Software
Sustainability
Institute

Sustaining the Digital Humanities in the UK

Contents

Authors and acknowledgments

This report is based on the findings of a workshop sponsored by the Software Sustainability Institute, held at the University of Oxford's e-Research Centre (OeRC) on 21 June 2018. The workshop was led by an advisory board of Digital Humanities practitioners, representing a range of career stages, roles, and disciplines. The workshop's organisers and advisory board are the joint authors of this report, with contributions from workshop participants.

Lead Authors

Giles Bergel and Pip Willcox

Foreword

David De Roure

Contributing authors

Guyda Armstrong
James Baker
Arianna Ciula
Nicholas Cole
Julianne Nyhan
Mia Ridge
Oscar Seip
Claire Taylor
Pip Thornton
Elizabeth Williamson
Jane Winters

Workshop participants

Alfie Abdul-Rahman
Toby Burrows
Giovanni Colavizza
Iain Emsley
Alejandra Gonzalez-Beltran
Sarah Griffin
Alexander Huber
Graham Klyne
Lucia Michielin
Yelda Nasifoglu
Gethin Rees
Catherine Smith
Paul Spence
Shoaib Sufi

Foreword

This report is timely for the UK Digital Humanities (DH) landscape. The establishment of UK Research and Innovation (UKRI) has created an opportune moment for the strategic planning of research infrastructure between and across all the research areas. This theme was elaborated on in two recent reports in which it is recognised that cultural heritage institutions are not just multipliers of impact, but sites of research infrastructure in their own right.[1] Internationally, the Arts and Humanities Research Council (AHRC), partner research councils and funders in the UK and elsewhere have highlighted the Digital Humanities as part of its Fund for International Collaboration.[2] The Alan Turing Institute, the UK national institute for data science and artificial intelligence, is now housing what this report identifies as a notable gap – Digital Humanities' capacity for operating on a large scale – in the form of the Living with Machines project.[3] This report also follows one from the University of London's School of Advanced Studies on the potential for a UK network for DH.[4] Lastly, the discipline itself continues to flourish and to forge alliances, with both the established humanities disciplines and such new formations as creative computing and heritage science.

This convergence of favourable developments is endorsed by the AHRC's decision to join with the other UKRI bodies in funding Phase Three of the Software Sustainability Institute (SSI).[5] This decision recognises and reinforces the initiative taken by the SSI in engaging with Digital Humanities: an initiative, active over many years, that has included welcoming humanities researchers and Research Software Engineers (RSEs) into its Fellowship programme; support for training programmes such as the Digital Humanities at Oxford Summer School (DHOxSS) and Library Carpentry; and the SSI's commissioning of this report and support for the workshop hosted by the Oxford e-Research Centre that forms much of its basis.

The SSI's alliance with the Digital Humanities does not begin with this report, nor will the future relationship necessarily unfold within a landscape that is recognisably

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[1] https://www.ukri.org/research/infrastructure/
[2] https://www.ukri.org/research/international/fund-for-international-collaboration-fic/
[3] https://www.turing.ac.uk/research/research-projects/living-machines
[4] Marketwise Strategies Limited (2017) Digital Humanities Research, Teaching and Practice in the UK – Landscape Report. School of Advanced Study, University of London, London, https://sas-space.sas.ac.uk/9216/
[5] https://software.ac.uk/blog/2019-02-26-software-sustainability-institute-improve-research-software-practices-ps65-million

the same. A discipline that must by necessity constantly reshape itself, Digital Humanities is well placed to create new hybrids of scholarly inquiry and public service which harness the traditional humanities' core strengths (which include long histories of computational work, as the report rightly states) with emerging methods. But impact will only be lasting, like that of all research, if sustainability, reproducibility and engagement with other disciplines are placed at the heart of the Digital Humanities' values and working practices. A cautionary note should therefore be struck: while Digital Humanities practitioners are perhaps best placed to engender sustainability through the quality of their own work, the breadth and depth of the resulting impact should be of wider concern to the UK research community and beyond if this success is to continue.

As the work of the SSI demonstrates, sustainability does not happen by itself: it requires planning, forethought and care, which is embodied in the living expertise of practitioners and supported by many forms of infrastructure. Sometimes considered mere ancillaries to research, such structures are in fact the basis for a healthy research environment. If, as is sometimes said, the Digital Humanities are 'about making things', then those things are to be cherished; preserved for the appraisal of the unknown audiences of the future, who may find new – and perhaps vitally critical – uses for them.

David De Roure
Giles Bergel
Pip Wilcox

Summary of key recommendations for the SSI

The Digital Humanities landscape

1. Support DH-specific conferences and training events.
2. Create shared spaces between DH activities and allied disciplines.
3. Partner with DH centres, broadly conceived.

Critical and ethical issues

1. Support historical research on computing.
2. Engage with researchers undertaking ethnographical and critical work within (or about) the Digital Humanities.
3. Support research into social costs and benefits of AI as a priority.

Career structures

1. Survey of RSEs within the humanities.
2. Survey DH practitioners.
3. Target RSE training events to DH practitioners.

Sustainability in perspective

1. Work with the community to promote good practice.
2. Partner with funders on infrastructural sustainability.
3. Commission studies of exemplary Digital Humanities projects.
4. Provide toolkits on software citation, project planning and end-of-life care.
5. Lead on accrediting training programmes in sustainability for DH.
6. Survey the 'infrastructure gap' between humanities and other disciplines.

Background to this research

This report was commissioned by the Software Sustainability Institute with the aim of advancing its mission within the humanities. Digital Humanities, a broad intersection of models, methods, tools, materials, career paths and affiliations, in both established and novel disciplines was identified as the area within the humanities that most closely aligns with the SSI's role. The report covers the following topics:

- the nature and landscape of DH,
- critical and ethical issues that are part of DH's unique character,
- career structures within DH, including of Research Software Engineers (RSEs), other research professionals, and academic researchers and teachers,
- the overall sustainability of the discipline and its outputs.

What is the scope of this report?

While this report is most immediately addressed to the UK's SSI community, it is hoped that it will contribute to a conversation within the Digital Humanities and the Galleries, Libraries, Archives and Museums (GLAM) sectors, and beyond on digital transformations within learning, culture, and communications. It does not attempt to cover the full extent of DH's engagements, nor does it cover the work of parallel (and sometimes intersecting) disciplines, such as creative computing, the digital arts and media, or the digital social sciences.

Analysis

The Digital Humanities landscape: one discipline or many?

Digital Humanities is institutionalised in diverse forms:

- as a number of university academic departments,
- in centres, laboratories, or networks within arts and humanities schools,
- as a component of library or other GLAM sector research,
- as an engagement activity,
- as a specialist academic support service within university IT services.

Variously (and sometimes precariously) institutionalised, it might best be characterised as a shifting community of practice in which participants hold diverse affiliations: DH arises in part as a debate about the composition and goals of that community. This report does not aim to define what DH is, but rather to describe what digital humanists do.

DH practitioners' work is both interdisciplinary and a sub-discipline of humanities and related fields. Their work intersects with fields such as: heritage science; digital methods within history, classics, literary studies, and archaeology; modern languages, linguistics, literary, and textual studies; art history; media archaeology; science and technology studies; digital musicology; digital cultural heritage, and creative computing. Practitioners may ordinarily profess these disciplines, while intermittently practising within the DH space, or identify primarily as working in DH. Some historians of DH trace the origins of the field to the 1940s, specifically to the collaboration between Roberto Busa and IBM on a computer-assisted concordance to the works of Thomas Aquinas.

To this timeline (and of particular relevance to the UK) may be added the contributions of humanists (classicists, lexicographers, linguists, bibliographers, and historians) to cryptographical work at Bletchley Park during the Second World War. Some historians of the humanities have seen DH as reconnecting the natural with the human sciences by occupying a common methodological ground with data science fields, applied to humanities' materials and approaches. Given the diversity of institutional affiliations, DH places particular emphasis on 'big tent' conversations,

aimed at the discovery of commonalities and differences, and on critical reflection on DH work.

Despite its fluidity, certain landmarks stand out, including a number of professional organisations, centres, degrees and training programmes. Informal networks of expertise, often specific to the local culture of an institution or region, offer pathways to DH that complement more formally accredited DH activities. DH centres may sit within a single department, across several, within a GLAM environment, an IT or academic support division, or as freestanding units supported by special initiatives. Their functions are diverse: typical activities include research support, training and formal teaching, professional engagement, provision of technical infrastructure, consultancy (from digital methods and strategies to grant writing), and hosting research activities in their own right. They may act as regional hubs, delivering training within a Collaborative Doctoral Partnership; acting as portals to global networks; or serving as hosts to major conferences, network meetings, or training events. The landscape within which DH centres are situated is continuously shifting: centres' responsibilities may overlap or complement fields such as data science, digital preservation, and heritage science. A centre's importance to DH within the wider academic landscape is proportionate to the density and quality of connections that this centre is able to sustain, and to the institutional commitment behind it. Those connections and commitments are sometimes fragile, dependent on key individuals with the energy and capacity to make innovative connections, or on flagship projects with specific lifespans.[6]

DH arguably also exemplifies wider values of academic hospitality and openness to collaboration, as competition between researchers intensifies. However, as it itself competes for resources, DH, like many new fields, has attracted critics. Criticisms include:

- DH lacks 'true' disciplinarity.
- It has lost sight of its humanistic origins.
- It is insufficiently engaged with critical or ethical issues, amplifying instead of challenging privilege.
- It is over-resourced, or under-resourced in relation to its broad remit.

6 As of December 2017, there were 13 Digital Humanities centres in the UK (Digital Humanities Research, Teaching and Practice in the UK Landscape Report, 2017).

- Its outputs have often not been sustained.
- Its leading practitioners are not representative of the people who work in DH.

DH, lacking a voice, sometimes finds it hard to respond to and act on these criticisms: it has also struggled to establish public recognition in the UK. The centralisation of both formal and informal networks risks reproducing structural biases, both within the field and the wider academic landscape. Problematising DH – understanding it as one counterpart to what Evgeny Morozov (2013) has called a naïve 'solutionism' – is therefore important to the health and vital connectivity of what, for all its vibrancy and recent rapid growth, remains a small and somewhat precarious field.

Recommendations

1. That the SSI continues its support for DH-specific conferences and training events. Its support for the Digital Humanities at Oxford Summer School (DHOxSS) is one such example, as is its support for DH-specific or affiliated training delivered through the Software, Data and Library Carpentry series.[7] A consistent presence at such events would grow the SSI's brand within DH.

2. That the SSI actively creates shared spaces between DH activities and areas of the digital social sciences and computer science by, for example, growing its cohort of Fellows within DH and/or creating interdisciplinary events.

3. That the SSI supports DH centres by publicising their activities, and by providing support for DH centre affiliates to participate in SSI programmes.

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[7] See <https://www.software.ac.uk/blog/2017-10-12-data-carpentry-humanities>

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Critical and ethical issues

The study of what it means to be human in the digital world is central to the Digital Humanities. DH practitioners do not just look at human activity through a digital lens, they also look at the digital from a human perspective. Historical DH practitioners, for example, may be concerned with the discovery of 'hidden histories' within the history of computing, and with revealing the importance of invisible labour, cultural contexts and biases, unintended consequences and benefits. In practical terms, this may mean that understanding the individual and collective histories within a digital project is a peer output to the immediate knowledge created by that project. Even technological failures and missed opportunities may turn out, when viewed from a humanist perspective, to have unintended lessons and new relevance.

Humanists' unique perspective is also relevant to ethical inquiries: to assess the social and cultural impact of new technologies; to detect the implicit assumptions in algorithms; or to contribute to the design of appropriate and accessible user interfaces. While research on the ethical implications of, for example, the

widespread deployment of Artificial Intelligence (AI) is an activity that is strongly supported by UK government and industry, it is typically oriented towards the establishment of universal standards for good practice, as only then can its findings be implemented in regulatory or advisory measures. The traditional humanities' contextual orientation may limit their input in policy debates organised around such universal outcomes and norms. The humanities tend to relativise, seeing local meaning in what others may simply describe as bias. The lack of technical understanding of many policy makers and analysts has been well documented – a lack that DH practitioners are in a good position to remedy. The debate about the risks of AI might be improved by the contributions of humanists (in particular, philosophers, media archaeologists, and historians of science and technology), who are both able to understand the history of fears about technology escaping our control and have a good understanding of our current capabilities. Similarly, concerns about online abuse and misinformation may, to some extent, echo those made during the emergence of earlier media: digital humanists are in a good position to say when such parallels are relevant, and to propose responses.

Recommendations

1. That the SSI commissions research, including public outputs such as talks or long-form publications, on the 'hidden histories' of computation.
2. That the SSI engages with digital humanists undertaking ethnographical and critical work, to highlight (a) their technical and other methods; and (b) how sustainability in software might itself be championed as an ethical practice.
3. That the SSI considers supporting research into AI and fairness, and other social and relational aspects of software, engaging with both humanists and social scientists inside and outside academia, perhaps via some of the newly established centres (such as the Ada Lovelace Institute, the Leverhulme Centre for the Future of Intelligence, the Turing Institute, or DeepMind Ethics & Society research unit).

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Career structures

The career of a digital humanist is typically less formalised than many research or academic-related pathways. DH practitioners can be found in a variety of roles, ranging from permanent, full-time academic posts to portfolio careers that shift according to opportunities arising from research grants and other academic needs. While there has been a general trend in university employment in this direction, DH – along with the more wide-ranging career of research software engineering, development and support that forms the SSI's core remit – has been a forerunner in this matter. This can be attributed to a number of factors: the relatively recent emergence of the field; a paucity of requirements for full-time teaching positions (in particular for DH as a standalone subject); and the diversification of academic and related employment in general, including in the GLAM sector. While academic posts (whether or not associated with a specific department or centre) are one marker of esteem, academic-related positions within DH may be equally competitive; they will face comparable issues around access, retention and career development; and merit equal recognition.

While DH benefits from the energy, enthusiasm and achievements of its practitioners, the field carries a cost of entry and an incentive to leave. Vulnerable to funding cycles or shifting institutional priorities, DH practitioners carry the double burden of responding to such opportunities as they may arise while also pushing back against the perception that their work is faddish. The reward for being a DH practitioner – for which many are prepared to tolerate its precarity – is the opportunity to work in what is perhaps the most vital area within the humanities at present. The risk, however, is that the discipline is not able to sustain its capacity, to the particular detriment of practitioners from less privileged backgrounds. Not only does the field risk losing some of its most talented and under-represented cohorts to more secure employment, there is also an opportunity cost in failing to attract

the most capable and energetic entrants who are unable or unprepared to undertake a risky career path. The challenges of mobility are acute in the Higher Education sector, where moving is almost an inevitable requirement of early or even mid-career practitioners. However, mobility incurs costs, while barriers to mobility across international boundaries are rising. These challenges are magnified in the DH community due to the particularly precarious nature of the work.

Progression within DH also carries risks. Since most DH careers are by definition atypical, practitioners are obliged to continually reinvent themselves. Digital scholarly editors, for example, must keep abreast of a wide range of debates within editorial theory and method, alongside broader technological developments, in order to keep their skills relevant. New methods compete for attention, while there may be perceived risks in over-specialisation. While a pattern of lifelong learning is both a necessary and intellectually benign fact of academic and professional life, it is hindered by inequalities of access. In humanities research, digital scholarly outputs may compete with more established formats, such as print monographs. There are few (albeit increasing) opportunities for teaching DH at an undergraduate level: at the graduate level, DH courses are less common than the introductory programming or statistics courses typically provided outside the humanities.

While the above portrait is one of general DH career structures, the career structures of RSEs within the humanities deserve particular attention. While few appear to identify as RSEs, personnel in software development roles can be found across the full spectrum of DH institutions. Their careers may be more formally defined in IT, research services, and GLAM organisations. As with other disciplines, 'informal RSEs' may be attached to projects and centres. In some cases, these personnel do not identify themselves as DH practitioners, preferring to define themselves by their skills rather than their materials - this may be an obstacle to recognition within the humanities which are traditionally oriented towards materials, linguistic communities or cultural forms rather than skills. In parallel, DH developers who do not identify themselves as RSEs (and who often have humanities rather than engineering backgrounds) may lack the skills accreditation and professional networks that allow more mainstream RSEs to move between projects and across disciplines according to the funding cycle. DH is nonetheless well placed to develop the role of the RSE within the humanities. The SSI likewise plays a valuable role in both skills and career development for DH practitioners within the broader category

of software expertise. This is done by its appointment of Fellows,[8] its support for DHOxSS and other training events, and for its overall support for the accreditation, training and career development of RSEs. With its national remit, broad sectoral profile and cross-council funding, the SSI represents a suitable hub for the sharing and multiplication of skills, knowledge and professional esteem. It is crucial, therefore, that the SSI finds a way of maintaining its advocacy of and service to RSEs as a cross-disciplinary community, while balancing the profession's skills-based orientation with an appreciation of disciplinary backgrounds and the needs of specific research communities, such as DH.

The role of the project lead in DH also merits attention. While some have followed DH throughout their careers, others are established academics in their home disciplines before embracing DH. For this latter group, a funded DH project can be their first experience of running a large team whose skills and methods reach beyond their own. Tasks involved include leading a diverse team to produce a suite of outputs, technical and subject-based, in support of answering its research questions, while managing the project, its technical delivery, sustainability and legacy, finances and reporting, and ensuring compliance with *The Concordat to Support the Career Development of Researchers* to enable career development of team members.[9] A well-managed project will deliver better and more sustainable outputs on time and budget, and support the careers of people engaged in all aspects of its work. While most institutions offer services to support many of these aspects, the SSI is well placed to endorse formal training in leadership and management training for people new to this role.

Recommendations

1. That the SSI's ongoing survey of RSEs across the disciplines includes a remit to identify those with humanities training or who are currently employed in humanities research. While the term RSE is increasingly accepted, a particular focus might be placed on identifying the backgrounds and career pathways of colleagues who may perform the tasks of an RSE under a different name.

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8 Including James Baker, Melodee Beals, Adam Crymble, , Stuart Dunn, Heather Ford, Terhi Nurmikko-Fuller, Catherine Smith, and Reka Solymosi. See www.software.ac.uk/about/fellows.

9 Vitae, 2008 – 2019. *The Concordat to Support the Career Development of Researchers*, <https://www.vitae.ac.uk/policy/concordat/Download_Concordat_PDF>

2. That the audit be widened, in collaboration with a DH centre or national body, to include a survey of DH practitioners as a whole. It would be tasked with identifying typical career paths, taking in qualifications, training, promotion, pay and other markers of esteem, perhaps in relation to a skills and competencies framework, such as SFIA.[10]

3. That the SSI publicises RSE training events to DH practitioners, while maintaining the Institute's cross-sectoral character.

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Sustainability in perspective

Discussion of sustainability in DH, often implicit in discussions about training, infrastructure and the wider intellectual landscape in which DH is practised, is rarely framed within workflows to assure its practical implementation. The sustainability of DH is directly linked to the impact of the activities within which digital resources and methods are involved.

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10 Skills Framework for the Information Age, <https://www.sfia-online.org/en/framework/sfia-7>

Within those activities, DH is variably recognised. Software is often seen as a research auxiliary rather than a research output. Citation of digital resources in journal and other publications is uneven, while citation of software tools is even less common. A similar pattern can be seen across the entire academic landscape within which the SSI practises, but the sustainability problem is particularly acute, given the fragmented nature of DH infrastructure, the fragility of institutional support for many centres, the isolated or informal nature of many DH projects and practitioners, and the perceived novelty of digital research outputs within the Arts and Humanities. Funding guidelines themselves may encourage the impression that digital activity and outputs are secondary to other forms of research – this is particularly the case with reusable digital resources for which the specific research case is broad. However, sustainability of digital resources, methods and tools is increasingly required by funders.

A parallel can be drawn with preservation, a statement on which is now mandatory for AHRC applications, in harmony with the other UKRI research councils and replacing the existing Technical Plan. Another positive development is funders' encouragement of open source and Creative Commons licenses, as well as a greater awareness of the ongoing costs of infrastructure. But while technical sustainability is understood as a necessary cost of doing business within DH, it is not as widely accepted that sustainability – and reproducibility – offer an opportunity to multiply the impact of research beyond its immediate objects: that the best use of a project's data, tools, and methods may be made by someone else.

Sustainability is often considered a purely technical issue, for example relating to the continued availability of a digital resource or tool, rather than a multi-layered concept that includes methodological sustainability, institutional, political and economic factors, and the ability of others to comprehend and build on existing outputs. There are few incentives for digital projects to document their method and pass on lessons learnt – a form of the general reproducibility problem that is perhaps particularly vexed in the humanities due to the sui generis nature of humanities datasets and research questions. Humanists themselves may be reluctant to adopt shared standards due to a belief (often justifiable) in the uniqueness of their research materials, and in the approaches that they wish to take to communicate their findings to their audiences. While scientific findings must be repeatable, humanities monographs cannot be.

Even when sustainability is narrowly comprehended as the continued availability of a digital resource, tool or approach in the form intended by the original researcher or developer, the landscape is oriented more towards capital investment in the new than towards recurrent funding to sustain (and reproduce) the intellectual and other investments that have already been made. Digital resources and tools begin to atrophy as soon as they are launched. More positively, humanists have a vital role to play in exploring and critiquing the affordances and biases of digital tools – a role that would be greatly enhanced by their having more input into tool- and resource-making at all stages of their development (one model here is the advisory boards that commonly exist for digital publishing platforms and journals). DH practitioners have an important role to play as assessors of the suitability of existing or envisaged software tools and infrastructure: many DH practitioners would wish to connect such a humanistic user-experience research role with the broader critical assessment of software as such and across the disciplines.

Perhaps the biggest challenge to sustainability and reproducibility in the Digital Humanities is the perceived cost of failure. Few projects are prepared to admit to failure, in the same way as observers of the reproducibility problem have noted there are fewer incentives to report negative results from medical trials or scientific experiments.

Due in part to the institutional, personnel and disciplinary issues mentioned above, DH work is particularly risky. While there is a large corpus of models of best practice, technical advice and proven methodologies in software development and project management, this expertise is rarely surfaced in DH work other than in the most experienced centres. There is a need for skills and training accreditation, success benchmarking and incentives for professional development and entrepreneurial risk, so that the cost of failure is not career-ending. The risk issue – and the perceived cost of failure – are in part behind DH's historical reluctance to 'think big': a reluctance based on the absence of a strategic approach within the sector. Despite these challenges, the Digital Humanities in the UK have, over the past two decades, generated a body of digital work that is in many ways exemplary in terms of innovation in methodology, its scale and breadth in reaching across disciplines, and in its broad impact inside and outside academia.

Recommendations

1. That the SSI further engages with the Digital Humanities community to champion good practice in software engineering and software and data lifecycle management.

2. That the SSI works with funding bodies to promote calls for infrastructural projects that, while predicated on specific research questions, are also in a position to change course or respond to new areas of research.

3. That the SSI considers commissioning 'project histories' from DH practitioners with historical and ethnographic skills, showcasing lessons learnt from both successes and failures in digital projects, and foregrounding exemplary Digital Humanities software.

4. That the SSI provides toolkits and tutorials on software citation, and sample Service Level Agreements (SLAs) and governance documents for project planning and end-of-life care, covering documentation, digital preservation, licensing, discoverability, virtualisation, etc. The SSI could also promote good practice by acting as a hub to connect small stakeholders with larger institutions.

5. That the SSI works with centres and trainers (The Carpentries, etc.) on accrediting training programmes in sustainability for DH resources, and other transferable skills.

6. That the SSI surveys the 'infrastructure gap' between humanities and other disciplines, and report on ways of overcoming its fragmentation both within the humanities and, moreover, between the humanities and other sectors.

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