narratives, for example Herodotus or Ammianus Marcellinus, the lack of spatial awareness has negatively affected their analysis and familiarity and, as a result, their interest in reading the an-

¹ See Wachowicz and Owens for a general bibliography and summary on the term “space” and the connection between history and place (2013, pp. 127-128). See also Bodenhammer (2010, pp. 14ff).

cient works. Using maps as images to connect students to the narrative, as well as for launching points into discussions, has inherent value. And, providing students with a more interactive and creative tool can open avenues for better student learning outcomes. Although mapping tools are becoming more intuitive and increasingly easy to use, finding the right tool for studying ancient history has not always been easily accomplished². Nevertheless, if the concept of using digital maps and HGIS is put at the front of the pedagogy, the use of these applications as an alternative tool to analyze the past and reconstruct historical space can result in discovery-based learning as long as the choice of tools is not too prohibitive³.

Whether it is the use and applicability of web applications and social media tools or mapping and GIS software, the marriage of technology and teaching has drawn the attention of many in Classics (and the humanities).⁴ New applications have challenged not only the ways in which instructors teach Latin, Greek, and Classical studies but also the manner in which students study and examine the ancient world.⁵ Moreover, the current generation of students is becoming increasingly familiar with the use of technology within and outside of the classroom as course management systems are being developed not only to service distance learning, but also in residential schools in order to extend and enhance the classroom.

The present paper discusses one such union of technology and teaching, specifically the use of mapping technologies within Classics courses, and explores the benefits of creating a hybrid classroom and fostering the special relationship that can exist between history and geography. Working under two different grants over a two-year period, I worked with a programmer and created my own instructor-led mapping tool (called the *Nearchus Project*) to be used in my courses on Roman History, Greek History, and the Classical Languages. I then examined how this mapping tool could serve as an approach to integrate the use of more sophisticated

2 In addition, more sophisticated tools (such as those from ESRI) can take time for an instructor to learn and for students, such a learning curve can be profoundly prohibitive. Instead, *Neatline*, *Google Earth*, *Google's Map Maker*, and the more recent *Tour Builder* offer user-friendly GIS-based applications. *ORBIS*, The Stanford Geospatial Network Model of the Roman World, was an invaluable resource for my students.

3 Mares and Moschek, note that student capabilities must often be assessed when integrating “spatial history education.” (2013, p. 67).

4 For studies in the use of GIS and HGIS in the humanities, see von Lünen and Travis (2013). In addition, game-based learning has also challenged traditional methodologies; see, for example, Travis (2011, pp. 25-42) for methods on using game-based learning in the Classics classroom.

5 For example, see Rydberg-Cox for a discussion on some online and digital resources for ancient Greek and an example of a hybrid approach to teaching ancient Greek (2013, pp. 111-117).

mapping technology.⁶ In this way, I wanted to know if students could benefit from the abilities of mapping technologies to promote inquiry, collaboration, and collect alternatives to the logo-centric presentation and analysis of history. The present paper will discuss both the use of this tool and two case studies from courses where it has been employed. My intent here is to present what we did, what worked and did not, how these experiences led to better learning outcomes, and thus display the benefits and limitations of using mapping technologies in Classics.

TEACHING AND HGIS: THE LANDSCAPE TODAY

In *Placing History, How Maps, Spatial Data, and GIS are changing Historical Scholarship*, Anne Knowles notes that the use of GIS by historians can go beyond the illustrative and, by creating a historical GIS (HGIS), one can gain an intimate knowledge of sources and subject area. Hence, historical GIS can inform research and provide another method to analyze the past.⁷ Bodenhamer argues that by allowing historians to offer and view alternative perspectives, GIS technology can serve as a catalyst for further inquiry and analysis.⁸ Likewise, studies in the use of GIS to create historic spaces have emphasized the benefits of using GIS or GIS-based platforms; with the simplest of tools, the integration of GIS-based platforms, such as Google Maps, “enables even pupils with little experience of spatial historical thinking to recognize the variations between historical levels of spatial representation.”⁹ Such project-based learning can and does inspire curiosity and by using the digital tools, students work with multi-dimensional and non-linear representations of history. Thus, “the dynamic use of data reinforces the skills of problem solving-based learning,” write Mares and Moschek, “and promotes and fosters analytical think-

6 In April 2013 I received a one-year grant from my home institutions (Hobart & William Smith Colleges) for an Innovative Digital Pedagogies Project supported by The Andrew W. Mellon Foundation. This project was a continuation of a Fall 2012 grant for Innovative Teaching supported by the Center for Teaching and Learning at Hobart & William Smith Colleges.

7 Knowles (2008, pp. 2-13).

8 Bodenhamer (2008, pp. 222-223).

9 Mares and Moschek (2013, p. 67).

ing.”¹⁰ Nevertheless, the initial growth of historical GIS was slow,¹¹ but the past decade has seen rapid change and an increased use of historic GIS in research.¹² The benefits for those who use HGIS seem clear enough, yet often the decision is not so much the use of GIS rather the challenges of learning and becoming proficient with the technology, and then teaching courses with it.

Classicists have been producing various forms of digital works such as databases, 3D virtual models, GIS-based interactive maps, games, and more. For example, the *UCLA Cultural Virtual Reality Lab* created digital 3D models of the buildings and spaces of the Roman Forum using imaging software.¹³ Others have used the *Cultural Virtual Reality Lab* and a mapping program, *HyperCities*, to create digital projects that can be used in the classroom. One example, the *Visualizing Statues* project, recreates the religious experience of Rome, such as a procession down the Sacred Way complete with 3D images and descriptions of the statues as they might have once appeared.¹⁴ Similarly, the *Digital Hadrian’s Villa Project* has created a virtual world where users can experience Hadrian’s Villa in a virtual setting through an avatar, walk through the environs and even interact with other characters.¹⁵ These virtual worlds and 3D models allow users the ability to experience recreations of these ancient spaces in more detail. In addition, with these digital tools, scholars and students have opportunities to create representations of spaces where hypotheses can be tested and new approaches to understanding the ancient world and historical phenomena developed.

Beyond the virtual world, Classicists have also generated databases and mapping programs to organize and share data. *Pleiades*, for example, provides researchers with a database of geographic information about ancient world places and names.¹⁶ Linking locations and names with emerging data from users and contributors, *Pleiades* is an open source database that allows scholars to contribute to the data or

10 Mares and Moschek (2013, p. 69). Staley notes that the use of maps allows for data to be represented simultaneously and as such offers a different representation of history than written accounts (2013, pp. 149-150).

11 Gregory and Ell (2007, pp. 15-16).

12 Elliot and Gillies (2009, pp. 6-7).

13 Frischer *et al.* (1997-2003).

14 Favro, Johanson, and Kalas (n.d.). See also Johanson (2012-2014).

15 For an overview, see Frischer (2013). To enter the virtual villa, visit “Hadrian’s Villa” (n.d.).

16 Bagnall, Talbert, Elliott, and Horne (n.d.).

download a dataset to research or create a map.¹⁷ Using this database as well as maps provided by *The Ancient World Mapping Center*, the web-based GIS interface *Antiquity À-la-carte* gives users the ability to create their own maps with data from the ancient world just as someone in Environmental Science might create a map using other GIS mapping tools.¹⁸ Finally, the *Stanford Geospatial Network Model of the Roman World (ORBIS)* calculates communication costs in relation to time and space. As an interactive model, *ORBIS* simulates travel time based on travel preferences such as the time of year, the route, the type of travel (on foot, cart or boat for example) and environmental factors, and then determines the price of travel based on the data and analysis of the price edict of 301 CE.¹⁹ These databases and mapping technologies provide another way to organize, share, and present the spatial data of antiquity with which students can begin to understand the relationship between spatial, temporal and historical information.

Incorporating digital tools such as these within a classroom does affect pedagogy, both one's philosophy and praxis, and although the discussion of using technology and improving pedagogy is not entirely new to Classics, it has made its own unique strides. In 2003, Barbara McManus and Carl Rubino wrote about the possibilities that computer technology, specifically the Internet, had to offer Classics, noting that there would be those who would "fear or disdain the internet."²⁰ But today most faculty seem to have moved beyond discussing if one ought to integrate technology into a classroom and instead are asking how best an instructor can do so. In Classics, scholars have even suggested a need to provide better pedagogical training to graduate students, including ways and resources to help integrate technology into one's courses.²¹ And as Ann McCullough has remarked, it may be important to consider changes to teaching Classics as a more sophisticated pedagogy is needed to teach in today's environment.²²

17 Meanwhile, *The Ancient World Mapping Center* provides an online place for scholars to collaborate and exchange information about the geography of the ancient world as well as cartography and GIS issues concerning antiquity. The *AWMC* also organizes and provides access to maps and resources related to the Barrington Atlas and the mapping tool *Antiquity À-la-carte* (n.d.).

18 *Antiquity À-la-carte* (n.d.).

19 Scheidel and Meeks (n.d.).

20 McManus and Rubino (2003, p. 608).

21 Reinhart writes that it is of "critical importance" that graduates familiarize themselves and learn to teach with technology, and that by integrating technology into the curriculum teachers can provide a more stimulating class that will help Latin "compete" with other languages and maintain student enrollments (2012, p. 124).

22 McCullough (2012, p. 114).

A fine example of the possibilities and challenges of digital pedagogy is the work of the *Digital Cultural Mapping Project* at UCLA. This project explored the use of digital technologies by developing a program focused on the digital humanities.²³ The UCLA project had to consider many issues, but particular to the present paper was how instructors taught the use of digital tools as one method of examining and presenting history without neglecting those traditional methods of historical research.²⁴ The project provided core courses on the development of digital tools, labs on how to use GIS and other tools, then integrated these digital skills and technologies into existing and new courses. The core course therefore provided students with theories, models, and training so that when introduced to digital projects within affiliated humanities courses students were able to choose the right platform for their work.²⁵ In a course on Roman spectacles, for example, students examined the spectacles for the first seven weeks of the course and then, began to develop their own digital projects to articulate a thesis. The course introduced students to hypothetical representations of the past such as historical fiction and digital reconstructions of spaces and thus examined not only the history of the spectacles but also how they have been represented. Equipped with digital training, class lectures and research, students were thus able to create their own projects. As Chris Johanson describes: “one project interrogated large-scale entertainment venues to contend that imperial power manifest itself through an overt control of spectacular spaces.”²⁶ Another group created a 3D model with the image of a blood-stained toga as a prop at Caesar’s funeral to test out their own hypothesis on funerary image manipulation.²⁷ The students, noted Johanson, were able to shift from, “consumers to producers” and were able to synthesize the material from the first half of the course to present their own narratives in the second half of the course; their projects included arguments that could only, said Johanson, be developed by “space-based argumentation.”²⁸

In another course, Roman Architecture and Urbanism, students used a 3D vi-

23 Johanson and Sullivan note that the pedagogical goals of the project were to introduce students to the tools that could, “equip [students] with the form of geospatial, digital literacy,” to provide technical training in the tools in order to be able to contribute to digital mapping in humanities, and to develop critical thinking skills that are related to representations of spatial and temporal data (2012, p. 123).

24 Johanson and Sullivan (2012, p. 122).

25 Johanson and Sullivan (2012, pp. 124-127).

26 Johanson and Sullivan (2012, p. 140).

27 Johanson and Sullivan (2012, p. 140).

28 Johanson and Sullivan (2012, p. 139).

sualization program alongside a mapping platform, *HyperCities*, to test and develop a hypothesis or analyze an architectural challenge within the Roman world. Diane Favro explains that the digital tools “stimulate spatial and chronological thinking and collaborative, multidisciplinary engagement.” For example, in order to answer why the Claudian port at Ostia failed, students had to examine the port’s construction, tides, types of vessels, artistic representations of the port, as well as technologies and then, offer an alternative site for a Roman port. Another group hypothesized what Roman theaters would look like if built without Greek influence by first analyzing types of construction techniques in Italy and then using 3D models for simulations and hypothesis testing.²⁹

In addition to these virtual reconstructions, studies in the use of digital maps and GIS in the classroom have shown that similar to virtual worlds, digital maps also challenge students to examine new questions or re-frame previous inquiries, and that students must do so by performing multiple tasks on their own. When developing historical GIS (HGIS) for the classroom, instructors provide their students with projects that consider how to research and evaluate sources and then include within their research “spatial thinking.”³⁰ In any use of HGIS, says Amy Hillier, students must first perform traditional historical research and look within the sources for historical spatial data. Then, students can frame their own research questions and engage in critical thinking.³¹ For example, for one in-class assignment Urban Studies students explored a discriminatory housing practice called “redlining” where access to mortgages was restricted by the racial composition of neighborhoods and communities. Students used GIS and its ability to layer maps to study the relationship between the characteristics of neighborhoods and mortgages. Being able to answer a difficult question or exploring in more detail historical problems provided sufficient incentives, but it was the use of the ability to layer maps that provided students with the representation of multiple variables to analyze. Students in this class learned the entire story behind why certain national lending companies were less prominent in some areas than others.³² Like the UCLA projects, the creative process challenged students to consider what is spatial data, and how to present and analyze this data. Because of the abilities of GIS, students were then able to re-test old hypotheses.

29 Favro in Johanson and Sullivan (2012, p.135).

30 Hillier (2008, pp. 73-91).

31 Hillier (2008, p. 73).

32 Hillier (2008, pp. 87-90).

For example, one group created a map based on data concerning prostitution arrests in Philadelphia from 1913 to 1961 and thus challenged notions that prostitution became more spread out as brothels were replaced by other forms of prostitution.³³ In fields such as Urban Studies, the layering of maps is possible because of the availability of data and has thus allowed historians to reconstruct space in order to analyze historical phenomena. But examples from ancient history where data is less readily available are surfacing. For instance, covering over 2,000 years of Chinese history, the China Historical GIS (CHGIS) project successfully integrated a history of China and its changes in administration, culture, and economic processes with GIS technology. The CHGIS created a record of the administrative units and their changes over time and, by using GIS, explored as Bol states, “how spatial relationships change over time.”³⁴ As a research tool, the CHGIS provides the platform into which more data can be added or from which spatial data can be exported. Users can, therefore, either see the administrative units and capitals, analyze the data, create their own maps from the CHGIS or increase the set by adding their own data.³⁵

Finally, GIS-based mapping has also been deployed in courses to complement literature and language. In a course on the French Language, the instructors utilized GIS to explore and study the people and landmarks of France. An interactive map provided students with a type of virtual world where students roamed around the country using features to zoom in and explore the highlights of France in detail. In addition, students were able to watch videos, listen to pronunciation, and relate the places they read about with the images, videos, and geography. The project revealed that because of the interactive nature of the digital tools, students were better able to learn and remember the places that they had previously studied.³⁶

In all of these examples, from Roman spectacles to Chinese history to the

33 Hillier (2008, p. 85). In another Urban Studies course, Drennon, used GIS for problem-based instruction where students worked on projects for Habitat for Humanity (HfH) in San Anontio, Texas, in order to assess the impacts of HfH on the city (2007, pp. 140-152). Drennon noted that among the issues, one group of students explored the question of whether personal and property crimes rates were affected by a HfH neighborhood (2007, p. 149). The group not only had to consider crime rates but also the types of crime and the comparisons between the neighborhoods; map layers were again able to provide the visual presentation of the spatial data for comparison.

34 Bol (2008, p. 28).

35 Bol (2008, pp. 28-59, and 2015).

36 Goldfield and Schlichting (2007, p. 229).

culture of France, the use of digital mapping has allowed researchers to suggest new ideas and challenge previous theories. Meanwhile, the examples of the use of digital tools and HGIS in classrooms reveal that the use of digital maps and GIS has the potential to provide students in humanities courses with the same experience and project-based learning as those in the sciences in which hypotheses can be tested and relationships between multiple variables explored. On the other hand, the complexity of teaching with mapping tools in a Classics course goes beyond the practical challenges. Students need not only to be taught some of the technical skills, but also need to learn the theoretical: what is spatial information; why is it important to the study of history; how do maps tell a story; how does one analyze and critique representations of historical spatial data in digital formats? Therefore, the commitment to using maps and GIS within in a Classics course can seem daunting, but the challenges are surmountable.³⁷ In sum, the technology of GIS is becoming increasingly popular for research and teaching and yet the efficiency and effectiveness of historical GIS and GIS-based mapping software as teaching tools in Classics is an area that can continue to benefit from more attention.³⁸

THE APPLICATION: THE NEARCHUS PROJECT

In response to the issues and questions concerning the use of technology and mapping software, working with a programmer I developed an application, called the *Nearchus Project*, to be used in various Classics courses.³⁹ The tool is a mobile optimized application (a web-based application) that provides a collaborative, interac-

37 How the use of geospatial technology in Classics, such as GIS and GIS-based applications, leads to better understanding of content has not yet been adequately answered. Other fields, such as Environmental Education, are currently considering how such tools help to develop better skills suited for the discipline, see Barnett *et al.* (2012, p. 345). And, a HASTAC online forum asked whether using mapping programs such as Google Earth is problematic in mapping historical and literary geography (2013).

38 Digital pedagogy is not only a growing *techné* but it is also one that is continually being tested and re-imagined within a wide array of fields and disciplines. Travis notes that although scholars are trying to survive the digital revolution, not all have entirely grasped “how critical spatial thought can illuminate their fields of study.” (2013, p. 174).

39 For an overview and access, visit www.nearchus.org. The first iteration of the project lacked a name and a few students in my Alexander course had suggested Nearchus after the friend of Alexander the Great who was appointed admiral of the expedition down the Indus. The analogy between someone chosen to lead an expedition and a program that allows an instructor to lead students through discovering spatial data in a history class seemed appropriate.

tive mapping tool where the instructor can lead a lesson by choosing locations and creating fields with specific questions. Students can then access the program, chose a location from a list, respond to the questions and, if needed, add images. The system was built using the LAMP stack with Symfony PHP Framework and jQuery Mobile to provide a responsive user interface that would work on a variety of devices. The map uses the Google Maps API as well as a helper library called Gmap3 to simplify the calls between *Nearchus* and the Google API.⁴⁰ To integrate this program into a classroom, students need a device to access it, but can use anything from an iPhone to a desktop computer. Once in class, an instructor can choose to project the program while each individual user signs in and begins entering data. Since it is cloud-based, refreshing the browser updates any student work on the map. There is no need for any licensing, sharing files or inviting individuals to view a map. The *Nearchus Project*, thus, differs from other mapping programs in that it provides a common map for people to enter data into, much like a wiki (such as a Google document) allows individuals to type text into the same blank document synchronously.

My criteria for building our program were for it to be simple to use, allow for creativity, and promote collaboration. By creating the program ourselves, we could add only those tools and features that we found to be essential to the learning process and experience. As the instructor, I created a list of locations (for example, ancient cities, communities, or places of interest such as battle locations) that students could choose from and then research.

The program, that is, does not pre-choose locations or come with any features but rather, using the geocoding tool of Google Maps, plots any location entered by an instructor on a modern map. In this way, an instructor can allow the class to first research and determine what locations they would like to place on the map or chose these for the students. Both approaches have their values. If a class needs help starting, an instructor may choose locations on their own and then, on a second map, ask the students to choose locations based on their own interests, research or familiarity with the topic. Secondly, once the map contains locations, the instructor can pose a series of specific questions that each student can respond to for their individual location so that, when viewed collectively, every student responds to the same questions on the same map. Hence, students could put their narrative (their responses to questions) onto the map independently and simultaneously. Their responses appear as a “pop-up bubble” on the Google Map as in the following example:

⁴⁰ Like most current web applications, jQuery is used throughout to simplify JavaScript calls, which are primarily used for map manipulation. The application is currently Cloud-hosted by Linode via a datacenter in Trenton, NJ.

Name: Lutetia

Distance to Rome (miles): Shortest route, quickest, and cheapest

(calculate per kil. of wheat): If traveling from Lutetia to Roma in October, the fastest route would take 29.4 days, and cover a distance of 1,910 kilometers, or 1,186 miles (15.91 per kil of wheat); the shortest route would take 59.1 days and cover 1683 kilometers, or 1,045 miles (47.11 per kil of wheat); and the cheapest route would take 40.8 days, covering 1937 kilometers, or 1,203 miles (10.59 per kil of wheat). Military travel time in the same month and using the fastest route would take 23.4 days and cover 1,937 kilometers, but if the army proceeded in rapid military march, it would only take 18.1 days to cover 1,910 kilometers - that's 1,186 miles!

How and When did it become a Province: Lutetia, which literally means “place near a swamp,” was founded by a tribe called the Parisii and became a Roman conquest in 53 BCE during Julius Caesar’s subjugation of the Gauls. It surrendered around 51 BCE and functioned as a Roman town thereafter.

Resources and economy: Not much is written about Lutetia’s economy, but due to remnants of a forum, three baths (the most well preserved being the Cluny baths), an amphitheater, an aqueduct, a rampart, and multiple public buildings, it is clear that Lutetia was well populated and fairly prosperous. The Seine River was a great resource, for it facilitated trade between Rome and its further provinces.

Here, the bold-face type represent the questions posed by the instructor to which each student responded for their respective location. This student had chosen the location Lutetia (modern-day Paris) from the list of locations I had entered.⁴¹ The instructor can develop these questions on her or his own or students can discuss first what data each location should contain, and then how this data could be presented as part of the collaborative map.

In sum, the application is one that the instructor leads but in which the students create their own narrative by responding to questions. In this way its simplicity

⁴¹ For brevity, I included just a portion of the student’s response here. Students used *ORBIS* to calculate routes and cost of travel.

can lead to more advanced levels of analysis and research where students can define their own spaces to analyze, collect their own data, ask their own questions, and thus frame their own discussions and reconstructions of historic space.

CASE STUDY 1

For an instructor the *Nearchus* tool is, therefore, a blank canvas; there are no pre-plotted locations, only the Google map. Each assignment can contain different locations, different questions, and thus different discussions; each assignment, that is, can be its own map and lesson.⁴² In my first case study, the tool was used as part of a course on the Roman Republic. Students were asked to choose a location from a list I had entered into the program, research this one location and input their research into the map. The goals of this project were to gain a better understanding of the content, specifically to learn about the various types of communities that made up the Roman Republic, to consider the affects of geography on a community's prosperity, and to begin to understand how digital maps present information.

Thus, students began by creating a collaborative map of 34 locations of the Roman Republic. In order to facilitate the research, I chose a set of questions I wanted each student to research and respond to and then enter their responses into the program for their specific location. The questions were as follows: (1) calculate the distance from Rome and how to get there; (2) what was the type of community (colonia, etc.); (3) what is the name of the nearest modern community or city; (4) provide a brief history of the location (200-225 word description); (5) provide an image or video of the location. Students were asked to visit the Stanford Geospatial Network (*ORBIS*) to calculate distances, travel costs and times and then, work on their own with library resources to research locations. Once each location was completed, students worked in groups of three in class and responded on paper to the following questions: how does cost affect travel and trade under the Republic (509-31 BCE); how can geography benefit cities and communities so that some, because of their location, may gain more wealth? Finally, as a class we discussed how geography does or does not affect prosperity in the ancient Roman world?

In performing some basic research and spatial reasoning at the outset of the

42 For example, in the case of the example cited above (Lutetia) the goal was to create a map on the topic of Roman provinces during a course on the Roman Empire. In another class (see the example below of Brundisium), the goal was to create a map about trade and travel in the late Republic and early Empire.

assignment, students begin working with maps and asking questions about space and representations without having to set up accounts and learn how to navigate a particular system. That is, the simplicity of a program can be its strength and in this way make discussions about history, geography and digital maps the focus. Without having to work with the cartographic features and layering, students were beginning to understand what is historical spatial information, such as the location of communities and their proximity to economic resources.

For the in-class assignments, an instructor can choose to focus on the content of the map or its presentation. For instance, in addition to the exploring the history of the Roman Republic, students also informally discussed the ways in which a digital map serves as a repository for information and how maps presents information. Students asked what sort of information was valuable when considering the relationship between the history of Rome and the geography of the Mediterranean. Moreover, I found that students began asking questions about maps and the presentation of information on a map, such as how a tool like *ORBIS* calculates cost of travel or why classmates chose certain routes when they calculated distances. Students were better able to join these discussions because they had already begun the process of inputting their own data based on their own research. Like their counterparts in Urban Studies and Architecture courses mentioned above, students in this Roman Republic class were looking for data, trying to analyze it, and then present it to their peers.

This first case study concerned the initial use of this program in the fall of 2011 in a class of thirty-six students, only one of which was a Classics major. The initial learning goal was to apply the tool so that students would gain a better understanding of the course's content and the historical narrative of an ancient culture. However, at the end of the course I concluded that the use of the mapping tool went beyond this specific goal. Instead, by collectively building a single map, engaging in a group and class discussion, and exploring locations using mapping software, students were becoming more inquisitive and autonomous.

These learning outcomes were the result of my own experiences during an entire semester where the map project was loosely built into the grade for the course, with 5% of the final grade dependent upon the completion of two individual entries and participation during two in-class projects.⁴³ For each of their entries, students were asked to choose a location, explain how its geography affected its prosperi-

43 My Classical Studies courses tend to be populated with those who are not concentrating in Classics; hence, each semester witnesses a wide variety of levels, experiences, and abilities.

ty, and then research the entire map to become familiar with the locations about which their peers had written. Each individual entry was graded on effort, the level of analysis, and precision of historical accuracy.⁴⁴ In some instances, the data was overwhelming and the student had to select carefully what to include. For example, when describing Brundisium, one student kept the historical narrative to a minimum to highlight its importance as a port for Rome:

Significance to Time Period: After the Punic Wars, Brundisium became a major naval port for the Romans. It was also the major port for trade with Greece and the East because of its location in the boot heel on the Adriatic Sea. Brundisium was connected to Rome by the Via Appia, built by Appius Claudius Caecus in 312 BC. Two pillars originally flanked the end of the Via Appia, although only one now remains.

In this case, the student was given full credit for this part of their entry and Brundisium was referenced several times by students during that week's lectures; brevity and accuracy had helped peers learn more about Roman trade. In other cases, students simply did not put in the effort to research their location and it was clear that these students did not go beyond the Internet for their research. For example, one student wrote about Massilia (modern-day Marseille) the following: "The history wasn't so hard to find - it was the status that eluded me for a while, because Wikipedia didn't specify it. I had to dig around more for that ... Nothing really all that important happened at my city (Mersaille), it was important to Rome because it was a port city connecting trade routes from Rome to France and Spain." In addition to the spelling mistake, this entry led other students to erroneous conclusions about Massilia and did not help to promote collaboration. Students did use it, however, to discuss how to research ancient locations since it was clear to several students that a more thorough examination of Marseille would have helped the group to understand better the economy of the Roman world. In sum, the learning objectives were affected by the level of research and attention to writing that the project required outside of class; those who had spent adequate time researching their ancient locations and then responding to the questions provided a better collaborative experience for their

44 One of the most challenging aspects was assessment. For each of these individual locations, I did include a rubric to grade students individually. The rubric included the following: meeting the deadline (5 pts); meeting the criteria (5 pts); accuracy of spatial information (10 pts); accuracy of historic narrative (10 pts); quality of historic narrative (5 pts); quality of image or video (5 pts); attendance in class for group work (10 pts).

peers. In class, discussions began with students working in groups and during general class discussion, groups then formulated their own questions for the entire class to discuss such as what areas or communities on the map might have become, due to their location, wealthier than others? Lastly, during the final exam, I provided an extra-credit mapping quiz to see if students could remember where previously discussed places were located in the ancient world.

The assessment of each student's individual entry and class discussions did show that students were developing a better understanding of the historical narrative; they were able to discuss events with more clarity, knew where events happened in relation to each other, and showed more interest than in past courses in discussing the economic and political relationship between the provinces and the Roman government. In class, students were excited to discuss the geography of the ancient Roman world, thus providing anecdotal evidence that they were becoming more inquisitive about the content of the course. More importantly, by discussing the map and using it as a research tool, students were asking their own questions about the geography and thus framing their own inquiry into the historic space. Although the results of the final map quiz did not prove that the use of the mapping software improved their ability to remember where locations were, the anecdotal evidence showed that there was value in using this tool; students felt that they did connect better with the content through their analysis of the collaborative map.

At the end of the course, students isolated three issues concerning the use of maps. First, 95% of the class responded that they work with maps less than 3 times a year in their collegiate career, hence their familiarity and understanding of maps was not necessarily strong enough for the current project. Second, 57% of the students had problems finding data or information, but several comments made it clear that students were relying too much on the Internet for their research and not the library, or that they were not putting sufficient effort forth to complete the projects. Finally, students focused much more on their own individual assignments than on reading the entire map and contributing to the collaborative effort.

After reflecting upon the results of the project, the student evaluations, and discussions with a cohort of other professors working on a digital pedagogy initiative, my learning objectives changed at the end of the semester. When I began re-envisioning how I would work with maps again in a class, I began to think of ways that one could use maps in order to promote inquiry and as tools to provide students a different method to examine ancient history. By focusing on the skills that can be developed by using mapping software, students were learning not only the content of Roman history and the craft of ancient historians but also how to find, analyze,

and use spatial historical information. The first case study revealed, therefore, that students were capable of doing much more with mapping software than becoming more familiar with the content of their course - they were ready and able to discuss the ways in which maps represent ideas and can lead to more questions about the past. In this way, students did achieve a deeper and more sophisticated analysis by thinking about how information about the past is presented and about the connection between place and space.

CASE STUDY 2

Consequently, in the following semester we focused on how mapping technology could be used to serve as a catalyst for collaboration and inquiry, all the while allowing for students to gain a deeper knowledge of the subject area. We used the *Nearchus Project* in a much smaller class (eighteen students) with more Classics majors and minors. In this course (The Fall of the Roman Empire), students were required to collaboratively build two maps with *Nearchus* and then create their own historical map with another tool and present their map to the class at the end of the year. Before the course began, I surveyed the class and the majority affirmed that they used maps to orient themselves but did not use maps in their analysis or research; 14 of the 18 students responded that they had not used any mapping software as a tool to explore or examine history and were unfamiliar with using geography and mapping technologies as a research tool.

The assignment differed from the first iteration (case study 1) in its topic and process. To begin with, the course focused on the Roman Empire and the mapping lessons on the provinces. Second, students generated the list of locations, the questions each student would research for their own location, and then, the specific topics for in-class discussions. In this way, the students became the leaders and creators of the lessons.

Similar to the first case study, students choose locations from the list generated by the class and then entered their data. The questions the group asked varied from one map assignment to the next, but for the first map the students decided to respond to the following for each location: what cities were located within the inner circle of provinces that lacked frontier forces but were taxed and drained of resources; what cities relied on domestic industry or local resources; what cities from the list prospered because of the proximity to resources; what factors limited their prosperity.

As in the first case study, once each student had researched and entered their responses into the program, we discussed our map. We asked, for example, what data we believed was missing and what data we would have liked to add to this map in order to continue researching the economy and logistics of the provincial system. Hence, students were discussing the relationship between spatial, temporal, and historic information. Outside of class, students used our Course Management System (Canvas) to continue their discussion and respond to questions such as the following: what cities prospered because of the proximity to resources and what were these resources; does a location's proximity to Rome affect its prosperity; in this way, the use of the mapping tool allowed students to frame their own questions and then collect data on their own.⁴⁵

When the semester came to an end, students were required to create their own historical map (we used Google's *Tour Builder*). For this assignment, students had to set up an account, build a map and then, present their map to the class. During this presentation, each student had to address the benefits and limitations to using mapping technology for their specific topics.⁴⁶ The requirements for each student were the following: chose a topic, formulate a question or thesis, and look for spatial data to support or explain the thesis. Some chose to study the locations of battles during the late Empire, locations of frontier forces, and even the location of churches and cathedrals. But the best projects were those that had a clear thesis. For example, one student examined the re-elaboration of Roman iconography during the Renaissance, how Italian cities modeled their own artistic works on Roman art and architecture and if location and proximity to Rome was a defining factor.

Another student tried to map changes in the Latin language during the late Empire and connect this topic to the political and social changes in the West. The student wanted to know if these social changes could be observed also in the changes to the languages. First, he had to find documents such as texts containing the "Oaths of Strasbourg" and then he tried to map the locations of these and other pieces of evidence to connect changes in languages to the places where he had documented social change.

The topics these and other students chose and the questions they pursued were their own. Moreover, these students researched their topics by looking for spatial

45 Such a benefit is echoed by Mares and Moschek (2013, pp. 66-69).

46 Google's *Tour Builder* was very easy to use, though its name should convey how it operates - it provides tours by zooming in and out of locations based on the order or route that is entered. Hence, when projecting and presenting the maps, the program was often too distracting.

information within the sources and asking their own questions. For example, where are current examples of the re-elaboration of Roman iconography and does location influence the type of re-elaboration? In addition, when presenting their maps to the class, the students thought about the ways in which presenting their information with the digital tool helped complete their understanding of the story or historical phenomenon. In this way, students in this course were acting autonomously, performing historic research, exploring and testing their own ideas, all-the-while experiencing how digital tools can present information.⁴⁷

In addition to their final presentation, students were given a quiz at the end of the course with 28 locations on an outline map of the Mediterranean. Students were able to place locations on an outline map with greater frequency than in the first case study. Although no one could place all 28 locations, 67% of the class correctly located 14 or more of the 28 sites.⁴⁸ Those locations that 6 or more students (40% of the class) were able to locate included the following: Constantinople, Nicomedia, Ephesus, Antioch, Alexandria, Carthage, Syracuse, Londinium, Trier, Milan, Aquileia and Sirmium. Places such as Edessa, Tanais, Mogontiacum, and Gades were located by less than 4 out of the 15 students who took the quiz.

Student responses were overwhelmingly positive about the simplicity of the *Nearchus* tool, its effectiveness to learning the geography of the ancient world, and the utility as an alternative method to studying ancient history. Students also appreciated having a collaborative project that combined the use of technology and research and led to an independent project. All but one of the students found that *Nearchus* was easy to use and helpful in gaining a better understanding of the historical narrative of a course. As one wrote, “I really liked the ease with which I could simply plug information into separate distinct fields as well as the use of Google Earth as the actual map, making it a more interactive experience both for map creators and viewers.” Another noted that the use of the tool was helpful in “remembering where locations were in relation to other locations. Much easier than just reading about locations and being expected to know where they are.” A third commented,

47 The final project could have, in fact, been better given more time. These students were working on this final project during the last three weeks of school when exams, papers and the rigor of finals impeded much of their work. Nevertheless, as one student put it, the project felt more like the beginning of something rather than the end of the class.

48 Only 15 out of the 18 students took the quiz. The 28 locations were the following: Constantinople, Nicomedia, Nicea, Pergamum, Ephesus, Antioch, Damascus, Emessa, Edessa, Tanais, Alexandria, Cirta, Lep-tis Magna, Carthage, Syracuse, Gades, Londinium, Lutetia, Colonia Agrippensia, Mogontiacum, Vindobona, Trier, Milan, Aquileia, Sirmium, Colonia Ulpia Traiana Dacia, Apulum, and Rome.

“I appreciated the ways in which the map allowed me to spatially understand and interact with the vastness of the Roman Empire . . . Though simple, I feel that it granted me a more sophisticated awareness of the Empire’s inner workings.” The majority (88%) of the students also responded that the tool was effective in promoting inquiry and collaboration and did positively affect how they examined ancient history. As one student wrote, “It had given me a larger appreciation for the level of communication that took place between emperors and their administrations.” And in terms of research, another student commented that, “I enjoyed the process of researching information about a certain area and seeing what other people found out about their locations as well.” The responses reveal that, at its least, the use of the mapping helps students learn about the history and geography of a single location, as evidenced by one of the negative evaluations of the tool: “to be completely honest, using the maps didn’t really help me, with the exception of understanding things about my own location.” On the other hand, at its best, students not only begin to situate the historical narrative spatially, but also connect geographic variables to historical events and developments and think about the spatial relationship between history and geography.

CONCLUSION: A HYBRID CLASSROOM

Admittedly, the evidence and data is anecdotal and incomplete. We do not have any constant or pre-course diagnostic, the student population using these maps is small, and the assessment of the tool is still a work-in-progress. Nevertheless, in its infancy, it is a start and the qualitative evidence is strongly in favor of the benefits of using mapping technologies. Students have responded that they want to explore and create, and having them utilize digital mapping tools as a method to explore antiquity is a fine addition to other traditional methods. Hence, using mapping technology can help create a hybrid classroom where the marriage of teaching and technology can lead to better learning outcomes. These intuitive and easy mapping tools have challenged my own pedagogy so that I can see the benefits of bringing such tools into my class either as an integral part of the course or as additional tools when needed. My course goals of promoting inquiry, autonomy, and productivity alongside my traditional methods of instruction are thus enhanced and not hindered by the integration of mapping technology.⁴⁹

49 Since the inception of the *Nearchus Project*, ESRI’s *ArcGIS Online* tool has become increasingly easy to use. In the spring of 2015 I did, in fact, use ArcGIS online for a class on Alexander the Great. Although it was very easy for me to create a map, for many of my students the features of the tool proved difficult to

In conclusion, as an alternative to using complicated software, integrating a course-specific mapping tool within a Classics course provides students with an introduction to historical GIS and, by using such mapping software and creating their own digital maps or historical GIS, students can better understand the content of the course. In addition, they can examine the benefits and limitations of using mapping technology in Classics while being introduced to critical spatial analysis. Introducing mapping technology into Classics courses does inspire curiosity and inquiry and, by beginning with a simple tool, the transition to more robust and sophisticated software and programs can and will follow. In the end, such a union of teaching and technology can challenge students to move beyond the use of maps for the illustrative purposes and toward using mapping technologies for their critical and analytical value.⁵⁰

use and thus, they spent more time trying to learn the tool than think about spatial information and the connection between the spatial information and history. Secondly, when it came time to share maps using the ArcGIS Map Journal, group work was cumbersome for sharing layers and map presentations. In sum, ArcGIS Online is an excellent tool but one that takes time to incorporate into any large group collaboration.

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