DATAM

Digital Approaches to Teaching the Ancient Mediterranean

DATAM: Digital Approaches to Teaching the Ancient Mediterranean

Edited by Sebastian Heath

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Teaching Information Literacy in the Digital Ancient Mediterranean Classroom

David M. Ratzan

I. Introduction

A familiar rite of passage for early-career academics and academic librarians with instructional responsibilities is the Statement of Teaching Philosophy. Are these compulsory études effective when it comes to landing a job as an assistant professor or academic librarian? *Quot docti, tot sententiae*. Can they be valuable in themselves as theoretical meditations on a practice that lies at the heart of the academic mission? Surely Plato thought so. It is unfortunate and unfortunately unsurprising that most of us who teach the ancient Mediterranean world to undergraduates are typically asked to reflect on our craft as teachers only once or twice in our careers: once at the very beginning, when applying for jobs; and then many fewer of us when submitting tenure or promotion dossiers. Yet it may be to this state of affairs that we owe the richness and energy which characterized the discussion at the conference that generated these proceedings, in which seasoned educators from very different kinds of departments and institutions across the United States engaged critically with their experiments in and experience of digital approaches to teaching the ancient Mediterranean world. During the presentations I found myself returning to and reflecting on my own Statements of Teaching Philosophy, written long before I had taught any of the workshops and lecture classes that now form the staples of my teaching, and how digital resources, models, and computational approaches have changed what and how I teach, and why.

Fresh out of graduate school I wrote that I attempted to plan classes with three nested pedagogical objectives: a *subject* lesson (e.g., what kind of text is the "Oracle of the Potter" and what does it actually say?);[1] an *object* lesson (e.g., what does it mean to read the "Oracle of the Potter" as "resistance" literature in the Ptolemaic or Roman Empires?); and what I called a *take-home* lesson (e.g., what are our own contemporary forms of "resistance?" How are they culturally and historically conditioned, and what does that mean for the discourse of and potential for "resistance?"). This is still the way I approach lesson planning; yet over the past five to six years I have increasingly found myself incorporating a new pedagogical objective into some classes, one intimately bound up with the project of teaching antiquity in our digital present and informed by the information literacy pedagogy of my library colleagues. A focus on information literacy may seem to intersect only obliquely with the theme of these proceedings. First, information literacy is, of course, a wider and more general competency, one we might hope that all undergraduates attain, not just those studying the ancient Mediterranean. Second, it is also not a domain restricted to specifically digital resources and approaches to information. I concede both propositions; yet I nevertheless hope to show in this contribution that designing activities and paper topics with information literacy in mind can help to lay a foundation for critical engagement with digital approaches as well as to adumbrate for a non-specialist, undergraduate audience the distinctive challenges, pleasures, and intellectual value of studying the ancient world. In the next part of this essay (Section II), I will review the recent (and to my mind salutary) shift in the theory and practice of information lit-

[1] The so-called "Oracle of the Potter" is an Egyptian apocalyptic-oracular text, most likely written in demotic in the third century BCE in reaction to Ptolemaic rule. Fragmentary versions of the text survive only in Greek in five papyri, all from the Roman period (late second-early third century CE, and so clearly continuously read and re-read in different political and social circumstances). Still fundamental are Koenen's basic studies (1968; 2002). An English translation (which does not reflect Koenen 2002) may be found in Kerkeslager 1998. Recent noteworthy studies on the text and the basic question of revolt in Greco-Roman Egypt include: Collins 1994; Potter 1994: 192-206; Beyerle 2016; Gruen 2016; Ladynin 2016; Ludlow and Manning 2016; and McGing 2016.

eracy in the United States. In the final part (Section III), I will describe specific projects I have assigned in class that include an information literacy objective.

II. Information Literacy and the ACRL Framework

There is a tremendous amount written about information literacy on both a theoretical and practical level.[2] Very little of this literature, however, is directly pertinent here, since most of it addresses the challenges of teaching information literacy per se (i.e., independent of any specific discipline) and the specific instructional role and responsibilities of libraries and librarians. What is worth noting here, particularly for teaching faculty, is that this field has witnessed a recent and noteworthy development, one which is still percolating through the academy. In 2015 the Association for College and Research Libraries (ACRL), a division of the American Library Association, published its new *Framework for Information Literacy for Higher Education* (the "Framework"). The Framework entirely replaced its predecessor, the *Information Literacy Competency Standards for Higher Education* (the "Standards"), which had been approved by the ACRL Board of Directors in 2000 and subsequently adopted by several other organizations and state legislatures and implemented widely as the basis of information literacy curricula and courses across the United States. The Framework is not an update and revision of the Standards but instead a complete reconsideration of the theoretical basis and pedagogical strategy of teaching information literacy.[3] Unless you are particularly interested in information literacy or closely connected to an academic library's instructional program, this was a revolution that very likely passed you by. The irony (and one not lost on many librarians) is that teaching faculty may be better placed to do some of the work of this revolution than librarians.[4]

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[2] I would like to thank Lauren Kehoe, Michelle Demeter, and Jill Conte for generously sharing their perspectives and suggestions about teaching information literacy in the wake of the publication of the ACRL Framework.

[3] See, e.g., Oakleaf 2014 and Foasberg 2015.

[4] "Framework" 2015: 7, 27-28; cf. Wilkinson 2016d. Bombaro 2016 is highly

The Framework defines information literacy as:

> the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning. (2015:8)

Likely, this will seem reasonable to pretty much anyone teaching in secondary or higher education today. However, as Marcus Leaning relates in his history of the concept, the content and the aims of information literacy have changed dramatically over the last three to four decades. Information literacy was one of several new "literacies" discovered and articulated in the second half of the twentieth century, with the first attestation of "information literacy" appearing in 1974.[5] From the start, information literacy has been connected conceptually to technological development, the growth in the amount and types of information available, and the multiplication of ways in which it is created, packaged, discovered, retrieved, delivered, and now increasingly shared and reused. Pedagogically, the focus has, until quite recently, been very much on the teaching of the technical skills associated with specific tools or resources. In some ways, the culmination of this phase was the erection of the Standards. This document identified five standards, 22 performance indicators, and 87 (!) outcomes for the information literate. To give an example:

> Standard 2: The information literate student accesses needed information effectively and efficiently.

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critical, but behind the palpable anxiety lies a hard reality of the challenges that face librarians trying to work with teaching faculty to put the Framework into practice. Recent work on the impact and implementation of the Frames is generally more positive and optimistic about collaboration with teaching faculty: e.g., Dawes 2019; Dolinger 2019; Latham et al. 2019.

[5] Leaning 2017: 40.

> Performance Indicator 2.3: The information literate student retrieves information online or in person using a variety of methods.
>
> Outcome 2.3b: Uses various classification schemes and other systems (e.g., call number systems or indexes) to locate information resources within the library or to identify specific sites for physical exploration. (2000: 10).

If your institution teaches information literacy classes, it is a good bet that the curriculum was, and may still be, based on these standards.

The Framework is a different animal. Its prologue asserts that "the rapidly changing higher education environment, along with the dynamic and often uncertain information ecosystem in which all of us work and live, require new attention to be focused on foundational ideas about that ecosystem" (2015: 7). Accordingly, it dispenses altogether with the idea of standards defining some objective technical proficiency in favor of six "Frames":

- Authority Is Constructed and Contextual
- Information Creation as a Process
- Information Has Value
- Research as Inquiry
- Scholarship as Conversation
- Searching as Strategic Exploration

Before diving into what these Frames mean and how they can be helpful in teaching the ancient Mediterranean world, it is important to explain their intellectual foundations, specifically two educational theories: "threshold concepts" and "metaliteracy."

There is now an exhaustive monograph dedicated to metaliteracy, but for our purposes the basic idea suffices: it denotes the extension of traditional information literacy skills (e.g., determine, locate, access, understand, use, cite, etc.) to the more fluid, dynamic, and social information ecosystem we now inhabit, in which users collaborate,

participate, produce, share, and reuse information.[6] Behind the jargon lies an important reality: these new modes of creating, assembling, consuming, and sharing information have important implications for data and interpretation; and our students need to learn not only to appreciate these implications, but also to adopt a more active, critical stance with regard to their intellectual and ethical participation in these living networks of information (which the theorists call "metacognition").[7] The Framework is an attempt to reorient the teaching of information literacy along these lines, to cultivate the skills and critical habits of mind required to navigate our world of interactive and recombinant information. I will return to some of these points below when I discuss working with papyrus documents from Ptolemaic and Roman Egypt.

"Threshold concepts" are a cottage industry unto themselves in educational theory and seem to have reached the pitch of their popularity in first half of this decade, just as the Framework was being drafted.[8] The basic premise is that each field of inquiry has a set of core concepts, which, once taught, are *transformative* (they precipitate a radical change in perspective), *irreversible* (they are hard to "unlearn"), *integrative* (they expose a deep interconnectedness of phenomena or thought patterns in a particular discipline or methodology), *bounded* (they are specific to a discourse or field or method, or perhaps better put, they are the foundational, constitutive ideas or paradigms that define a discourse or field or method), and potentially *troublesome* (they may be counter-intuitive, hard to internalize or operationalize, run counter to deeply held views about the world, etc.). To learn these ideas is in some sense to learn to "think like" a physician, an economist, a historian, an archaeologist, a classicist, etc.

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[6] Mackey and Jacobson 2014; cf. Mackey and Jacobson 2011 and 2016.

[7] See Caraher's incisive contribution in this volume for some of the challenges, limits, and perhaps unwitting ways in which educators serve corporate interests when trying to teach their students to be "prosumers," or participants in the digital world who consume and produce "products," "content," and "media."

[8] The seminal article is Meyer and Land 2003, further elaborated in Meyer and Land 2005 and 2006. For the application threshold concepts to information literacy in libraries in advance of the drafting of the Framework, see, e.g., Townsend et al. 2011.

By way of example, consider the change in perspective and subjectivity that takes place when a student learns how a classical literary "text" is constructed, and therefore what classicists mean when they speak about the "text" of, say, Plato's *Republic*. There is, in a real sense, no going back once the veil has been lifted and she understands that every classical text is the complex and inherently unstable product of an evolutionary history of composition, publication (which was itself very different in the ancient world), copying, recopying, correction, collation, and, finally, modern scholarly intervention and printing (our books look very different from the manuscripts the ancients read). To see any particular text as but one possible instantiation of a tradition and a process, and so unlike almost all texts written in the last century, forces a change in perspective with respect to what that "text" is—and indeed what any and all classical literary "texts" are. It also establishes a different relationship between the reader and the text. True, the responsibilities and engagement now demanded of the initiated reader can be suppressed for casual reading, but they can only be pushed off: it would be virtually impossible to forget or unlearn this new understanding or not to engage with it when embarking on a "serious" reading of any classical text. Again, such knowledge is integrative, in that one now sees and can therefore abstract the processes involved in the creation and editing of all classical texts. Similarly, philology in all of its varied facets, from grammar to diction to stylistics to socio-linguistics, is revealed to have a motivated, dynamic, constructive—and therefore potentially circular—relationship to the texts and language it purports to describe. All of these revelations are potentially troubling: the text is no longer unitary and simple (if any text is); one can take neither the text nor "reading" for granted; the ap. crit. (and the abbreviation is a shibboleth of one's membership) acquires a meaning and a function—and if you know what it is for, you also know that it is not necessarily to be trusted, since it is the creation of an editor and thus rests on (usually still) his authority—which is based on what? Ultimately, the appreciation of his ability to think like a philologist and an editor in the eyes of other Classicists. Is Classics a "profession" or a "discipline"? Well, to approach texts in this way is absolutely the hallmark of a philologist

of premodern texts, if not Classicists alone: it is one of the ways of thinking, perhaps a threshold concept, that defines or bounds what Classicists do *qua* Classicists—an idea to which I will return in the conclusion.[9]

Since the introduction of threshold concepts, there have been those who, perhaps predictably, have sought to identify and compile definitive lists for their respective disciplines, and the Framework is just such an attempt to define (at least some of) the threshold concepts for information literacy (which presupposes that information literacy is itself an independent discipline, asserted by the Framework but the subject of some debate).[10] As with many theories, this one has been applied mechanically, as some have debated how many of the italicized qualities above have to be valid, and to what extent, in order for a particular concept to qualify as a "threshold concept."[11] While such a discussion may have the salutary effect of pushing practitioners to clarify precisely what it is that they do when they do it (and here I cannot help but think of Stanley Fish's classic essay, "What makes an interpretation acceptable?"), erecting some disciplinary cannon of threshold concepts seems as unnecessary as it is quixotic, if only because methods and disciplines change over time, and individuals can and surely will find that different concepts spark some set of the important transformations contained in the ideal type of the threshold concept.[12] To my mind, one realizes the pedagogical value of threshold concepts by resisting the temptation to dogmatism and instead seeing the idea as a convenient label for a bundle of qualities that reflect a certain educational rite of passage that most teachers recognize and strive to catalyze (in fact, we might see Plato as the original threshold concept theorist). In my assignments, I therefore look to stimulate elements of the threshold experience, which I have

[9] See Walsh's contribution in this volume and her identification of "partial puzzle analytics" as something like a threshold concept in Classics. I engage with her critique in the conclusion to this piece.

[10] See, e.g., Wilkinson 2016d.

[11] E.g., Wilkinson 2014a.

[12] This is, to my mind, one of Fish's central messages, *avant la lettre liminaire*, when it comes to present and potential future rules of interpretation.

found pedagogically valuable, without concerning myself with the need to credential any particular idea as a "threshold concept" per se in either information literacy or any branch of ancient studies.

Below are the six Frames and their explanations, presented in their original, alphabetic order. For ease of reference, however, I am numbering them. The ideas embodied in the Frames will be familiar to almost anyone who teaches. In fact, that is the point: to distill and articulate what we do as twenty-first-century scholars when it comes to the critical discovery and use of relevant information in our research and writing, even if we as teaching faculty do not necessarily think of this as teaching "information literacy" when we model these practices and dispositions.[13] In the Framework, each Frame is followed by a list of associated *knowledge practices* (basically, skills) and *dispositions* (the new metaliterate subjectivity that attends the threshold experience), which I have omitted. If you read the Framework (and it is refreshingly succinct), I recommend reading Lane Wilkinson's trenchant criticism of just about every aspect.[14]

1. Authority Is Constructed and Contextual: Information resources reflect their creators' expertise and credibility, and are evaluated based on the information need and the context in which the information will be used. Authority is constructed in that various communities may recognize different types of authority. It is contextual in that the information need may help to determine the level of authority required.

   Experts understand that authority is a type of influence recognized or exerted within a community. Experts view authority with an attitude of informed skepticism and an openness to new perspectives, additional voices, and changes in schools of thought. Experts understand the need to determine the validity of the information created by different authorities and to acknowledge biases that privilege some sources of authority over others, especially in terms of others' worldviews, gender, sexual orientation,

[13] Cf. Dawes 2019 and Latham et al. 2019.

[14] Wilkinson 2014a-2014g, 2016a-2016f.

and cultural orientations. An understanding of this concept enables novice learners to critically examine all evidence—be it a short blog post or a peer-reviewed conference proceeding—and to ask relevant questions about origins, context, and suitability for the current information need. Thus, novice learners come to respect the expertise that authority represents while remaining skeptical of the systems that have elevated that authority and the information created by it. Experts know how to seek authoritative voices but also recognize that unlikely voices can be authoritative, depending on need. Novice learners may need to rely on basic indicators of authority, such as type of publication or author credentials, where experts recognize schools of thought or discipline-specific paradigms.

2. Information Creation as a Process: Information in any format is produced to convey a message and is shared via a selected delivery method. The iterative processes of researching, creating, revising, and disseminating information vary, and the resulting product reflects these differences.

   The information creation process could result in a range of information formats and modes of delivery, so experts look beyond format when selecting resources to use. The unique capabilities and constraints of each creation process as well as the specific information need determine how the product is used. Experts recognize that information creations are valued differently in different contexts, such as academia or the workplace. Elements that affect or reflect on the creation, such as a pre- or post-publication editing or reviewing process, may be indicators of quality. The dynamic nature of information creation and dissemination requires ongoing attention to understand evolving creation processes. Recognizing the nature of information creation, experts look to the underlying processes of creation as well as the final product to critically evaluate the usefulness of the information. Novice learners begin to recognize the significance of the creation process, leading them to increasingly sophisticated choices when matching information products with their information needs.

3. Information Has Value: Information possesses several dimensions of value, including as a commodity, as a means of education, as a means to influence, and as a means of negotiating and understanding the world. Legal and socioeconomic interests influence information production and dissemination.

   The value of information is manifested in various contexts, including publishing practices, access to information, the commodification of personal information, and intellectual property laws. The novice learner may struggle to understand the diverse values of information in an environment where "free" information and related services are plentiful and the concept of intellectual property is first encountered through rules of citation or warnings about plagiarism and copyright law. As creators and users of information, experts understand their rights and responsibilities when participating in a community of scholarship. Experts understand that value may be wielded by powerful interests in ways that marginalize certain voices. However, value may also be leveraged by individuals and organizations to effect change and for civic, economic, social, or personal gains. Experts also understand that the individual is responsible for making deliberate and informed choices about when to comply with and when to contest current legal and socioeconomic practices concerning the value of information.
4. Research as Inquiry: Research is iterative and depends upon asking increasingly complex or new questions whose answers in turn develop additional questions or lines of inquiry in any field.

   Experts see inquiry as a process that focuses on problems or questions in a discipline or between disciplines that are open or unresolved. Experts recognize the collaborative effort within a discipline to extend the knowledge in that field. Many times, this process includes points of disagreement where debate and dialogue work to deepen the conversations around knowledge. This process of inquiry extends beyond the academic world to the community at large, and the process of inquiry may focus upon personal, professional, or societal needs. The spectrum of inquiry ranges from asking simple questions that depend upon

basic recapitulation of knowledge to increasingly sophisticated abilities to refine research questions, use more advanced research methods, and explore more diverse disciplinary perspectives. Novice learners acquire strategic perspectives on inquiry and a greater repertoire of investigative methods.

5. Scholarship as Conversation: Communities of scholars, researchers, or professionals engage in sustained discourse with new insights and discoveries occurring over time as a result of varied perspectives and interpretations.

Research in scholarly and professional fields is a discursive practice in which ideas are formulated, debated, and weighed against one another over extended periods of time. Instead of seeking discrete answers to complex problems, experts understand that a given issue may be characterized by several competing perspectives as part of an ongoing conversation in which information users and creators come together and negotiate meaning. Experts understand that, while some topics have established answers through this process, a query may not have a single uncontested answer. Experts are therefore inclined to seek out many perspectives, not merely the ones with which they are familiar. These perspectives might be in their own discipline or profession or may be in other fields. While novice learners and experts at all levels can take part in the conversation, established power and authority structures may influence their ability to participate and can privilege certain voices and information. Developing familiarity with the sources of evidence, methods, and modes of discourse in the field assists novice learners to enter the conversation. New forms of scholarly and research conversations provide more avenues in which a wide variety of individuals may have a voice in the conversation. Providing attribution to relevant previous research is also an obligation of participation in the conversation. It enables the conversation to move forward and strengthens one's voice in the conversation.

6. Searching as Strategic Exploration: Searching for information is often nonlinear and iterative, requiring the evaluation of a range of information sources and the mental flexibility to pursue alternate avenues as new understanding develops.

   The act of searching often begins with a question that directs the act of finding needed information. Encompassing inquiry, discovery, and serendipity, searching identifies both possible relevant sources as well as the means to access those sources. Experts realize that information searching is a contextualized, complex experience that affects, and is affected by, the cognitive, affective, and social dimensions of the searcher. Novice learners may search a limited set of resources, while experts may search more broadly and deeply to determine the most appropriate information within the project scope. Likewise, novice learners tend to use few search strategies, while experts select from various search strategies, depending on the sources, scope, and context of the information need.

There is much to critique here (and, again I recommend reading Wilkinson's criticism). Also, since the Frames are designed to teach information literacy per se, I have not found all equally useful in thinking about how I want undergraduates to learn and practice a twenty-first-century digital source criticism in ancient studies. I will refer back the Frames as they are implicated in the assignments below, which are designed to impart specific information literacy lessons.

III. Some ideas for teaching critical information literacy in ancient studies

I tend to create three types of assignments with information literacy objectives. The first category includes assignments that ask students to use and then deconstruct digital models, in order to identify and analyze precisely the kinds of information that went into making them, often in comparison to a modern analog. The second category comprises activities that invite students to become active participants in the creation of information, as a way of encountering first-hand the

impact of participation on the kind, quality, and amount of information in certain kinds of digital corpora and resources. Assignments of the third type ask students to step self-consciously out of their digital present and to recreate or solve information problems as an ancient person might have. The third category thus represents a sort of exercise in ancient information literacy, in order to cast into higher relief what is different and distinctive about our current information ecosystem. In this section I will give one example of each type of activity.

Type I: The critical use of digital models

If you teach Roman history, you may have come across or even taught with ORBIS, Stanford University's geospatial network of the Roman world.[15] ORBIS is a model of travel and connectivity in the Roman Empire that is capable of plotting various routes between any two of 632 sites, whose coordinates are taken from the online gazetteer Pleiades.[16] The routes mapped depend on certain key factors or constraints, such as the time of year (month or season), travel priority (the fastest, cheapest, or shortest route), travel medium (land, river, coastal, or open sea), and mode of travel (on foot, donkey, carriage; civilian or military; etc.). In addition to the routes, the model will also calculate the distance, time, and cost of the journey for a passenger and a kilogram of wheat, which allows for comparison of travel times and shipping costs at different times of year, according to different priorities, and along different routes. Finally, ORBIS is capable of mapping and comparing geospatial networks around a given central place in cartograms that represent the zones or isobars of distance as a function of time or cost. So, for instance, in a cartogram with Tarraco (mod. Tarragona) as the center point, Corinth and Corduba are represented as the same visual distance apart, and thus in the same functional zone, as each is calculated as being 14-15 days away in summer, despite the fact Corinth is much further away by geographic distance.

[15] http://orbis.stanford.edu/. ORBIS was reviewed recently by Chiara Palladino (2019).

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

There is more that one can do with ORBIS, such as comparing multiple trade networks and exploring the effects of particular routes by excluding specific nodes; but for undergraduate teaching purposes, the functionality described above is particularly effective in demonstrating the likely nodal character and certain seasonality of connectivity in the ancient Mediterranean world, as well as the dramatic differences in time and cost between land and sea travel. In any ancient history or civilization course that touches on the Roman world, I typically spend part of a class or lecture modelling different routes to demonstrate these points, constructing at least a cartogram or two. Depending on the course, I also assign a break-out activity around ORBIS for a section (often led by graduate students) or turn this activity into a stand-alone paper topic, based on the section instructions, which asks the student to use and then critique the tool in an explicitly comparative mode.

The work of the section is divided into preparatory work to be done before class (the results of which I ask to be posted online the night before) and a set of operations and questions we try to perform and answer in class. (The instructions printed below are wordier than I tend to publish online, since I am including many questions here that I usually ask in person.) In order to facilitate in-class discussion, I organize the students into working groups of three to four people and assign to each group two primary sources from their sourcebook or textbook (translated inscriptions, papyrus documents, letters, excerpts from literary texts, etc.). I ask each student to prepare for the section by reading some of the online documentation for ORBIS and creating one travel scenario from a primary source. They are required to: describe the scenario; use it to model a route with ORBIS; and record and post the scenario and route online before class. The primary sources (e.g., Lewis & Reinhold (1990) *Roman Civilization*[3], Vol. 2, nos. 27, 28, or 30) all describe travel that is either germane to the subject matter of the class (e.g., the route between Rome and Alexandria) and/or include significant open sea (e.g., London to somewhere in the Mediterranean) or overland (e.g., anywhere in central Hispania to the Mediterranean) travel segments, since both kinds of trips will result

in substantial differences in route, time, and cost if certain parameters are changed. I figure that student preparation takes approximately 30-45 minutes, if done conscientiously.

ORBIS Section instructions:

Before class:

1. Watch the three ORBIS (http://orbis.stanford.edu/) YouTube demonstrations in the "Using" tab in the "About" section.
2. Read the "Understanding," "Building," and "Geospatial" tabs in the About section. (If you have time, I also recommend reading Walter Scheidel's "Orbis: the Stanford geospatial network model of the Roman world" (http://orbis.stanford.edu/assets/Scheidel_64.pdf) and Scott Arcenas's "ORBIS and the Sea: a model for maritime transportation under the Roman Empire" (http://orbis.stanford.edu/assets/Arcenas_ORBISandSea.pdf), both of which are pdfs linked to the "Research" tab). Do not worry if you do not understand everything in the second and third tabs: please try to read them in light of the "Understanding" tab, which describes what one can expect of this model and why.
3. Create one specific travel or trade scenario based on one of the ancient primary sources you have been assigned. Describe the scenario you have constructed in two to three sentences, and try to be as specific as you can: Who is traveling and why? What is the origin and the destination? At what time of year are they travelling? Are they making any stops according to the source? What, if anything, are they shipping? Do we know anything about mode of transport? Etc. YOU WILL NEED THIS SCENARIO FOR CLASS.
4. Model the route for your scenario in ORBIS. In order to calculate the route, you will need to pick a set of characteristics, such as time of year, mode of travel, etc. Justify (i.e., give the reasons for) your settings as either most likely or based on something specific in your source material. Record the nodes (sites) of your route and the mode of travel, time, and cost for each leg of each journey.

ORBIS saves your searches in your search history. I recommend looking at this, so that you see how to toggle between searches in class. You can also print images of your routes. YOU WILL NEED THIS ROUTE FOR CLASS.

5. Post your scenario and route to the online discussion forum by 9pm the day before class.

In class:

6. Share your scenarios and routes with your group. Were they the same? How did they differ? Decide as a group on a final version of one scenario for each ancient source and model them in ORBIS, i.e., you need as a group to have two shared scenarios and routes based on your primary sources. Be sure to describe your final scenarios in two to three sentences and record the results of your routes (a good idea is to elect an official recorder for the group).
7. As a group, decide on at least one factor in each trip to modify: time of year (e.g., summer to winter); priority (e.g., cheapest to fastest); network modes (e.g., disallow travel by open sea, forcing the trip to go along the coast); or mode of travel (e.g., from foot to rapid military march for the land leg and from civilian to military for river travel). Recalculate and re-describe the routes. (Again, the recorder should make sure that you have notes for the results of your new routes.) Are they different? How? What accounts for the differences? For instance, what would happen if you were to take the same journey only by road? How much does the season matter and what is affected? How important are rivers to your route with respect to time or cost? Post your results online to the class forum.
8. Go back to your ancient source: Did ORBIS map the same itinerary as what seems to be described? If not, what is different? Can you think of reasons why? Is there even enough information in your source to know what the itinerary was? (For thinking about these and the following questions, I recommend reviewing the "Understanding" and "Building" tabs in the About section.)

9. What kind of information does ORBIS model? Where does it come from? *When* does it come from? Consider, for example, the information used to calculate prices: what is the source for that? What are some of the pros and cons of relying on this source for the purpose of this model? To what extent does ORBIS seem to rely on sources like the ones from which you derived your scenarios? What sort of information do you think it takes from those kinds of sources and how does it seem to incorporate it? Do the answers to these questions have implications for what this model is telling us when it calculates a route? How "Roman" is this model? How "imperial"? Can we use this model to think about the Mediterranean ca. 400 BCE? How about ca. 800 CE?
10. What does ORBIS leave out? In other words, are there factors, which were likely important to the cost and duration of any ancient trip, that the model does not include? Can you see any of these factors implicated in the specific scenario you modeled? In thinking about this question, it might be useful to try to retrace the steps in any long, multi-leg journey you have taken and consider the factors that made that trip deviate from some notional "average."
11. When ORBIS was first introduced, several journalists in the popular press called it a Google Maps for ancient Rome (examples are collected in the "Media" tab in the About section). One can see why they made this comparison, but is it apt? Why or why not? Are the similarities or differences between ORBIS and Google Maps more important?
    a. Now that you have thought about the kind, quality, and amount of data that OBRIS is integrating when it calculates a "route" with associated times and costs, we need to explore how Google Maps works. There are several popular descriptions of how Google Maps works, but the most useful summary I know, with links to many of those resources, is the article in Wikipedia.[17] Many of the technical details are complicated, but please see if you can figure out some of the

[17] https://en.wikipedia.org/wiki/Google_Maps#Map_data_and_imagery

kinds of information Google draws on and how much. What kind of data does it collect in order to calculate travel times? How does it compare to that which is collected and compiled for ORBIS with respect to type, quality, and amount?

b. Is the primary aim of Google Maps to describe or predict? What about ORBIS? If you see a difference in aim, is this important? You probably look to Google Maps to give you a useful answer to a precise travel question: does ORBIS provide the same sorts of "answers" to the same sorts of questions? Are Google Maps results and ORBIS results "useful" in the same way, or do we use the results differently? What are we supposed to "do" with an ORBIS result?

c. Taking into account what you now know about Google Maps, what are the key similarities between it and ORBIS? What are some of the key differences? Are the differences quantitative or qualitative or both? Which are more important, the similarities or the differences? In your opinion, is it helpful to say that ORBIS is a Google Maps for the Roman world? Why or why not?

12. In the final analysis, what does ORBIS tell us about travel and connectivity in the ancient world? On another level, what does ORBIS tell us about our ability to build sophisticated digital models of the ancient world? Do the differences in kind, quality, and quantity of information available to us now mean that we have a fundamentally different relationship to antiquity than to the present and recent past? If so, do you think that the ORBIS interface should make this difference clear? For instance, you now likely have a much deeper appreciation of the limits of ORBIS: should the interface or the results give some sort of obvious indication of those limits as a warning or reminder to the user?

In class, I and/or the graduate student(s) move from group to group, asking questions and driving them forward or throwing a provocative monkey wrench into the works, as required. At a certain point, perhaps 20-25 minutes into the period, I bring the groups together to discuss what they have discovered by doing steps 6-10. I

often ask one group to present its scenarios, routes, and transformations, which (hopefully!) have been posted online, to serve as a focal point for conversation. We then address some of the questions raised in steps 8-10. This leaves 20 minutes or so to explore and discuss steps 11-12. We return the students to their groups and charge them with staking out a position on the comparison of ORBIS to Google Maps. I give them about 10 minutes to organize their positions and then we reconvene to discuss. The essay version of this activity is almost like a lab report: the student constructs a scenario or two from a primary source and then maps the routes and transforms them; she argues what she believes these experiments with the model reveal about travel in the Roman world; she finally compares ORBIS to Google Maps with a view to how we are to understand and use ORBIS results as evidence for travel in the Roman world.

In the age of black-box devices and seamless apps, I have found it increasingly important and useful to have the students meditate on what one might view as twenty-first-century digital source criticism, since the majority of our digital models of antiquity are not built on the same kind, quality, or quantity of data as those which constitute the main points of departure and reference for our students. When crafting this sort of assignment with an information literacy objective, I tend to go back to the Framework and the associated practices and dispositions as a stimulus to thinking about the kinds of questions I want to ask the students.

Frame 4 (research as inquiry) is integral to the design of the session above, since research as inquiry is built into the DNA of the ORBIS model: one of the main points in creating the scenarios and then working the transformations is not so much to learn how to *use* the tool (e.g., how to retrieve the text of an inscription in a more traditional database, like the Clauss-Slaby epigraphic database),[18] much less to discover "the" route between A and B (which route, as Scheidel notes, would be completely coincidental to that of any recorded ancient trip), but rather to explore the *heuristic value* of a model like ORBIS by playing with the parameters and measuring

[18] http://www.manfredclauss.de/

the results against other forms of evidence. In other words, it is only by asking questions of the model that we succeed in unearthing and interrogating our own assumptions and discovering and testing new patterns latent in our data.

Similarly, Frame 1 (authority and expertise) is useful for thinking about how I want students to learn to see the subjectivity encoded in the "data" that underlies a model like ORBIS. Scheidel is both an expert and an authority, and he has done an excellent job in making his assumptions and choices clear in the documentation to ORBIS; but one can easily imagine that another editor might have made different decisions, with a potentially profound impact on the results. Significantly, students develop over the course of this session a much deeper appreciation of why the citation to any map one prints from ORBIS generates a citation with Scheidel and Meeks as the "authors." They come to see map they have created not as one tracing "the" route from, e.g., Rome to Sirmium, but rather as one illustrating an outcome of Scheidel's and Meeks's hypothesis about how travel worked in the Roman Mediterranean. (I sometimes bookend class by asking about this citation, to see how their views change from start to finish.) This sort of observation feeds into Frame 5 (scholarship as conversation), as we come to realize that ORBIS is in fact more of a planting of an intellectual flag in the field of scholarly research on the Roman world than a "tool" to "answer" a question.

In many ways, this and other exercises of this type are really extended meditations on Frames 2 and 6 (information creation as process and searching as strategic exploration). The main task of this section, for which ORBIS is a case study, is to think as precisely and explicitly as we can about the effects of taking the evidence we have for the ancient world, like the isolated testimonials for travel in ancient literature and documents underlying our scenarios, and reprocessing and repackaging that evidence as visual representations which are perhaps best described as bits of fact stitched together with a relatively large number of (reasonable, but debatable) inferences drawn from comparative sources. I have found that there is something very powerful in pointing out to students that over the course of this exercise we have moved from a traditional, nineteenth- and

twentieth-century medium and mode for studying ancient history (i.e., the source book, which presents a subjective and tendentiously edited collection of translated sources, not the evidentiary *Dinge an sich* in all of their messy, unmediated reality) to a twenty-first-century medium and mode (which has its own set of epistemological problems). The only way one can truly begin to comprehend the intellectual value of ORBIS results as "evidence" or "information," and so be strategic in their generation and deployment in an argument, is to understand the process by which these visualizations are constructed.

All of these critical aims are thrown into high relief by comparing ORBIS results to those one gets from what seems to be a modern analog, Google Maps. Besides the obvious differences in aim as well as sources, quality, and amounts of information (the data underlying Google Maps is: collected systematically and from multiple sources; generated and shared as structured data; represents actual routes and actual trips based on crowdsourced GPS and real-time accident reporting data—none of which one can claim for any travel data from the ancient world), there are some other salient points of divergence. For instance, where is the documentation behind Google Maps? There is very little, because information has (commercial) value (Frame 3). Also, you might say that Google Maps has a very different authority problem from that underlying ORBIS, because the proof is in the pudding: it either gets you where you want to go, when it predicts it will, or it does not. It is precisely the uncritical and implicit transference of this kind of authority structure, erected for our modern predictive digital models, that this lesson aims to expose and deconstruct for our descriptive digital models of the ancient world.

Type II: Community-based digital resources

As described above, one of the principal aims motivating the drafting of the Framework was to open up a space for the social, participatory dimension of the information environment in which we now find ourselves. The Standards were published in 2000 and Wikipedia was launched in January of 2001: obviously, a good deal had changed between 2000 and 2015. In one sense, of course, scholarship has been

"social" and "participatory" for more than a century, or at least one could make that argument when looking back on the growth of journals and international associations since the turn of the twentieth century or the organization of massive, collaborative undertakings like the Pauly-Wissowa, the *Corpus Inscriptionum Latinarum,* the *Lexicon Iconographicum Mythologiae Classicae*, etc. Even crowdsourcing is not itself a new concept: the "premium edition" of a book in the early nineteenth century was one that had been edited by the public with a reward paid for each error discovered in the proof-sheets; on a much more ambitious scale, the *Oxford English Dictionary* was effectively crowdsourced, as vividly related in Simon Winchester's *Professor and the Madman* (1998).[19] Since 2000, however, changes in the technology, scale, and application of the social, participatory mechanics of collaboration have transformed the speed and modalities of scholarly debate, communications, and cooperation, often in ways that are not always obvious to students. Understanding the implications of the social and participatory elements of current scholarship goes beyond the initial and often overly narrow focus on the admittedly important issues of authority, credibility, and perspective. Some of the most interesting and useful resources and corpora or repositories in ancient studies today are the product of participatory projects, such as Pleiades, papyri.info, the Online Coins of the Roman Empire (OCRE), the Nomisma.org project, and Open Latin and Greek (OGL), to name a few that I personally use for research and teaching; and, like Wikipedia, one cannot use them critically without understanding how the data gets there, who is allowed to transform it and how, and what its limitations are. Activities and assignments under this rubric thus aim to push students to understand something of the mechanics, rules, limits, and ethics of scholarly participation, and how each affects the shape and quality of the information they retrieve from these digital resources. Below I give some of the exercises I assign with papyri.info in various types of courses.

[19] Crowdsourcing was a technique understood by the Greeks: see, e.g., Arist. *Pol.* 1281a40-b10. For Greek crowdsourcing in practice, see, e.g., Lanni 2016: Ch. 2.

Papyri.info and crowdsourced scholarship

Papyri.info is a web application that aggregates and allows searching via the Papyrological Navigator (PN) of several different kinds information from a collection of increasingly integrated databases, including the Advanced Papyrological Information System (APIS, which consists of metadata records edited by the institution holding the ancient texts), the Duke Databank of Documentary Papyri (DDbDP, which originally was dedicated to collecting and encoding the Greek and Latin texts of ancient papyrological documents), the Heidelberger Gesamtverzeichnis der griechischen Papyrusurkunden Ägyptens (HGV, which created metadata records for ancient documents for information such as date, provenance, publication, keywords, etc.), and the Bibliographie Papyrologique (BP, which collects and publishes bibliography on papyrological subjects). Papyri.info also serves as a portal for the Papyrological Editor, an online text editor that allows registered users to enter, edit, and (if they have the requisite editorial privileges) approve digital versions of papyrological texts in TEI EpiDoc XML.

Whenever I teach ancient history or culture classes in translation, I always attempt to make time during a lecture in which papyri figure prominently (typically, classes on the ancient economy, family relations, literacy, government, etc.) to step strategically out of the lecture and make—in real time—a simple addition or correction to a record in papyri.info. This may seem like a distraction from the topic at hand, but I find that it provides good pedagogical value: signing into papyri.info, transforming a record (and here it does not matter if the correction is to the Greek or Latin, the translation, the punctuation, the bibliographic metadata, etc.), committing the change to the editorial boards, and pointing out how such work is recorded, takes perhaps eight to ten minutes at most (I abandon ship if the site happens to be slow); yet those eight to ten minutes succeed admirably in lifting the hood on an important scholarly digital resource. The majority of my students are completely removed from the core scholarly activities of reading ancient sources in the original languages and formats, excavating on site, handling artefacts, etc. For this reason, they

not only find it interesting to be invited into the scholar's workshop, but they also learn some valuable lessons as to what this process means for the information presented on papyri.info and similar digital resources for antiquity (and beyond).

For example, the students see that the structure of papyri.info accommodates two modes or levels of participation: one for capturing and sharing volunteer contributions; and one for exercising a form of expert peer review, since all changes must be reviewed and approved by editors before being pushed to the public (in this light, the fact that my change will not go through instantaneously is part of the lesson). This observation affords us a chance to discuss authority and expertise and the mediation of the data presented in papyri.info (cf. Frame 1). After I submit my contribution, I point out the documentation of past transformations that is attached to each record and my own personal record of microattributions for scholarly interventions (e.g., offering a textual emendation or supplement, correcting a reading from the original, etc.) and scholarly service (e.g., adding a text from an *editio princeps*, correcting miscoded lineation or punctuation, etc.). I also show them how some changes (and not others) are collected and displayed with the text or in the *apparatus criticus*, and (in two slides) how all of this is replacing (but has not yet fully replaced) the twentieth-century scholarly tools of the *Sammelbuch* (which collects and republishes in print a corpus of all papyrological editions, assigning to each a unique publication number) and the *Berichtigungsliste* (which collects, collates, and republishes editorial and scholarly corrections to published papyri).[20] In terms of the Framework, we here see scholars actively engaged with the idea that information has value, as demonstrated by the care that they have taken to properly record and credit all scholarly work (Frame 3).

Tracking who has done what to each text also allows us to think about these texts as (hierarchical, structured) scholarly "conversations"—if that really is the right metaphor (Frame 5).[21] In order to help illustrate the contours of the papyrological conversation, I show how the majority of texts have in fact been edited by a small number

[20] Preisigke et al. eds. 1915- and 1913-, respectively.

[21] Cf. Wilkinson 2014b and 2016e.

of editors (which is conveniently visualized by Trismegistos Editors) and suggest (admittedly, in a more anecdotal way) via the activity statistics available in the editorial interface that the same is likely true of the number of active contributors to papyri.info versus the number of users.[22] Papyri.info allows us to see the evolution of the texts, and so the "conversations" that they embody, through time. Indeed, the evolutionary, open-ended, potentially unfinished character of the texts is one of the main information literacy lessons I hope to communicate to the students. More specifically, I argue that the current state of the texts in papyri.info reflects two important drivers in the scholarly ecosystem: the present state of our scientific knowledge; and the ability, time, and commitment of a discrete community of scholars to contribute its time and encode its knowledge in shared XML records. In other words, one cannot assume that any record is either correct (indeed, did I not just now correct an error, albeit a relatively minor one?) or current, or that the database as a whole reflects the entire universe of published texts. In other words, one must always ask: Does the text here reflect a decades-old *editio princeps* or our most current reading? Has anyone had the time to incorporate all the corrections of the *Berichtigungsliste*? How about any or all of the corrections and advances of the last two years? Are there texts important to my search that have been published recently but not yet encoded and so will not show up in my search results? And so on.

Most undergraduates taking ancient studies classes in translation are unlikely to need to work with the texts in papyri.info so closely as to make the kind of critical window I offer above directly useful. But again, that is not the point of this ten-minute exercise: instead, the aim is to get them to see how the scholarly sausage is made (in a way that is not possible with a closed model like ORBIS, a direct comparison I draw if I have taught both) and to prod them to consider how that process implicates structures of expertise and authority and the credibility and quality of the information in a contemporary scientific corpus. In undergraduate Latin and Greek classes, I plan a more

[22] Trismegistos Editors: https://www.trismegistos.org/edit/index.php. This long-tail phenomenon appears to be generally true of wiki-type projects, including Wikipedia: see Matei and Britt 2017.

hands-on version of this type of exercise. For example, I assign a papyrus letter to translate in class alongside a literary letter by, say, Cicero or from Chariton's novel *Chaereas and Callirhoe*. I follow this up with a written assignment in which I have them pick a papyrus letter that has no online translation from a list I have assembled and ask them to contribute their own translation to papyri.info. To do this, they need to sign up for an account (which is very easy) and I teach them the rudiments of textual markup and how to contribute a translation via the text editor, with the help of the online documentation available. I work with them individually on the translations, to which they append a short commentary in which they make explicit and justify their philological choices (this commentary is for class purposes only: it does not get uploaded to papyri.info). I have found that students take this assignment very seriously and appreciate the opportunity to join the scholarly conversation. It also expands their view of what should now count as "publication" and certainly gives them a deeper appreciation of the costs imposed on both a community and individual level when it comes to maintaining and growing a "free" corpus of ancient texts (cf. Frame 3). The recent development of the Digital Corpus of Literary Papyri (DCLP) and the Digital Latin Library (DLL) now means that there are an increasing number of similar exercises one could design using literary and subliterary papyri and texts.[23]

Type III: Ancient information literacy

One of the lessons I hope to inculcate in assignments of Type III is a recognition of the fact that the data we have for the ancient world differs not only quantitatively but also qualitatively from what we have for the contemporary world.[24] While the former is obviously in large part a function of survival, the latter is a function of the measurement and data habits in antiquity: even if all documents had survived, we would still be missing much of the information we should like to have, since it was not recorded in the first place. This negative lesson,

[23] DCLP: http://www.litpap.info/; DLL: https://digitallatin.org/

[24] Cf. Dunn 2012 on the terms "qualitative" and "quantitative" data in the humanities.

in my experience, is one worth teaching students, particularly in this context, because it subverts many of their implicit assumptions and helps them to become more critically aware of the contours of their own modern relationship to information and data. In other words, it helps to reveal our own structures and techniques of measuring, cataloging, indexing, discovering, accessing, authenticating, and communicating to ask of ancient people the sorts of questions the Framework presses our students to consider in their own lives:

- What sort of information did ancient people collect, and why and how?
- How did they store, discover, retrieve, present, share, and guarantee the integrity of information they used, all without computers? Furthermore, how did these capacities, techniques, and modalities affect teaching, research, planning, and dispute resolution (to name but a few core social activities)?
- Who or what did ancient people trust and why?
- What techniques of authentication did they devise?
- How were any of these concepts or techniques taught?
- Conversely, how did people take advantage of the systems they built for their own ends? For example, was ancient information ever "stolen? Were there fakes, forgeries, disinformation, and "fake news" in the ancient Mediterranean world?

I have found Josh Ober's *Democracy and Knowledge* (2008) useful in thinking about the relationship of politics, culture, and information in classical Athens, and I am confident that Andrew Riggsby's recent monograph, *Mosaics of Knowledge* (2019), will provoke an interesting discussion of similar questions for the Roman Empire.[25] Below are two paper topics I assign in order to encourage students to think about information literacy in the ancient Mediterranean world, and by extension information literacy in their own. The first topic

[25] Johnstone 2011 is also interesting from this perspective.

comes from a seminar in translation for non-classics majors which explored institutions, economics, information, and strategic behavior in the Greek world. The second was assigned in a general education course on Greco-Roman Egypt.

- *Multifactorial authentication in the Hellenistic world?*
  Analyze the inscription recorded from Hellenistic Paros and published as *SEG* 33.679.[26] Paros was a polis on the eponymous island in the Cyclades. The inscription reports laws passed as a reform in the wake of a scandal at the *mnēmoneion*, a public record office where people could deposit notarized copies of their business documents. What was the nature of the scandal? What reforms did the Parians implement? What effect will these reforms have on the transaction costs of doing business in Paros? Do you see any familiarities between the problems confronting the Parians or the solutions they adopted and the experience of other communities in Classical Greece? As you reconstruct the problem and the solution embodied in this inscription, you may wish to think about the roles of literacy, documents, archives, law, inscriptions, enforcement, expertise, etc. You may also wish to compare this problem and its proposed solution to current issues surrounding fraud, authenticity, and information and identity control.

- *Information and the Ptolemaic State.*
  Using at least 2-3 documents from Bagnall and Derow, *The Hellenistic Period* (2004), make an argument about the role of information in the management of Ptolemaic Egypt. In thinking about this topic, please be sure to ask yourself what sort of information you are talking about (be specific: try

[26] A German translation of the inscription is available in Lamnbrinoudakis and Worle 1983. I have found published English translations of this interesting inscription deficient. I therefore distribute my own English translation with notes, which I am happy to share upon request. For two useful recent overviews of archives and information management in classical Greece, see Faraguna 2015 and Harris 2015.

focus on just one or two types of information) and how it was generated, compiled, accessed, authenticated, and shared. You might also want to look for ways in which various parties exploited these types information and the structures meant to control it for their own ends. Good documents for this topic are: B&D 84, 86, 87, 89, 90, 92-95, 99, 100, 102, 103, 105, 106, 107, 110, 114, 116, 117, and 124.

Conclusion

Lisl Walsh in her contribution argues eloquently for what we might call a threshold concept in Classics, which for her encompasses an integrated methodological approach to the ancient Mediterranean, not just philology: "partial-puzzle analytics." By this she denotes an intellectual approach, which she sees as specific to Classics, that combines rigorous micro-analysis with creative but controlled extrapolation and contextualization of limited evidence into a larger picture, whose outlines are barely adumbrated. In other words, to "think like a Classicist" is to learn to scrutinize closely the few remaining pieces of a large and complex puzzle and to put those surviving pieces in their proper places without the benefit of the picture on the cover of the box. (Paleontology and evolutionary biology would seem to depend on a similar set of skills.) For Walsh, the addition of the "digital" is compatible with teaching Classics and the inculcation of the deep learning of partial-puzzle analytics, but not essential. In fact, she sees a latent but potentially existential risk in digital approaches. First, in her view many digital projects and techniques, which aim to smooth or extrapolate from limited data, often therefore work to obscure the heterogeneity, distribution, and essential gapiness of the underlying evidence, which for her is the foundational methodological point of departure for Classics as a distinct and distinctly valuable intellectual discipline. Second, she also worries that teaching digital techniques, often in response to pressure to make the humanities "relevant," can effectively supplant, rather than support, the teaching of Classics.

I find Walsh's vision of Classics as an exercise in partial-puzzle analytics deeply compelling. I also share her wariness (echoed by Caraher in this collection) of the uncritical use of digital approaches in ancient

studies classrooms, often driven by what I see as a grimly myopic and ultimately self-defeating techno-philistinism. However, I have drawn the opposite conclusion, finding myself instead motivated to think about how to introduce digital and information literacy approaches into my teaching precisely because we are living in a world dynamically shaped by digital approaches. In this contribution, I argue that teachers of the ancient Mediterranean should consider incorporating some information literacy lessons into their curriculum for (at least) two reasons, both of which are, for me, deeply implicated in the teaching of partial-puzzle analytics.

First, our students come to us at least information semi-literate, but crucially in a different information culture. When they approach digital resources—and their number will only increase—they are likely to draw many of the inferences that so concern Walsh: that the data is complete, objective, standardized, etc. When they use ORBIS, they see Google Maps. I have found ORBIS to be a valuable didactic and research tool for visualizing certain important aspects of travel in the ancient world, but it is, in essence, an interactive manifestation of one team's intellectual picture of one part of the ancient Mediterranean puzzle. From this perspective, it is hard to think of a better way to demonstrate the essential partial-puzzle reconstructiveness of scholarship on the ancient world than to deconstruct so seemingly complete a reconstruction as ORBIS. That said, to my mind one of the most promising frontiers in digital resources is not exemplified by closed digital projects like ORBIS, but by open, community-based, collaborative projects, like some those I note under Type II. From where I stand, with one foot in libraries and the other in the research community, open, community-based resources are poised to play an increasingly important role in the ancient studies research ecosystem. We who use—and perhaps particularly those of us who contribute to—these resources have a positive pedagogical obligation to teach students about the ways in which such resources are built and sustained, and how this affects the information they contain. My first suggestion, then, is that we should teach information literacy about digital approaches and resources as a form of twenty-first-century source criticism in ancient Mediterranean studies.

Second, the low-information environment of the ancient Mediterranean world is, for me, one of the important markers of its pre-modernity. It is not merely that much of the documentation and information has perished with time (although this is true), but also that the ancient world was radically and perhaps essentially unmeasured compared with our modern society. We tend to see the effects of both as "information gaps," but they should not be conflated, since they represent distinct phenomena, with the latter having, I would argue, a profound effect on the ancient experience. Teaching in an information literacy mode, precisely because it was conceived to deal with the complexities of negotiating the information age, can help to delineate both the gaps of survival and the contours of an increasingly alien information culture.[27] For instance, keyword searching in the TLG or any other digital literary corpus is self-evidently useful; but does it matter that we can now read with a completeness and a precision that no Callimachus or Horace could have ever contemplated, much less attempted? How did they or the Aristarchuses or Galens of antiquity search or compare literary texts? To be sure, certain words seem to be keywords in ancient poetics or political discourse, but how precisely did they act as "keywords" if keyword searching was effectively impossible? Seen in this light, what do our search results *mean* when comes to, say, the actual practices of *ancient* intertextuality?[28]

[27] Cf. Riggsby 2019: 2.

[28] Fowler's essay (1997) on the meaning (in all senses and directions) of intertextuality remains a classic: my question is specifically about the relationship of *ancient* searching to *ancient* intertextuality. In other words, how do we imagine ancient authors, readers, and critics went about the sort of operations Fowler describes for himself using the PHI corpus of electronic texts on pp. 20-24. And further, is there any evidnece of the ways in which the knowledge of those ancient reading and searching strategies and techniques conditioned the writing or interpretation of texts in antiquity. With Fowler (31), should we be open and sensitive to the possibility that the potential and quality of ancient intertextuality evolved from the 5th century BCE to the 5th century CE, as the number and availability of texts increased? For a recent description of current forms and trends in intertextual searching, see Coffee 2018. Coffee outlines four scenarios of modern intertextual practice or operations, but only the first was possible in antiquity, since it begins and ends with human reading and memory. The other three involve targeted or computational searching of texts, corpora, and tagged and encoded intertexts. He contends that his fourth scenario, which envisions reading with a

Similar questions can and should be asked of ancient politics and administration on the basis of our surviving documentary record, which is an archaeology of ancient information and information practices. To ask students to try to reconstruct ancient information techniques and strategies from what survives is thus to ask them to step out of one of the key ways in which they are most self-consciously "modern" and to inhabit temporarily a world characterized by the particular limits, freedoms, thought-patterns, and ingenuities of a comparatively well-documented pre-digital age.

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visual, customizable, instantaneously available, linked, and shareable web of texts, translations, and intertexts, "could simulate the experience of the ancient one" (220). This *might* approximate or recover something of the otherwise lost mental condition of the highly educated, urban, élite reader who had consumed a steady diet of Latin and Greek texts from an early age and had access to an exceptional library. If so, we might see this as our reading with a sort of ancient reading or memory prosthesis. But to my mind, this sort of reading more likely misses or obscures what was essential to the condition of most ancient reading, and so the precondition of ancient text production, namely that texts were hard to find and harder to search; that many texts or discourses were oral and visual and local; and that intertexts were themselves hard to find or to share when found because citation was rudimentary and non-uniform. This is not to say that new ways of reading are not valuable or do not recover some important ways of ancient reading or intertexuality, only that we should mind the gap between the ancient and modern.

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