Chapter 10

The Digital Classicist:
Disciplinary Focus and Interdisciplinary Vision

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We have moved still further from the Ancient World. In literature and the arts we have seen a startling break with tradition, and above all the technological revolution which we are witnessing is transforming our lives and insensibly affecting our outlook, encouraging us to live in the present, judging everything by the standard of technical efficiency and assuming that the latest is always the best. Descartes compared the study of antiquity to foreign travel; it was useful, he said, to know something of the manners of different nations, but when too much time was spent in travelling, men became strangers to their own country 'and the overcurious in the customs of the past are generally ignorant of those of the present'. Today, there is very little danger of living in the past.[1]

Introduction

Digital Classicists are at the forefront of digital humanities research: using, appropriating, and developing computational tools to aid in the study and exploration of Greco-Roman antiquity. Classicists were early adopters of digital technologies, identifying the potential benefits of computers to undertake their data-intensive research. Computational tools are increasingly necessary components of classical research projects, and can allow novel research which would otherwise prove impossible, occasionally benefiting computing and engineering science research as well as research in the humanities. However, undertaking research which crosses disciplinary boundaries brings with it its own logistical, practical and personal problems for the researchers involved. This chapter explores the interdisciplinary vision of the 'Digital Classicist', grounding the discussion with regard to two distinct research projects and current research on disciplinarity and cross-disciplinary team working. Understanding and predicting issues which may emerge from research projects in the Digital Classicist domain can assist those undertaking, managing and participating in future research projects.

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1 M.L. Clarke, *Classical Education in Britain 1500–1900* (Cambridge, 1959), pp. 175–6.

Enter the Digital Classicist

The term 'Classicist' came into prominence from the mid nineteenth century with the emergence of a groundswell of scholars with a focused interest in, and increased access to primary historical evidence of, Greco-Roman antiquity.[2] Often understood as 'one who advocates the school study of the Latin and Greek classics',[3] this definition belies the complex range of sources and associated research techniques often used by academic Classicists. Varied archaeological, epigraphic, documentary, linguistic, forensic and art historical evidence can be consulted in the course of everyday research into history, linguistics, philology, literature, ethnography, anthropology, art, architecture, science, mythology, religion and beyond. Classicists have, by nature and necessity, always been working across disciplinary boundaries in a data-intensive research area, being 'interdisciplinary, rather than simply un-disciplined'.[4] The addition of advanced digital and computational tools to many a Classicist's arsenal of skills should therefore not really come as a surprise, given the efficiencies they afford in the searching, retrieval, classification, labelling, ordering, display, and visualization of data.

Indeed, Classicists were amongst the forerunners of humanities scholars willing to bear – and even create – digital tools, an endeavour which came to be known as *Humanities Computing*, or more recently *Digital Humanities*, loosely defined as 'applications of computing to research and teaching within subjects that are loosely defined as "the humanities"'.[5] Applications involving textual sources took centre stage within the early development of humanities computing with the creation of textual databases and indices. The commonly accepted first humanities computing project is the Italian Jesuit priest Father Roberto Busa's attempt to create a computational index variorum of the works of Thomas Aquinas (in medieval Latin), begun as early as the 1940s.[6] From the 1970s, fairly centralized attempts were undertaken at using computational technology to serve as a community focus and to develop electronic versions of primary source material for Classical scholars, such as David Packard's *Ibycus* system (used to process, search and

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2   From 'the mid-sixteenth century' antiquarians had achieved 'the status of a bonafide profession and begun to establish the parameters of their discipline', P. Jacks, *The Antiquarian and the Myth of Antiquity* (Cambridge, 1993), p. 9. Classics had been taught in various forms in schools and universities from the medieval period onward, see Clarke, *Classical Education in Britain*. However, it was not until the mid-nineteenth century that new primary source material and university structure allowed 'Classics' to thrive as an independent mode of academic enquiry.

3   'Classicist', *The Oxford English Dictionary*, 2nd edn, OED Online (1989).

4   Jacks, *Antiquarian and the Myth of Antiquity*, xvi.

5   Susan Hockey, 'The History of Humanities Computing', in S. Schreibman, R.G. Siemens, J. Unsworth (eds), *A Companion to Digital Humanities* (Oxford, 2004), pp. 3–19.

6   Roberto Busa, 'The Annals of Humanities Computing: The Index Thomisticus', *Computers and the Humanities*, 14 (1980): 83–90.

browse Greek texts), the *Thesaurus Linguae Graecae* (TLG), *The Bryn Mawr Classical Review*, the *Database of Classical Bibliography*, the *Duke Databank of Documentary Papyri* and the *Perseus Projec*t.[7] The ubiquitous adoption of the personal computer in the 1990s, and the rise of the networked, Internet environment towards the close of the twentieth century encouraged a wave of decentralized, smaller digital projects. These (relatively low-cost) developments have enabled Classicists to undertake digitization of classical source material, the customization of general tools to allow searching, manipulation, and analysis of classical source material, and the sharing of a rich networked infrastructure with larger disciplines (which inevitably have greater resources than cash-strapped Classics scholars) to organize, annotate, publish and share information, and to facilitate general communication and discussion within the community.

The adoption of computing within Classical research should be seen in this wider context, not in a disciplinary vacuum:

> There should not be a history of classics and the computer, for the needs of classicists are simply not so distinctive as to warrant a separate 'classical informatics.' Disciplinary specialists learning the strengths and weaknesses have … a strong tendency to exaggerate the extent to which their problems are unique and to call for a specialized, domain-specific infrastructure and approach … For classicists to make successful use of information technology, they must insinuate themselves within larger groups, making allies of other disciplines and sharing infrastructure.[8]

Classicists must, again, work in an interdisciplinary manner: both so they can follow, understand, adopt and utilize recent computational advances to their own advantage, and to have access to computational infrastructure and resources necessary to undertake efficient and useful research in the field.

Undertaking interdisciplinary research and working in a cross-disciplinary environment is an exception from the lone, ivory-towered scholar image traditionally associated with humanities research, even within the smallest of Digital Classicist projects:

> Given that the nature of research work involves computers and a variety of skills and expertise, Digital Humanities researchers are working collaboratively within their institutions and with others nationally and internationally to undertake research. This work typically involves the need to coordinate efforts between academics, undergraduate and graduate students, research assistants, computer

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7 Theodore Brunner, 'Classics and the Computer: The History', in J. Solomon (ed.), *Accessing Antiquity: The Computerization of Classical Databases* (Tucson, 1993), pp. 10–33; Gregory Crane, 'Classics and the Computer: An End of the History' in Schreibman, Siemens and Unsworth, *A Companion to Digital Humanities*, pp. 46–55.

8   Crane, 'Classics and the Computer', p. 47.

programmers, libraries, and other individuals as well as the need to coordinate financial and other resources.[9]

The issue becomes even more complex when software development and the writing of new, bespoke computational algorithms becomes necessary (rather than just use of existing software for, say, digitization and the creation of online resources):

> Few research centres in Digital Humanities have the staff necessary for undertaking large application development projects, and even the ones that do quickly find that cross-departmental collaborations are needed to assemble the necessary expertise … For most Digital Humanities practitioners, amassing a team of developers almost requires that the work be distributed across institutions and among a varied group of people. Any non-trivial application requires experts from a number of different development subspecialties, including such areas as interface design, relational database management, programming, software engineering, and server administration (to name only a few).[10]

A Classicist devoting their research time to working in the digital arena will have to face both logistical and personal issues of disciplinarity, which will affect both the project, their role in the project, their own personal skills development, and perhaps their own career. Yet there has been 'minimal research on the role of teams with academic communities, particularly within the Humanities'[11] and minimal consideration of how issues of interdisciplinarity – particularly the use of new and emergent technologies within a traditional academic discipline – can affect the outcome of research projects.

The aim of this chapter is to sketch out issues of disciplinarity and the benefits of interdisciplinary research for the Digital Classicist, providing a brief overview of two successful research projects to demonstrate the varied and complex nature of interactions between Classicists, engineers, computer scientists and other interested parties. Additionally, by summarizing potential flashpoints which can arise in such projects (including disciplinary identity, developing and retaining skills sets, publication venues, administrative and management problems) this chapter highlights areas which principal investigators and managers of projects that fall within the Digital Classicist domain should be prepared to deal with successfully, should they arise within the course of their project.

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9 Lynne Siemens, 'It's a Team if You Use "Reply All": An Exploration of Research Teams in Digital Humanities Environments', *Literary and Linguistic Computing*, 24:2 (2009): 225–33.

10 S. Ramsay, 'Rules of the Order: The Sociology of Large, Multi-Institutional Software Development Projects', presented at Digital Humanities 2008, Oulu, Finland, <http://www.ekl.oulu.fi/dh2008/Digital%20Humanities%202008%20Book%20of%20Abstracts.pdf>, 20.

11 Siemens, 'It's a Team if You Use "Reply All"'.

Disciplines and disciplinarity

Being part of a discipline gives a scholar a sense of belonging, identity and kudos. But the idea of what constitutes a discipline is muddy, and often hinges around the bricks-and-mortar proof of a university department's existence:

> [A Discipline] can be enacted and negotiated in various ways: the international 'invisible college'; individuals exchanging preprints and reprints, conferences, workshops … But the most concrete and permanent enactment is the department; this is where a discipline becomes an institutional subject. The match between discipline and subject is always imperfect; this can cause practical difficulties when, for example, the (discipline-based) categories of research selectively do not fit the way the subject is ordered in a particular department.[12]

This notion of institutionalizing the subject would seem to give gravitas: if you can point at an academic department, the discipline exists. However, this definition of a 'discipline' is problematic, as many have specialisms and subspecialisms, which may or may not be represented in every university department, and every 'discipline' is different in character and scope from the next:

> most embrace a wide range of subspecialisms, some with one set of features and the other with different sets. There is no single method of enquiry, no standard verification procedure, no definitive set of concepts that uniquely characterises each particular discipline.[13]

Additionally, a 'discipline' is not an immutable topic of research or body of individuals: 'For nothing is more certain in the lives of the disciplines, whatever the field, whatever the institutional setting, than that they are forever changing.'[14]

The discipline gains kudos from becoming permanently established in the university subject roll-call. Academic culture can define a 'tribe' of scholars, whilst the span of disciplinary knowledge can be described as the 'territory' of the discipline.[15] 'Fields gradually develop distinctive methodological approaches,

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12   C. Evans, 'Choosing People: Recruitment and Selection as Leverage on Subjects and Disciplines', *Studies in Higher Education*, 20:3 (1995): 253–4.

13   T. Becker and P.R. Trowler, *Academic Tribes and Territories: Intellectual Enquiry and the Culture of Disciplines*, 2nd edn (Buckingham, 2001), p. 65.

14   J. Monroe, 'Introduction: The Shapes of Fields', in *Writing and Revising the Disciplines* (Ithaca, 2002), 2.

15   Becker and Trowler, *Academic Tribes and Territories*.

conceptual and theoretical frameworks and their own sets of internal schisms,'[16] and those of Classicists are well entrenched into University culture:[17]

> Any study of European literature and thought down to at least the eighteenth century needs to begin with Greece and Rome, and the study of the classics helps to unite the modern man not only with the men of the ancient world but with all those who in later centuries learned from them.[18]

Although it is difficult to provide a definition of what a discipline may be, there are characteristics which are associated with disciplinary practice. Disciplines have identities and cultural attributes. They have measurable communities, which have public outputs, and

> can be measured by the number and types of departments in universities, the change and increase in types of HE courses, the proliferation of disciplinary associations, the explosion in the number of journals and articles published, and the multiplication of recognised research topics and clusters.[19]

Disciplines have identifiable idols in their subject,[20] heroes and mythology[21] and sometimes artefacts peculiar to the subject domain,[22] meaning that the community is defined and reinforced by being formally accepted as a university subject, but also instituting a publication record and means of output, and, more implicitly, by 'the nurturance of myth, the identification of unifying symbols, the canonisation of exemplars, and the formation of guilds'.[23] Any 'new' academic subject has gradually to be accepted into the university pantheon, with much discussion along the way regarding whether they actually are disciplines in the first place.

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16   Ibid., p. 14

17   For an overview of the history of Classics as an academic discipline and the related quirks and approaches of the discpline, see: G. Boys-Stones, B. Graziosi and P. Vasunia (eds), *The Oxford Handbook of Hellenic Studies*, Oxford Handbooks in Classical Studies (Oxford, forthcoming); A. Barchiesi and W. Scheidel (eds) *The Oxford Handbook of Roman Studies*, Oxford Handbooks in Classical Studies, (Oxford, forthcoming); Clarke, *Classical Education in Britain*; James Morwood (ed.), *The Teaching of Classics* (Cambridge, 2003); J.P. Hallett and T. Van Nortwick, *Compromising Traditions: The Personal Voice in Classical Scholarship* (London, 1997).

18   Clarke, *Classical Education in Britain*, p. 177.

19   Becker and Trowler, *Academic Tribes and Territories*, p. 14.

20   B. Clark, *Academic Culture*, Working Paper no. 42 (Yale, 1980).

21   P.J. Taylor, 'An Interpretation of the Quantification Debate in British Geography', *Transactions of the Institute of British Geographers*, ns 1 (1976): 129–42.

22   Becker and Trowler, *Academic Tribes and Territories*.

23   D.D. Dill, 'Academic Administration', in B.R. Clark and G. Neave (eds), *Encyclopedia of Higher Education*, vol. 2 (Oxford, 1992), 1318–29.

Classics is no different from any other academic subject in this regard. Its aims: to 'know the civilizations of classical antiquity as they were, honouring the unique qualities of each' and to 'see the continuities between ancient and modern societies and their works of art' require a specialist knowledge (and investigation) of texts, artefacts, and physical sites.[24] Classics has its own defined area of source material, means of study of this material, and established modes of research output and dissemination (publishing imprints, conferences, journals). There is established behaviour associated with the classical scholar, such as specific classical writing styles.[25] The field has hierarchies and networks, with a variety of scholarly organizations and associations. There are varied and energetic discussions regarding what constitutes its curricula at both school and university levels.[26] This disciplinary behaviour has been refined and reinforced in the widespread study of Classics as a bona fide academic discipline in the past two hundred years. Computing technologies (and the scholars who bring them) are the newcomers to this established, respected, field.

The Digital Classicist, then, faces two challenges. There is that of forging an identity and gaining recognition within the established discipline of Classics itself. What are the methodological approaches of a Digital Classicist? Is there a culture that binds the scholars together? Or is the Digital Classicist community merely that – a community of practice, which shares theories of meaning and power, collectivity and subjectivity[27] but is little more than a support network for academic scholars who use outlier methods in their own individual, established, field of Classical discourse?

The second challenge, which presents both problems and opportunities for the Digital Classicist, arises for those scholars who choose to step outside the traditional Classics fold and engage with experts in data management, manipulation and visualization such as computer and engineering scientists: that is, behaving in an interdisciplinary manner. The concept of 'interdisciplinary' research, defined as 'of or pertaining to two or more disciplines or branches of learning; contributing to or benefiting from two or more disciplines',[28] became popular towards the mid twentieth century, and the use of the word has been increasing in popularity since.:

> Unlike its nearest rivals – borderlands, interdepartmental, cooperative, coordinated – 'interdisciplinary' has something to please everyone. Its base, *discipline*, is hoary and antiseptic; its prefix, *inter*, is hairy and friendly. Unlike

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24   T. Van Nortwick, 'What is Classical Scholarship For?', in Hallett and Van Nortwick, *Compromising Traditions*, 182–90, 187.

25   Hallett and Van Nortwick, *Compromising Traditions*.

26   Morwood, *The Teaching of Classics*.

27   E. Wenger, *Communities of Practice: Learning, Meaning, and Identity* (Cambridge, 2002).

28   'Interdisciplinary', *Oxford English Dictionary*, 2nd edn, OED Online (1989).

fields, with their mud, cows, and corn, the Latinate *discipline* comes encased in stainless steel: it suggests something rigorous, aggressive, hazardous to master. *Inter* hints that knowledge is a warm, mutually developing, consultative thing … And from the twenties on between-ness was where the action was: from interpersonal, intergroup, interreligious, interethnic, interracial, interregional and international relations to intertextuality, things coming together in the state known as inter encapsulated the greatest problems facing society in the twentieth century.[29]

Although popular, the term is often ambiguous:

It can suggest forging connections across the different disciplines; but it can also mean establishing a kind of undisciplined space in the interstices between disciplines, or even attempting to transcend disciplinary boundaries altogether.[30]

Classicists using digital technologies in their research are regularly at the forefront of research in digital humanities, given the range of primary and secondary sources consulted, and the array of tools and techniques necessary to interrogate them. However, to adopt new and developing techniques, and to adopt and adapt emergent technologies, the Digital Classicist has to work in the interdisciplinary space between Classics and computing science. What are the benefits of straddling, inhabiting or transcending the disciplinary divide, and what does this mean, both practically and theoretically, for the Digital Classicist?

Interdisciplinary vision

It is worth pausing here to consider the benefits of utilizing computational technologies to undertake Classical research, and to sketch out examples of two disparate projects which demonstrate how varied the type of work is that is undertaken in such an interdisciplinary domain, how advanced the technologies utilized can be, and how complex Classicists' research questions often are.

The benefits of digitization, the creative use of networked technologies, and the community-building elements of the Internet are obvious to those working with Classical source material:

The texts of antiquity, freed from the tyrannical limitations of expensive print publication, preserved in multiple servers across the globe, flash instantaneously

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29   R. Frank, 'Interdisciplinary: The First Half Century', in R. Burchfield, E.G. Stanley and T.H. Hoad (eds), *Words for Robert Burchfield's Sixty-Fifth Birthday* (Woodbridge, 1988), p. 100.

30   J. Moran, *Interdisciplinarity* (Oxford, 2002).

anywhere that the Internet can reach – hundreds of millions of desktops and mobile devices. Homer, Plato, Virgil, Cicero – they all reach more of humanity than ever was conceivable in the millennia since they set down their styli for the last time and passed into dust. And it is not just physical access – we already can, with simple links between source text and its commentaries, translations, morphological analyses and dictionary entries, provide a better reading environment than was ever conceivable in print culture. We know from the readers of our web sites that texts in Greek and Latin, of many types, now fire the minds to which twenty years ago they had no access.[31]

Digital text, digital images, digital databases and digital models of both Roman and Hellenic primary evidence and related scholarship now provide the advantages routinely associated with digitization: immediate access to high-demand and frequently used items, rapid access to remotely held materials, flexibility of display, virtual reunification of dispersed collections, integration of materials into other media and teaching materials, the potential for analysis of a critical mass of materials, enhanced searchability, potential for digital enhancement and manipulation, and the potential for engaging with remote scholarly communities.[32] An example of a successful project utilizing digital media in this manner is the Perseus Digital Library at Tufts University, which for more than twenty years has been investigating how the history, literature and culture of the Greco-Roman world can be delivered, explored, expounded, questioned, analysed and researched, through collating all evidence available from this historical period and beyond.[33] Since the inception of the Perseus Project in the mid 1980s, many other classical resources have turned to digital media and networked technologies as a means to facilitate research in this data-intensive domain.

Not all projects utilizing computational technologies within Classical research need to engage on a research level with computing technologies: there are now many good guides to areas such as digitization, the provision of multimedia materials, textual processing, textual markup, database management and linguistic analysis for those establishing a Digital Classics project.[34] However, those on the cutting edge of Digital Classicist research, or working on large-scale projects,

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31   Gregory Crane, Brent Seales and Melissa Terras, 'Cyberinfrastructure for Classical Philology', in G. Crane and M. Terras (eds), *Changing the Center of Gravity: Transforming Classical Studies Through Cyberinfrastructure, DHQ*, 3.1 (2009) <http://www.digitalhumanities.org/dhq/vol/003/1/000023.html>.

32   M. Deegan and S. Tanner, 'Digital Futures: Strategies for the Information Age', *Digital Futures Series* (Oxford, 2002), pp. 32–3.

33   Perseus Digital Library, <http://www.perseus.tufts.edu/hopper/>.

34   For an overview of the type of tools used in general humanities computing research, which are fairly accessible to new interested parties, see S. Schreibman, R. Siemens and J. Unsworth, 'The Digital Humanities and Computing: An Introduction', in *A Companion to Digital Humanities*, pp. xxiii–xxvii.

inevitably have to liaise with colleagues who are computing scientists or those who provide computational support to traditional humanities scholars. In these cases, the application of advanced computational techniques and information technology to answer Classics research questions is only useful, and indeed, possible, when there is enough knowledge and understanding regarding both the classical and computational elements of the research project by the teams of researchers. Occasionally, the research questions asked are complex or novel enough that a bespoke computational solution is required (when off-the-shelf solutions and best-practice guidelines do not cover the technological system required): the development and documentation of this solution can sometimes benefit both research within computer science and Classics, or provide infrastructure, tools and facilities for other related research projects following in the pioneer's wake. Complex Classics research questions can provide real-world issues for computer scientists to test their hypotheses on, often allowing blue-sky[35] research and development which can have positive, unforeseen outcomes radiating back into computing and engineering science themselves. Undertaking research at this level also opens up new possibilities for digital humanities in general: many projects develop technical tools and procedures which can be used in different humanities fields (is a digital image of a medieval manuscript so very different from a digital image of an ancient text?).

A brief overview of two projects carrying out novel research in both Classics and computing science is persuasive regarding the value and complexity of Digital Classics research. The author's personal experience on these, and other, projects is then used to highlight the logistical and personal issues that can face those undertaking interdisciplinary research as a Digital Classicist.

eSAD: e-Science and Ancient Documents[36]

The analysis and understanding of ancient manuscripts and texts via specifically developed technological tools can aid both the Classicist and the computer scientist, in the development of novel techniques which are applicable elsewhere. A demonstrative case is recent work done on building an intelligent image-processing and artificial intelligence based system to aid in the reading of the Roman stylus texts from Vindolanda.[37] This joint project between the Centre for the Study of Ancient Documents (CSAD) and the Department of Engineering Science at the University of Oxford between 1998 and 2002, funded by the UK's Engineering

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35   Blue-sky research is the term given to creative or visionary research undertaken without any predefined outputs, or immediate commercial value, which can sometimes (and hopefully) lead to unexpected and novel approaches, solutions, and products.

36   e-Science and Ancient Documents, <http://esad.classics.ox.ac.uk/>.

37   M. Terras, *Image to Interpretation. An Intelligent System to Aid Historians in Reading the Vindolanda Texts*, Oxford Studies in Ancient Documents (Oxford 2006).

and Physical Science Research Council (EPSRC), resulted in a system which both aided the scholar in reading the Vindolanda texts and developed innovative image-processing algorithms, which are proving useful in a range of applications, including medical imaging analysis.[38]

Members of the original project team have since procured funding to carry on the research under the AHRC-EPSRC-JISC Arts and Humanities e-Science Initiative Programme, from September 2008 until September 2011. The project, now based between the Oxford e-Research Centre, CSAD and UCL's Department of Information Studies, will work on creating tools which can aid the reading of damaged texts like the stylus tablets from Vindolanda.[39] Furthermore, the project will explore how an Interpretation Support System (ISS) can be used in the day-to-day reading of ancient documents and keep track of how the documents are interpreted and read. A combination of image-processing tools and an ontology-based support system will be developed to facilitate experts by tracking their developing hypotheses:[40] this is founded closely on work currently being undertaken by medical imaging researchers and physicians, and systems used to track and trace medical diagnosis and treatment of colorectal cancer,[41] and is also closely linked to the system developed for the related project at CSAD, 'A Virtual Research Environment for the Study of Documents and Manuscripts'.[42]

The eSAD system will suggest alternative readings (based on linguistic and palaeographic data) to experts as they undertake the complex reading process, aiming to speed the process of understanding a text. The project also aims to investigate how the resulting images, image tools and data sets can be shared between scholars.

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38   M. Terras and P. Robertson, 'Image and Interpretation: Using Artificial Intelligence to Read Ancient Roman Texts', *HumanIT*, 7:3 (2005); <http://www.hb.se/bhs/ith/3-7/mtpr.pdf>; N. Molton, X. Pan, M. Brady et al., 'Visual Enhancement of Incised Text', *Pattern Recognition*, 36 (2003): 1031–43; V.U.B. Schenk and M. Brady, 'Visual Identification of Fine Surface Incisions in Incised Roman Stylus Tablets' (International Conference in Advances in Pattern Recognition, 2003); M. Brady, X. Pan, M. Terras and V. Schenk, 'Shadow Stereo, Image Filtering and Constraint Propagation', in A.K. Bowman and M. Brady (eds), *Images and Artefacts of the Ancient World* (Oxford, 2005).

39   *Vindolanda Tablets Online*, <http://vindolanda.csad.ox.ac.uk/>.

40   S.M. Tarte, J.M. Brady, H. Roued Olsen, M. Terras and A.K. Bowman, 'Image Acquisition and Analysis to Enhance the Legibility of Ancient Texts', UK e-Science Programme All Hands Meeting 2008 (AHM2008), Edinburgh, September 2008; H. Roued Olsen, S. Tarte, M. Terras, M. Brady and A.K. Bowman, 'Towards an Interpretation Support System for Reading Ancient Documents', at Digital Humanities 2009, University of Maryland.

41   M. Austin, M. Kelly and M. Brady, 'The Benefits of an Ontological Patient Model in Clinical Decision-Support', *Proceedings of the 23rd AAAI Conference on Artificial Intelligence* (2008), <http://www.aaai.org/Papers/AAAI/2008/AAAI08-325.pdf>.

42   See Chapter 5 in this volume.

Necessarily, the project involves Classicists, engineering scientists, and information scientists, with close input from those with specialities in humanities computing, medical imaging analysis, papyrology, user analysis and image processing. Issues emerging include questions regarding how to model complex humanities research processes, how to facilitate the annotation of digital surrogates of primary documentary evidence, and how to encourage adoption of use of these new solutions into established papyrological method, as well as the need to create new, advanced image-processing algorithms to deal with the noisy, abraded images of ancient manuscripts utilized by the experts.

VERA: Virtual Environments for Research in Archaeology[43]

The UK Joint Information Systems Committee (JISC) funded VERA (Virtual Environments for Research in Archaeology) project is a collaboration between the University of Reading (Department of Archaeology and School of Systems Engineering), University College London (Department of Information Studies) and York Archaeological Trust. Between 2007 and 2009 the project looked at various aspects of the acquisition, management, dissemination and usability of the digital record of the large research excavation at Silchester Roman Town, Hampshire, England.[44]

VERA aimed to improve the accessibility of the digital excavation records to co-workers, particularly those such as artefact specialists who are not generally physically present on the excavation. The project centred around the IADB (Integrated Archaeological Database), which has been used as the excavation recording system at Silchester since the start of the archaeological project twelve years ago. The research approach was multifaceted, involving input from archaeologists, Roman historians, engineering scientists, information professionals and experts in humanities computing and human–computer interaction. In practical terms, this meant investigating the use of digital recording devices on site, such as hand-held tablets, digital pens and digital clipboards; the analysis of user needs; the trialling of visualization techniques to enhance the traditional archaeological representation of the excavation finds; extending the functionality of the IADB user interface; standardizing the code base of the IADB within a portal framework to improve accessibility, stability and security; and experimentation with direct publication from the IADB for scholars referencing excavation data within their research.[45]

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43   Virtual Environment for Research in Archaeology, <http://vera.rdg.ac.uk/index.php>.

44   A full account of the excavation at Silchester can be found in Chapter 1 of this volume.

45   M. Baker, M. Grove, M. Fulford et al., 'VERA: Virtual Environment for Research in Archaeology' (4th International Conference on e-Social Science, Manchester, 18–20

Various issues have arisen throughout the course of the project – in fact one of the aims of the project was to identify the type of issues involved in such a large-scale, interdisciplinary attempt to provide a virtual research environment. These included the importance of training in new technologies, the establishment of data management, recording and data validation measures, the need for integration of users' needs in the development of new tools, the need for careful introduction of technological 'solutions' into established offline workflow, the fragility of technology (and technological infrastructure) in the trench, and issues in the use of open source architecture for providing applications such as the IADB and the verifiable maintenance of the data they contain.[46]

Project parallels

The parallels between these two very different projects are to be found in the large-scale, interdisciplinary teams they both required. Individuals involved had very different backgrounds, and understandings of both the humanities and technological dimensions to the projects. The teams were both operating across dispersed sites, meeting physically fairly regularly but by no means weekly, and utilizing online tools of communication that we come to expect from such technologically aware teams: wikis, blogs, emails, discussion lists, video conferencing, etc. The projects required individuals to take responsibility for their own tasks, and work for periods alone, within the framework of the wider project. Engagement with the wider academic community was also important, as was ascertaining of user needs, gathering community opinion regarding various issues, and involving other experts in key developments.

As representative of the type of projects a Digital Classicist may work on, these two projects also demonstrated various issues that can emerge from working in such an interdisciplinary environment. The discussion below, although informed by personal experiences within the projects detailed above and communication with related research communities, is not indicative of any particular issue within either project, nor any problem with any project team member. It serves to highlight the areas which those involved in a Digital Classicist project should consider and monitor to ensure that their own project will be a success.

June 2008); C. Fisher, C. Warwick and M. Terras, 'Integrating New Technologies into Established Systems: A Case Study from Roman Silchester', Computer Applications in Archaeology 2009, Making History Interactive. Williamsburg, Maryland, USA, 22–26 March 2009.

46   E.J. O'Riordan, M. Terras, C. Warwick et al., 'Virtual Environments for Research in Archaeology (VERA): A Roman Case Study At Silchester', Digital Resources in the Humanities and Arts, Cambridge, September 2008.

Issues in interdisciplinary research

Different academic cultures

Although many younger classical scholars are developing better computational skills and knowledge as networked technologies become more pervasive, it is often the case that projects depend on collaboration with computer scientists and engineers to develop tools, techniques and methods which may be applicable to the further understanding of classical texts (and computational algorithms). This poses many problems for both the Classicist aiming to utilize advanced computational techniques and the scientist aiming to use the Classical research question as the 'real-world' problem: not only have they to find interested collaborators, but they also have to engage with the discourse, habits and different focus of other disciplines in order to answer their own research questions.

Classics and computing science are very different beasts, and it takes conscious efforts in communication to ensure all team members both understand project developments, and are understood themselves. There can be lack of a common language, a sense of isolation on the part of some team members if there are gaps in their knowledge base, and no experience of the unconscious understanding of the way a discipline operates, leading to tensions between technical and non-technical members of a team. To function well in both disciplines, the scholar needs to understand both the subject and culture of both disciplines (which can take both time and a certain type of personality), or a larger team needs individuals who can communicate effectively across these boundaries. There is also the need to be able to meet others who may be interested in interdisciplinary work in the first place, and Digital Classicists need to be comfortable networking in both Classics and other disciplines. To have a successful team, and successful team members, depends on those involved having good communication skills.

Interdisciplinary publications

A common area of discord in interdisciplinary projects emerges when projects begin to think about publishing material. Teams which had previously happily worked together can dissolve into individuals fiercely fighting over publication territory. Interdisciplinary issues are partly the cause of this: different fields have different publication expectations, mechanisms, venues, time frames, writing styles and ways of presenting research. A Classicist used to being the sole author on academic research may find themselves somewhat far down the list of joint authors on a paper, with little or no agreement on the conventions of author name ordering.

Individuals can also face issues with the acceptance of their interdisciplinary research (and multimedia) publications by their Classical peers. Is the eSAD project described as Classics or engineering? It does not matter until the outputs are being scrutinized to decide an individual's suitability for employment (in a Classics,

computing or information studies department?) or what counts as a tenure track publication. Digital outputs – such as digital editions, digital journal publications websites, etc. – are often not as respected as the traditional print based outputs of the humanities (where the single-author monograph is still viewed as the pinnacle of scholarly research, even though the publication industry sees sales of these in decline). How can a scholar working in digital media, producing digital outputs, convince their peers and superiors of their academic merit? Additionally, given that digital journal papers, digital editions, and suchlike are not well respected, or understood, how can humanities scholars working with computer code persuade other scholars that the intellectual rigours of programming are as valid as the production of scholarly textbooks?

Management

Strong communication can be fostered by good team leadership. Successful teams in digital humanities research have been defined as those who maintain a good working relationship, adopt clearly defined tasks, roles, milestones and obligations (which are to be discussed by the teams themselves), and work together to meet goals: 'it is by (un)productive working relationships that many projects live and die.'[47] There is beginning to be interest in how successful digital humanities projects function.[48] A large-scale survey project[49] has highlighted collaboration issues in digital humanities projects: in particular, there is a real need for face-to-face collaboration,[50] and strong leadership in maintaining communication links with all members of the project.

Teams are encouraged to utilize the digital communication technologies at their disposal, which can also serve as a project record, or part of the project documentation. Wikis, email, blogs, twitter and Skype can all contribute to communication within a team (although ironically, information overload from such technologies can prevent project work being carried out in the first place!) This problem can be avoided through good management and discipline, using communication technologies where necessary, not as a distraction from the business of research.

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47   Siemens, 'It's a Team if You Use "Reply All"'.

48   S. Ramsay, S. Sinclair, J. Unsworth et al., 'Design, Coding, and Playing with Fire: Innovations in Interdisciplinary Research Project Management', Panel at Digital Humanities 2008, Oulu, Finland, <http://www.ekl.oulu.fi/dh2008/Digital%20Humanities %202008%20Book%20of%20Abstracts.pdf>, 16.

49   R. Siemens, M. Best, E. Grove-White et al., 'The Credibility of Electronic Publishing: A Report to the Humanities and Social Sciences Federation of Canada', *Text Technology*, 11:1 (2002): 1–128, <http://web.viu.ca/hssfc/Final/Credibility.htm>.

50   S. Ruecker, M. Radzikowska and S. Sinclair, 'Hackfests, Designfests, and Writingfests: The Role of Intense Periods of Face-to-Face Collaboration in International Research Teams', paper presented at Digital Humanities 2008, Oulu, Finland, <http://www. ekl.oulu.fi/dh2008/Digital%20Humanities%202008%20Book%20of%20Abstracts.pdf>, 16.

Managers may also have to do battle with administrators and administration from their university: it is relatively rare in the humanities to have cross-faculty research projects, or to have large-scale projects which involve academics from other institutions. Administrative problems can create delays in the project, affect individual staff, and impinge on available research time, if not carefully managed and monitored.

Finding funding

Administrative issues can also be present when applying for, or trying to find, funding for Digital Classicist projects. Research which involves a computational element often requires much higher levels of funding than simple sabbatical funding for traditional, lone-scholar, humanities endeavours, given the facilities, staff and technologies required. The funding required is often 'blue-sky': with defined project outcomes sometimes hard to gauge, which is not attractive to funding councils in the current climate of accountability, where evidence of impact and value are application requirements. Additionally, those using computing in their research are often 'too technical' to be eligible for funding from the humanities sector, and 'not technical enough' to secure funding through engineering and computing science channels. As computing becomes more pervasive, there are signs that this is changing. In the UK, USA and Canada, various joint-funding council calls have recently been issued to provide funding for advanced computer techniques to be employed for the benefits of the arts, humanities, cultural and heritage sectors. For example, the eSAD project, detailed above, is funded by a joint funding programme, the Arts and Humanities Research Council, Engineering and Physical Sciences Research Council, and Joint Information Systems Committee Arts and Humanities e-Science Initiative.[51] The UK's Joint Information Systems Committee and the USA's National Endowment for the Humanities have recently embarked on a transatlantic digitizsation programme.[52] However, an interdisciplinary scholar is often too busy battling different cultures and regimes to succeed in either, or both, disciplines, and requires temerity and dedication to succeed in these highly competitive funding calls.

Recruitment and training

Many young Classics scholars have been immersed in IT, but this does not mean that they are computationally literate. Finding a PhD student or research assistant with the prerequisite subject expertise and good knowledge of digital techniques is difficult as individuals 'with the adequate combination of research in a humanities

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51   e-Science Research Grant and Postgraduate Studentship Awards (2007), <http://www.ahrcict.rdg.ac.uk/activities/e-science/awards_2007.htm>.

52   JISC/NEH transatlantic digitisation collaboration grants, <http://www.jisc.ac.uk/fundingopportunities/funding_calls/2007/09/circular0307>.

discipline and technical expertise are rare and valuable'.[53] An extensive training budget is often required for individuals working on digital humanities projects: ironically, once they are trained, it can be hard to retain qualified and experienced staff for future projects given the short-term nature of project-based grant funding and the emerging demand for computer-literate humanities scholars. However, individuals involved in such projects often benefit whether or not they stay in academic research: the skills and experience accrued in a successful interdisciplinary research projects are not just useful for academia, but can stand both humanities and science students and researchers in good stead by indicating their improved range of competencies, especially in a competitive job market.

Project charters

To counteract many of these problems, and to overcome cultural issues positively, it has been suggested that at the start of a project a 'charter' is drawn up between all project stakeholders, stipulating modes of communication, expected roles, expected means of conduct, and expected means and modes of publication.[54] Making such issues explicit at the start of a project can foster openness of communication, and alleviate any doubt for team members or managers regarding their individual roles, duties or expectations in the interdisciplinary environment.

Promoting Digital Classics

Given these issues and difficulties, but the latent intellectual and social potential waiting to be explored through such interdisciplinary endeavours, how can Digital Classical research be encouraged? What can be done to increase collaboration between those in computing and engineering science and Classics? How can Classical research questions be made more interesting to computing science? How are funding agencies coping with cross-disciplinary research proposals? Interdisciplinary research can be consciously fostered at individual, community, institution and funding council level, although this requires effort (and courage) from all stakeholders.

Individuals working in the area of Digital Classics have to become self-publicists, taking part in the wider Classics community, institution and beyond. By being intellectually and socially brave enough to establish dialogues with those in computing-based disciplines, both in person and in online forums, the

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53 Claire Warwick, Isabel Galina, Melissa Terras et al., 'The Master Builders: LAIRAH Research on Good Practice in the Construction of Digital Humanities Projects', *Literary and Linguistic Computing* (2009).

54 S. Ruecker and M. Radzikowska, 'The Iterative Design of a Project Charter for INTERDISCIPLINARY research', paper presented at DIS 2008, Cape Town, South Africa.

profile of Digital Classics will be raised, as will the chance of meeting like-minded collaborators, hearing about relevant funding schemes, and developing computational skills and knowledge. Individuals can also encourage the establishment of, and take part in, teaching programmes, summer schools, and workshops to encourage both the traditional humanities scholar, and the younger generation of Classicists, in the understanding that using computational methods within Classical research is entirely feasible, useful and increasingly normal. Individuals must also document the contribution they make to digital projects on their CVs, and consistently demonstrate to colleagues and superiors that digital outputs are worthwhile. It will take some time to change the culture regarding academic acceptance of digital media: but individuals can be proactive in their attempts to encourage its recognition as bona fide academic endeavour.

The activities of the Digital Classicist community are part of the solution: encouraging discussion via email, wiki, discussion lists and presentations from interested individuals at Classics, digital humanities, e-Science and computing conferences, and generally highlighting the rich research area which exists in the intersection between Classics and computational technology.[55] The Digital Classicist also provides a supportive community in which to share ideas, ask questions, point to other relevant sources and engage with Digital Classics in a disciplinary manner. This can both encourage and aid individuals in undertaking their research (on a professional and personal level), and foster the idea that Digital Classics operates as an academic discipline (which is important, again, for the acceptance and understanding of a scholar's activities when applying for jobs, funding, etc.).

Research councils have recently begun to encourage interdisciplinary research. Academic institutions can foster cross-disciplinary networking by establishing events, research centres, and employing individuals who can respond at speed to these calls, encouraging disparate scholars to work together. Given the wide range of sources of funding, many institutions are becoming aware that it can be useful for someone in a research services role to highlight funding possibilities to scholars and teams who may not have come across the funding streams in their day-to-day academic duties, and to encourage or 'matchmake' interdisciplinary academic teams within the context of their wider institution.

Funding councils can promote and encourage interdisciplinary research by providing adequate funding for multidisciplinary projects, and by not being too prescriptive regarding the type of 'added value' they expect from 'blue-sky' research. Cross-funding council schemes, such as those run jointly by the UK's Arts and Humanities Research Council, Engineering and Physical Science Research Council, and Joint Information Systems Committee, would seem the best opportunity for those undertaking novel computational research in the humanities, although humanities research councils themselves should not shy away from providing adequate funding to help humanities scholars engage in the increasingly pervasive networked research environment.

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55   The Digital Classicist, <http://www.digitalclassicist.org>.

Conclusion

> The greatest barrier that we now face is cultural rather than technological. We
> have all the tools that we need to rebuild our field, but the professional activities
> of the field, which evolved in the print world, have only begun to adapt to the
> needs of the digital world in which we live – hardly surprising, given the speed
> of change in the past two decades and the conservatism of the academy.[56]

Computational technologies can provide the scholar of Greco-Roman culture with
an array of tools for creating, searching, manipulating, accessing, analysing and
publishing the disparate types of information routinely utilized by the discipline.
Engaging constructively with these tools requires that the Classics scholar embrace
computing techniques, often extending their own skill set beyond the usual Classical
domain, or working (however formally) in large-scale interdisciplinary teams with
individuals from the computing, engineering and information sciences. Working
in a cross-disciplinary fashion can raise personal and professional issues for the
Digital Classicist. The same, of course, is true of the integration of computational
resources into other humanities disciplines, but the range and span of information
resources routinely consulted by Classicists, and the early adoption and creation
of computational tools and techniques by the Digital Classicist community, places
it at the frontline of interdisciplinary complications. This chapter has attempted
to expound the problems, and highlight issues, which can face those choosing to
work at the forefront of digital technologies in Classical research.

By understanding issues of interdisciplinarity, and being aware of both the
pressures and rewards in operating in such a domain, those undertaking Digital
Classicist research should be better placed to undertake successful projects. After
all, given the increasingly pervasive nature of technology within general society
and academic research, what other choice do we have, other than to engage and
tackle bravely the cultural divide to raise the voice of Classics in the computational
environment?

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56   Crane, Seales and Terras, 'Cyberinfrastructure for Classical Philology'.