

PART IV

IV.2 DIGITAL HUMANITIES: EMERGING PARADIGMS

Humanities in a Digital World

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Introduction

The following chapter discusses the influence of the digitisation on the humanities, reflects on discussions about the *Digital Humanities*, and investigates their influence on higher education, funding, institutions and the public.¹

The terms *Computational Humanities*, *eHumanities*, *Digital Humanities* and, formerly, *Humanities Computing* more or less refer to the same concept. However, as the Digital Humanities are an emerging field, defining and delineating them is still an ongoing endeavour as well as a favourite pastime of scholars in the field, as evidenced by several publications attempting to shed light on this question (cf. Callaway et al. 2020; Gold and Klein 2020; Schreibman et al. 2016; Terras et al. 2013). It is also a recurring topic at panels, on blogs, social media accounts,² dedicated websites³ and, anecdotally, countless conference dinner discussions. Like all computing-related areas, the Digital Humanities are relatively new, with their roots being attributed firmly – albeit in a rather philology-centric manner – to the late Jesuit scholar Roberto Busa and his ground-breaking collaboration with IBM on creating the *Index Thomisticus*, a concordance of the complete works of St Thomas Aquinas. Pinning down an emerging area is always difficult, but in the case of the Digital Humanities this is exacerbated by the multitude of humanities disciplines it implies a connection to: linguistics, literature, theology, history, philosophy, archaeology, history of art, ethnology, classics, Egyptology . . . to name but a few. The Digital Humanities are thus not only *interdisciplinary* in the sense that they intersect computing and the humanities, but also *multidisciplinary* in the application areas themselves. Furthermore, the *social sciences* are often also included as Digital Humanities and Digital Social Science share similar digital methods. On the other hand, disciplines such as *history of art* and *theology* may employ very different digital methods, the former focusing on objects and images and the latter on texts. These factors contribute to a field that is still converging and fractured. Consequently, Digital Humanities scholars may have very different views of their field, depending on whether their background is in *literary studies*, *history* or *computational linguistics*. Related and equally disputed is the question of whether the Digital Humanities can be viewed as a discipline in their own right or merely as an auxiliary research area, which solely offers a new set of digital tools to existing disciplines.

In this chapter, we use the term *Digital Humanities* (DH) in a broad sense, covering all efforts of *utilizing and developing digital data and digital methods in and for the humanities disciplines*. The degree of digitisation can range from fairly light (e.g., utilising digital media for data presentation) to very sophisticated (e.g., developing novel algorithms for analysing

research data from the humanities). To illustrate the different ways in which digital methods can permeate the humanities, in the next section we classify DH research in terms of the degree of digitisation involved and the amount of computing expertise required, identifying five broad categories.

The following section explores how digitisation influences the humanities with respect to methods, research and funding, institutions and public engagement. We also discuss what contributions the humanities can make to a digitised world and take a critical look at the responsibilities of DH research.

How Digitisation Transforms the Humanities

We characterised *Digital Humanities* as an umbrella term for all efforts of *utilizing and developing digital data and digital methods in and for the humanities disciplines*.

As an *emerging* interdisciplinary field, the Digital Humanities are still undergoing a consolidation process. Independent degree courses only started a few years ago, which means that the first ‘native’ digital humanists are now at the master’s or early PhD stages of their career. Established scholars in the field, on the other hand, typically have a background in either the humanities or computer science (and in rare circumstances, both) and acquired their DH expertise as an additional skill.

Until this process of consolidation is completed, we observe that Digital Humanities are mainly approached from two directions: either *digitising traditional humanities methods* or, alternatively, *applying methods from computer science to traditional or new humanities research questions*.

Towards (Common) Digital Humanities

Nearly all *humanities* disciplines have opened up to the ‘digital’, albeit to varying degrees. From the application of topic modelling in literary studies, the use of geographical information systems in history and gamification in classical archaeology, to the study of computer ethics in philosophy, it is hard to find a field of ‘traditional’ humanities that does not adopt computational methods, work with digital media, study the digital world or attempt to digitise and quantify traditional approaches.

The *digitisation of traditional humanities methods* is a natural consequence of the second industrial revolution – the *digital* revolution – that has changed almost every aspect of our lives, including the way we work. In this sense, research and education of traditional humanities scholars changes as rapidly as any other area of work through the ever-ongoing digitisation. In the case of the Digital Humanities, this includes the process of employing digital platforms for annotating a text and other forms of media. As long as scholars have pursued them, critical reading, reflecting, commenting and linking of sources has been a fundamental method of any humanities research effort. In the object- and picture-oriented disciplines, such as archaeology or history of art, critical reading has always been accompanied by ‘critical viewing’. Where these methods have been employed conventionally with pen and paper, today the Digital Humanities provide researchers with tools to perform them digitally, share annotations and results or provide and receive feedback in real-time.

With the digital revolution, humanities necessarily adopt the study and production of so-called *born-digital material*, i.e., data that has emerged in a digital form. Most prominently, researchers ‘harvest’ this data off the Web, e.g., from social media outlets, digital newspapers or computer games. Humanists today study phenomena that only arose a few

years ago, such as the rise and decline of ‘memes’ as a form of online communication. In the fine arts, the humanists have also become producers of born-digital material.

Digital Humanities efforts that include the *application of computer science methods* focus on bringing innovation to the humanities either in asking new questions that could previously not be answered, or reiterating and reinvestigating traditional research questions.

For example, the application of machine learning techniques helps literary scholars investigating large corpora of fictional works, such as novels or screenplays. Machine learning techniques can be employed to analyse sentiment and its change through time and genres. On the other hand, network analysis methods which use mathematical principles of graph theory are used in the social sciences and the humanities, as this is an approach that can be used to investigate (large) social networks – of real human beings and fictional characters alike. Both of these efforts were pursued before digital methods were available, but they used to require tedious manual and intellectual work. In this example, we see the potential and the limitation of the application of computer science methods.

Especially with regard to studies of textual data, algorithms are widely agnostic to the research question they are applied for. The implementation of these techniques becomes more and more independent from the data it is applied on as *machine* learning approaches progress towards *deep* learning approaches, i.e., techniques that use deep neural network architectures to learn representations of data. In the end, machine learning techniques do not distinguish between data from the biomedical, chemical or literary domain.

Both of the directions we observe when we speak of *Digital Humanities*, *digitization of humanities methods* and *the application of computer science methods to humanities research questions*, do not alone mean that the Digital Humanities are a discipline in their own right yet. They are rather a necessary consequence of the digital revolution, a next step in evolution of the humanities.

Consequently, the field of Digital Humanities is still in the process of developing its *own* methods, and theories. Dedicated DH programmes and professorships, organisational and interdisciplinary networks, and publications venues, which have been founded by a large, diverse and active DH community across the globe, bring different efforts together in order to elevate Digital Humanities as a discipline, a field in their own right.

Digital Methods in the Humanities

Digital approaches transform the humanities. Today, even the most tech-reluctant researchers cannot shy away from using technology in their everyday scholarly work. While twenty years ago, the occasional ‘technology resister’ was still a more or less common phenomenon within *humanities* departments, today even self-declared adversaries of the *Digital* in the *Humanities*, take technology – especially academic communication, e.g., via email and the use of the internet – for granted and use it naturally in their academic work life.

In Figure 14.1, we present five groups of research efforts, which are shared by both the ‘traditional’ humanities and the Digital Humanities. Without claiming universal validity, we sorted them by their sophistication, respectively the amount of skill they require. Of course, not every research project will employ all method spheres. Neither does a project that makes use of single digital aspects of those spheres necessarily deserve the term ‘Digital Humanities’ project. The five groups should rather be interpreted as a guide for those readers who are not yet familiar with the different tasks that are implied when we

Table 14.1 Traditional and digital examples of the five spheres of research efforts

<i>Traditional humanities example</i>	<i>Research effort</i>	<i>Digital Humanities example</i>
Printed monographs, book chapters and journal articles	Presentation	Digital editions, enhanced publications, open access monographs
Close reading, note taking, interviews, excavations	Data collection	Retrodigmatisation, digital annotations, collecting social media trends and raw data
Working with indexes or translations	Application of tools	Text mining tools, network visualisation
Freudian analysis of characters in prose texts	Application of theories and methods	Application of graph algorithms (e.g. Dijkstra) to character network analysis in novels
V. Propp: <i>Morphology of the Folktale</i>	Development and evaluation of new theories and methods	Automatic argumentation analysis, object mining

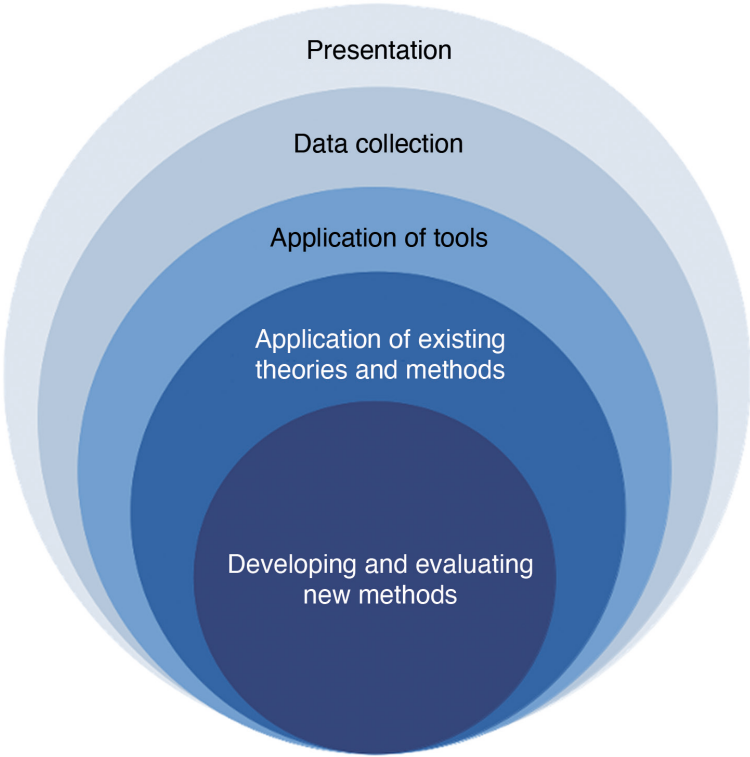


Figure 14.1 Research efforts in the humanities

speak about ‘Digital Humanities’ research. In Table 14.1 we present examples for traditional and digital efforts, which fall into these five categories.

The outer layer of Figure 14.1, **digital presentation**, refers to approaches that expose research findings to a wide audience in a digital form. It can come in the form of a blog,

a website, a Twitter account, an open access monograph or a digital exhibition, to name but a few.

New digital presentation formats that amplify and enhance humanities *publications*, such as single-source XML publishing, and the connection between freely accessible research data and traditional, albeit digital, monographs, yield major advantages for the humanities as a whole. They also allow the reader to engage with the research output, e.g., the monograph, in a new way. Social reading approaches, such as the hypotheses project,⁴ foster scholarly communication by connecting author and recipient of monographs and articles. They can also be used in teaching, providing a tool for collaborative close reading.

While the presentation of research findings in a digital way is an important sub-task of the Digital Humanities, it alone is not sufficient for the transformation of a humanities project into a Digital Humanities project. A DH project typically needs either to digitally transform traditional humanities methods, or apply existing computer science techniques to a humanities research question.

Often digital presentation is the final step in a pipeline of data acquisition, data curation, preservation and archiving, subsumed in the **data collection** layer. Nevertheless, the presentation layer is crucial to any DH research project, as it displays and connects all previous project efforts and yields the publication of the final research outcome. The digital presentation efforts of the outer layer are typically fulfilled by a digital, open access publication, as adhering to the principles of open science in general and open access in particular lies at the very core of the Digital Humanities.

Both of the aforementioned branches, the *application of computer science methods* and the *study of born-digital material* go hand in hand with the need for digital data, preferably of high quality, and providing additional metadata. Where material is born-digital, it may need to be collected or 'harvested' from the internet. Where it is analogous, the data has to be provided by third parties, such as libraries which digitise their collections and make them available to the public, or created by teams of humanities scholars and IT experts when the expertise of both is needed for the production, e.g., of creating digital models of lost artefacts. The process of digitisation also includes the identification of material worthy of digitisation, interesting enough to be studied and made available for future research. Digitisation efforts should never only be made for the sake of a single research project but should take future-use cases in mind when choosing material, providing metadata, as well as storing and archiving the final results.

The presentation layer also includes the visualisation of Digital Humanities research findings which are typically produced through the **application of tools**. Visualisations should follow design and gestalt principles and have to take the needs of future recipients into consideration, including users with reading or perception disabilities. Furthermore, all visualisation efforts should be sensitive to common discrimination and bias pitfalls.⁵

Digital Humanities **tools** are usually developed for a broad spectrum of research efforts. Lists and tool registries⁶ can provide an initial overview about software products and web applications in the Digital Humanities. However, they are often not particularly helpful if a researcher is looking for a tool which fulfils specific requirements. On the one hand, DH tools should be universal enough to be used in different contexts, while on the other hand they still need to cater to specific needs of a field or research endeavour. Software development for the humanities finds itself in multiple dilemmas at once: the dilemma between universality of applications and specificity of requirements, the need to adhere to software engineering principles such as portability while working with limited resources, and the dilemma of providing a sustainable product in a research project with fixed-term

funding. As a consequence, the humanist as a user might find herself in the position that a tool that provided a service at one point will be out of maintenance and likely unusable a few years later.

The two spheres at the bottom of Figure 14.1 – **application of existing theories and methods and developing and evaluating new methods** – additionally presuppose medium or advanced programming skills. We argue that digital humanists with a traditional humanities education can apply the three outer spheres with reasonable training effort. For the two inner circles and especially the development of brand-new algorithms and methods, they should engage in shared projects with computer scientists and IT specialists.

Porting existing digital technologies and theories from the sciences to the humanities frequently leads to exciting new findings and insights. One example is the application of phylogenetics in biology and (historical) literature research (Atkinson and Gray 2005; Robinson 2016). The process of applying methods from other fields always requires creativity, and the ability to think out of the box from the humanities. The scholars have to be willing to familiarise themselves with techniques from fields that appear very far from their area of expertise. Therefore, the Digital Humanities are *interdisciplinary* and *multi-disciplinary*. This interdisciplinary principle however does not end by connecting one humanities discipline with the sciences. It also allows collaboration between various fields of the humanities and encourages cooperation between the humanities and the sciences. For instance, studying human-machine interaction with regard to digital museums and art collections needs expertise from the fields of museology, art history, psychology and computer science.

The innermost sphere, the development of new methods yields the biggest chance for the Digital Humanities. These efforts do not stop at re-combining techniques and data in a new way, but they create research questions and findings that could not have been produced outside of the Digital Humanities. These efforts provide the arguments for defining DH as their own discipline.

All the spheres we presented share a common requirement towards the humanities scholar: they all require *digital literacy*, i.e., the ability to analyse and interpret results delivered by tools or algorithms. This includes the ability to interpret graphs and visualisations beyond what is obvious.

Whether or not core efforts of the humanities are transferred to the digital, what remains unchanged is the need for critical thinking – a fundamental effort that cannot be replaced or digitalised.

The European Digital Humanities Landscape – Institutionalisation and Internationalisation

The Digital Humanities communities in Europe form a well-connected network. Credit for this extensive network is mainly due to a number of infrastructure projects which dedicate constant time and effort to building and maintaining connections on national and international levels. One of those projects is *DARIAH* (Digital Research Infrastructure for the Arts and Humanities), which facilitates cooperation between nineteen member countries and eight cooperating partner countries across Europe.⁷ DARIAH connects scholars with similar research interests via their working groups, such as, for example, the geohumanities group. DARIAH's regional hubs help foster Digital Humanities in partner countries. Furthermore, DARIAH invests time and resources into promoting Digital Humanities teaching. Its course registry currently lists 214 courses and degree

programmes at undergraduate and graduate levels. Teaching material and an extensive Digital Humanities bibliography are also provided.

CLARIN (Common Language Resources and Technology Infrastructure) is a project focused on the sustainability and accessibility of tools and resources developed for European languages. CLARIN provides easy access to language data in written, spoken or multimodal form. They also provide educational resources, host events and provide funding, e.g., for workshops.

In total, twenty-five countries and intergovernmental organisations participate in CLARIN – either as members or observers. Each member sets up a national consortium, consisting of multiple national organisations, such as universities, libraries or archives. An institution can become a CLARIN centre if it provides specific services to the CLARIN community.

- B-Centres: technical service providing centres
- C-Centres: metadata providing centres
- E-Centres: external centres, which are not part of a national consortium but render central services
- K-Centres: knowledge providing centres

Both CLARIN and DARIAH are organised as ERIC (European Research Infrastructure Consortia).

The *PARTHENOS*⁸ project aims at strengthening the cohesion of research in the broad sector of linguistics studies, humanities, cultural heritage, history, archaeology and related fields through a thematic cluster of European research infrastructures. Currently, the *PARTHENOS* consortium consists of sixteen member organisations and infrastructure projects. Its efforts relate particularly to the sustainability of Digital Humanities data, its standardisation and interoperability, to data quality assessment and Digital Humanities methods, amongst many more. *PARTHENOS* additionally published a Foresight report,⁹ in which a survey of forty-one interviews was evaluated, identifying trends, obstacles, potentials and requirements within the Digital Humanities.

The Foresight study identifies five main fields of interest: public engagement, research infrastructure, development of the digital commons, artificial intelligence, and impact and evaluation.

The European Union funds a number of Digital Humanities-related projects. Among the projects funded through the Horizon 2020 (2014–20) and previously FP7 (2007–13) programmes,¹⁰ 170 included ‘Digital Humanities’ or related terms in their title or project description. We filtered those programmes and investigated them in terms of

Table 14.2 Top three countries by project participation and coordination of projects

	Coordinator	Participation
FP7 + Horizon 2020	UK: 36	UK: 62
	IT: 26	DE: 47
	DE: 16	IT: 45
Horizon 2020	UK: 21	UK: 35
	IT: 15	IT: 23
	FR: 12	DE: 22



Figure 14.2 Number of projects per country (participation including coordination) © EuroGeographics for the administrative boundaries

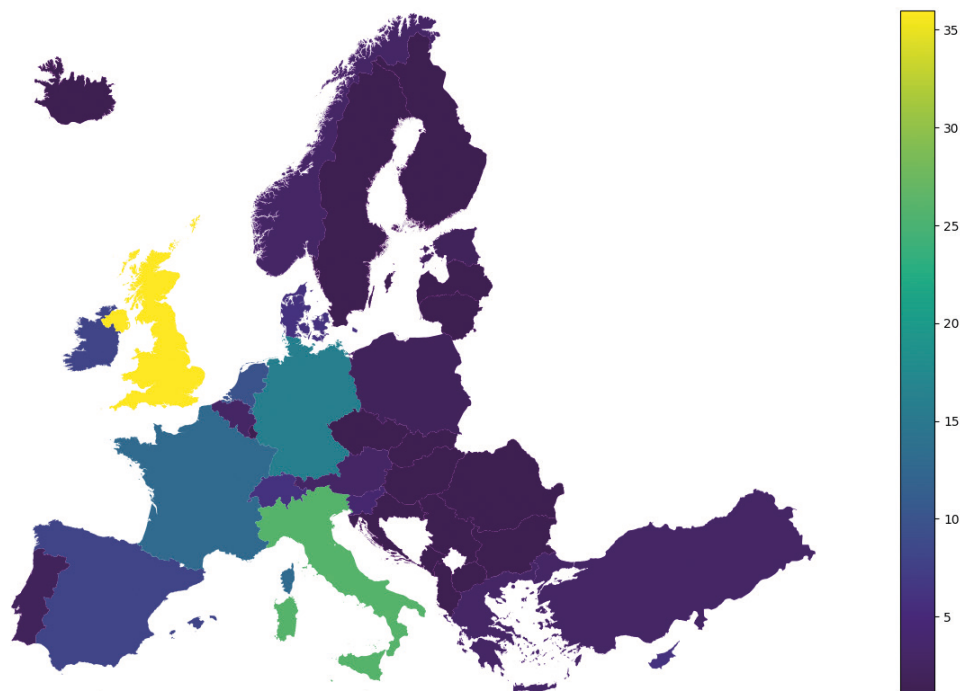


Figure 14.3 Number of projects per country (coordination) © EuroGeographics for the administrative boundaries

their geographical distribution. The data for Horizon 2020 and FP7 shows a strong over-representation of Western and Southern Europe when it comes to both project coordination and participation in projects with multiple partners. The United Kingdom, Italy and Germany are the most active in terms of Digital Humanities projects. Eastern European countries are still under-represented both in project lead and international project association. This tendency is still apparent if we only consider the Horizon 2020 projects.

The majority ($n=80$) of Digital Humanities projects funded through Horizon 2020 or FP7 include institutions from one country only.¹¹ Twelve projects included partners from two to ten different countries, and only four projects included between eleven and sixteen different countries. Only the ARIADNE Plus project had a very high level of internationalisation, with twenty-seven participating countries worldwide, including partner institutions from the US and Japan.

While certainly improvable, this shows an encouraging trend in internationalisation for the Digital Humanities. It is to be hoped that this trend will extend to institutions from Eastern and South-Eastern Europe in the future.

Pan-European organisations such as the EADH¹² can aid in achieving a more balanced representation of nations and cultures within the Digital Humanities community in Europe. Ultimately, it is the responsibility of the individual researcher or research team to become part of a larger international Digital Humanities network by making use of research infrastructure, engaging in an international project or becoming a member of the EADH.

Additionally, HERA, the Humanities in the European Research Area network, comprises twenty-six national funding agencies and is dedicated to fostering cross-European



Figure 14.4 Participation in HERA I funding calls: Cultural Dynamics and Humanities as a Source of Creativity and Innovation. *Note:* dark green: participating; light green: not participating; grey: not a member © EuroGeographics for the administrative boundaries

collaboration and knowledge exchange in the humanities. One of HERA's key principles is 'that historical, cultural, artistic and philosophical knowledge is indispensable for understanding humanity's past, for dealing with the key societal challenges of the present, and for imagining possible futures'.¹³

As of 2019, seventy-five projects had been funded by the HERA network together with the European commission in five funding lines with about 47 per cent of them having a Digital Humanities component (see Table 14.3)

Between 2009 and 2019, the HERA members participated differently in the four funding calls, divided into five programmes, as shown in Figures 14.4–14.7.

HERA I–III funded fifty-five research projects with 76 million euro in total. HERA IV (*Public Spaces*) provided funding for twenty international research projects with 20 million euro.

We investigated which of the digital methods introduced in Figure 14.1 the HERA-funded DH projects used by reviewing the project abstracts on <http://heranet.info> and the project websites where available. As expected, the outer layers of our methods schema are represented the most, whereas the methods that require a higher technological skill level are less frequent (see Figure 14.8).

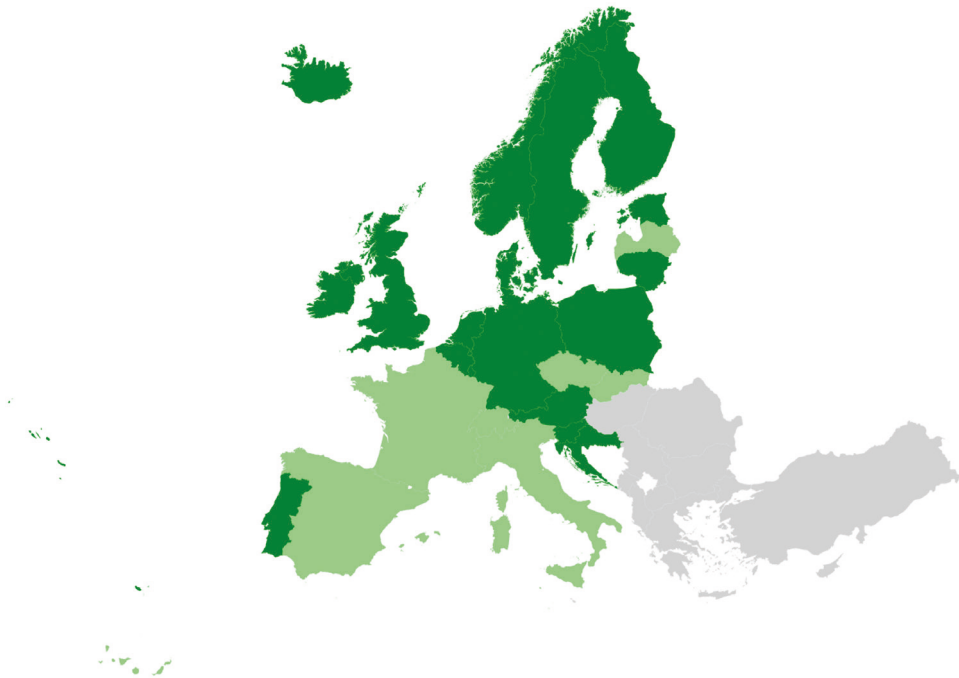


Figure 14.5 Participation in HERA II funding call: Cultural Encounters. *Note:* dark green: participating; light green: not participating; grey: not a member © EuroGeographics for the administrative boundaries

Table 14.3 HERA-funded Digital Humanities projects by HERA calls

HERA call	Period	Number of projects with DH aspects/ Total projects
Humanities as a Source of Creativity and Innovation	2009–12	4/9
Cultural Dynamics: Inheritance and Identity	2009–12	4/10
Cultural Encounters	2013–16	2/18
Uses of the Past	2016–19	1/18
Public Spaces	2019–22	5/20
Total		16/75

The Role of GLAM Institutions within the Digital Humanities

GLAM (Galleries, Libraries, Archives and Museums) institutions are vital for the success of many Digital Humanities projects. GLAM institutions build a metaphorical ladder to the ivory tower. Firstly, they can close the gap between the researcher and the public by making research output, tools and data resources – and naturally publications – publicly available long term.

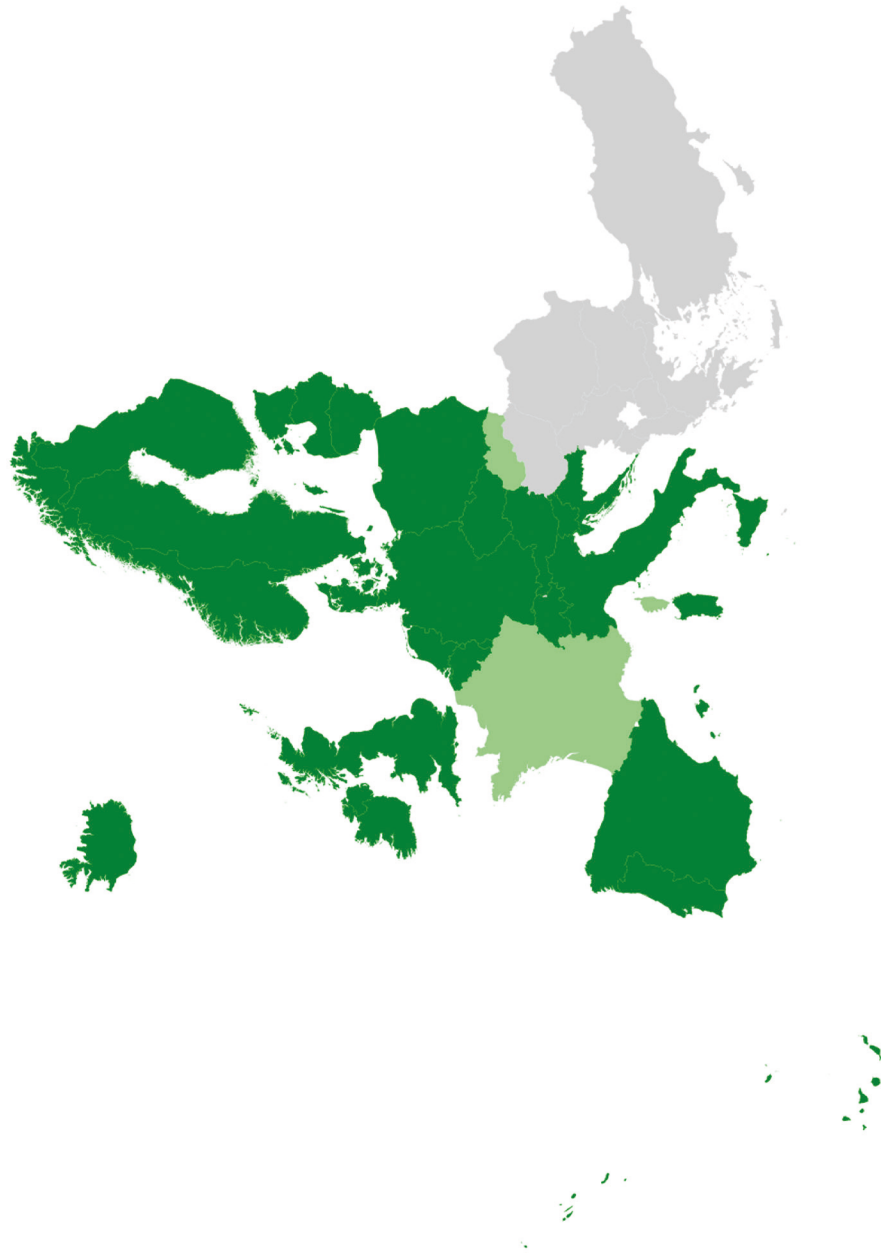


Figure 14.6 Participation in HERA III funding call: Uses of the Past. Note: dark green: participating; light green: not participating; grey: not a member © EuroGeographics for the administrative boundaries



Figure 14.7 Participation in HERA IV funding call: Public Spaces. *Note:* dark green: participating; light green: not participating; grey: not a member © EuroGeographics for the administrative boundaries

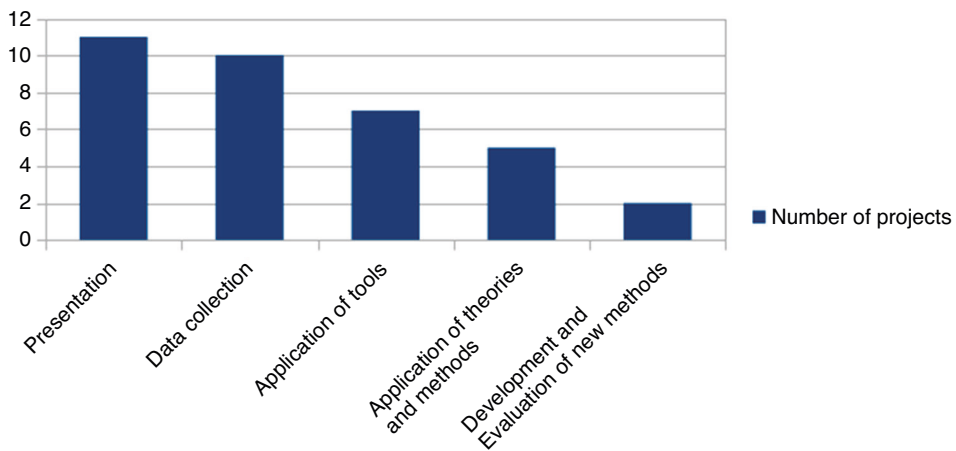


Figure 14.8 Distribution of Digital Humanities methods in HERA-funded projects

Long-term availability of digital research output on institutional repositories and servers can only be guaranteed if an institution commits to providing infrastructure over an indefinite time period. Due to time-limited funding, most research groups are unable to make a commitment exceeding the research and development stage. Scientific libraries are a key partner to host and maintain project output long term, e.g., by providing repositories for

Table 14.4 Involvement of GLAM institutions in FP7 or Horizon 2020 projects

Institution	Number of projects involved
Galleries	4
Libraries	12
Archives	5
Museums	8
GLAM institution (any)	19

research data. Larger libraries sometimes employ a team of software developers and IT specialists to maintain software. Smaller Digital Humanities projects unable to employ their own developers might be well advised to contact their library to find out if such a team exists. The German research funding agency DFG has a specific funding line for libraries and information systems (LIS). Fruitful cooperations between faculties and libraries have yielded many successful Digital Humanities projects, e.g., the TextGrid tool¹⁴ for creating digital editions. A designated team of developers for Digital Humanities projects, i.e., experts who are trained in software development and understand the needs of humanities scholars, will be able to assist researchers with their project planning, from funding applications to drafting of technical requirements, sustainable software development, and research data management. The role of larger scientific libraries slowly shifts from being a mere supplier of information services to becoming providers and maintainers of research infrastructure.

Historically, scientific libraries and archives have also provided a significant amount of data that is the foundation of digital research by digitising their historical collections. Almost all major libraries have dedicated time and resources to digitise at least parts of their old manuscripts, books and newspapers. High-quality images of old manuscripts are not only fundamental for the development of tools, e.g., for Optical Character Recognition (OCR), the application of new techniques, such as the study of printer’s ornaments using machine-learning techniques,¹⁵ but they also provide means to preserving the original manuscripts and to making previously hidden gems, such as the British Library’s illuminated manuscripts, available to the public.

Of the FP7 and Horizon 2020 funded projects we investigated in the previous section, GLAM institutions were involved in nineteen projects (c. 10 per cent, see Table 14.4). The project with the most involvement of GLAM institutions (as provided in the Cordis data) was the Integrated Platform for the European Research Infrastructure on Cultural Heritage (IPERION CH) with ten GLAM institutions (three galleries and seven museums).

Excursus: Digital Humanities and the COVID-19 Pandemic

As the global COVID-19 pandemic has influenced scholarly work in all disciplines around the world, the Digital Humanities community reacted swiftly by providing content, data, analyses and new projects.

Some of the responses included simply advertising what already existed: digital museum collections and exhibitions, digitised material such as books and tutorials, or humanities commons and open culture material. During the first few weeks of the crisis digital humanists shared their favourite DH resources on social media. While the public was confined at

home, the nationwide lockdowns across the world seemed to herald the time to shine for existing DH projects.

Early on during the pandemic, humanities' research teams, individual researchers and teams worked to put their expertise to good use in the fight against COVID-19, the presentation of information to the public and the fight against online hate speech and misinformation.

Digital Humanities Resources and Projects Regarding COVID-19

The outbreak of the global pandemic was not only a worldwide phenomenon, it was also widely a digital phenomenon. Political measures are discussed on social media, fake news is spread, art and literature is created and shared online. These materials are not only important for the people who produce and access them now, they are also possible research objects in the future.

Therefore, the Digital Humanities community has reacted swiftly, e.g., in harvesting online data from social media or newspapers, creating corpora and applications that use those data for different forms of DH research. For instance, CLARIN is maintaining a list of COVID-19-related language resources and NLP tools.¹⁶ As born-digital data is collected, e.g., from social media or newspaper sources, computational linguists can study language-related phenomena, and social scientists will be able to study community responses to lockdown announcements. One of those new corpora is the CORD-19 dataset that provides more than 199,000 scholarly articles on COVID-19.¹⁷ Language researchers from around the world joined the efforts to gain insights from the large amount of textual data, e.g., through a shared task on predicting the informativeness of tweets about COVID-19.¹⁸

Museums' Response to the Crisis

The Network of European Museum Organisations (ne-mo) conducted a survey on the digital response to the COVID-19 outbreak-related closures of museum facilities.¹⁹ They found out that more than 60 per cent of museums that answered the survey have increased their online presence in one way or the other. The online activities included social media presence, podcasts, virtual tours and much more.

About 30 per cent of the museums changed staff tasks, and about 13 per cent allocated resources to online activities. Those museums that allocated resources were most likely to start new forms of online engagement or increase their existing digital efforts. In particular, museums from Norway, Spain and Austria stood out in terms of (re-)allocating resources and increasing services. Unsurprisingly, it is way more likely for museums to increase existing efforts than to start new activities.

Naturally, the biggest increase could be observed in online activities that do not require additional training, e.g., using hashtags on social media or adding to existing online collections.

Therefore, while the global COVID-19 outbreak was certainly a curse for GLAM institutions, it was at the same time a blessing for their existing digitisation efforts. This survey shows us how essential it is that museums receive dedicated funding for their digitisation efforts, including funding for professional training. We see that those museums which previously started to engage in online activities are coping better with the crisis than those which did not. We also see once again that museums are able to render a service to the public not only locally, but worldwide, if and only if they adhere to the open data/open

access principles. In making their collections available, they provide access to cultural heritage education to *everyone*.

Forms of Scholarly Interaction in the Wake of COVID-19

Since the outbreak of the pandemic and the steep rise of infections in early 2020, many scholars were confined at home, either due to regulations by their research institutions or their own or their family members' health concerns.

Fortunately, many scholarly events such as summer schools or conferences decided to move to digital venues. In different formats, conference hosts tried to compensate for the lack of personal communication while giving participants the chance to engage with content and presenters. To that end, chat systems, face-to-face video conferencing, discussion forums or video lectures have been employed, to name but a few. Host universities and organisations are now faced with new infrastructure challenges, such as limitations in server uptime, or managing participation from different time zones. With less infrastructure costs for travelling, hiring location venues, conference dinners and hotels, many events are now free of charge or at least at significantly reduced participation costs. Participants from underfunded institutions or departments, especially from non-Western countries, can now participate more easily in global events. In a sense, access to data suddenly became more important than institutional affiliation.

In this regard, despite the countless negative effects of the pandemic on the lives and livelihood of people, the COVID-19 outbreak has accelerated innovation and accessibility in the academic world to a certain degree.

Conclusion

All in all, we see that the COVID-19 pandemic highlighted the strengths of existing digital efforts and paved the way for innovative approaches, but it also revealed desiderata.

Most importantly however, humanists play an important role in monitoring and evaluating the state of human rights during and after the pandemic. Why did some nations deal better with the COVID-19 crisis than others? Were the legal and ethical costs for preventing the spread of the pandemic worth it? How does the crisis stress existing social inequalities?

In the end, historians, linguists, media and communication theorists and other humanists will decide how much we as global societies learn from this crisis and how we cope with its effects in the future.

Digital Humanities and Public Engagement

In a digitised world, citizens become producers of digital data and cultural items. Humanities and Social Science scholars, but also psychologists and others, use these data for research in their respective fields. Digital citizen science, public tagging of digital collections, or crowd-sourcing approaches like CrowdFlower²⁰ or Amazon Mechanical Turk,²¹ among others, bring the public closer to traditional humanities research than ever before. While citizen science projects in the humanities predate the current crisis – with examples such as the *Transcribing Bentham*²² project at University College London (UCL), an initiative to preserve Jeremy Bentham's collected work, or the *Bomb Sight* project²³ at the University

of Portsmouth, which lets users record locations in which bombs fell in London during the Second World War – several new initiatives started in response to the COVID-19 crisis.²⁴ For instance, the real-life history project, *A Journal of the Plague Year: An Archive of COVID-19*,²⁵ initiated by scholars at Arizona State University, collects digital material of different types to create a real-time scrapbook of material for future historians to study. It is a direct response to a global pandemic by historians and other humanities scholars who see this as an opportunity to collect and curate present data for future research that studies the past.

Being a relatively young discipline, the Digital Humanities widely follow principles that have yet to be fully established in the traditional humanities: publishing research results as open access books and monographs, making source codes and applications available as open source and free software help in making research output available to the public. Academic blogging, e.g., using the *hypotheses.org* platform, makes humanities research available to the public beyond traditional publication as an academic monograph.

While not yet common, there are more and more Digital Humanities activities that find their way into schools. The HERA-funded project, *Intoxicating Spaces*,²⁶ creates public engagement and outreach not only through digital exhibitions; it also cooperates with seven schools in four countries. The project helps students engage with its research topic – the study of various intoxicants in European history – through group projects. The group's findings are reported in a project blog. Allowing students' texts to be published online, in the context of the research project results, creates a special motivation and reward for students – in addition to the research-oriented learning experience. This form of cooperation between international research teams and local schools is rare, but is highly rewarding for both sides.

While most Digital Humanities projects in Europe are hesitant to work with big IT companies, there are some examples of fruitful cooperation between humanities scholars and the corporate tech sector. For example, in November 2019 Bauhaus Dessau launched their augmented reality exhibition 'Bauhaus Everywhere'. The collection, which is accessible through the Google Arts and Culture app, provides detailed information on Bauhaus architecture and design. The exhibition is enriched with detailed background information. Users have various ways in which they can browse the collections. 'Bauhaus Everywhere' was created by Google developers and Bauhaus experts within thirteen months, which is impressively quick.

Therefore, in various ways, the Digital Humanities are not merely a scholarly discipline, they are also a way of opening academia to a wider audience, fostering scholarly communication in a post-academic way. The combination of the digital world's natural openness combined with high-quality humanities data, research findings and theories could also be a means to end the chronic underfunding of the humanities.

Digital Humanities Teaching

The DARIAH course registry lists more than 200 Digital Humanities programmes and modules for undergraduate and graduate students. Even taking into account that DARIAH employs a wide definition of 'Digital Humanities', this indicates that Digital Humanities education finds its way into universities' curricula. One of the key questions of Digital Humanities teaching remains: Do we need designated Digital Humanities programmes or should technical skills become a necessary element in the education of any humanities student?

Curricula designers, professors and lecturers from the humanities widely agree that technical skills should not be taught at the expense of traditional humanities education, such as critical thinking, close reading or field study. However, what exactly is a 'Digital Humanities' skill? Verification and criticism of digital sources would fall under both skill sets – traditional and digital – as would working with a digital edition.

It is dangerous to divide course work into 'traditional' and 'digital'. A good core module in the humanities would ideally already make use of digital resources of traditional material, and would introduce students to interesting tools that could help them investigate the course material in a new way. A 'traditional' literature course might benefit from introducing its students to web-based analysis software such as Voyant Tools,²⁷ while an introductory course in social history could potentially make use of a digital photo archive, e.g., as provided in Europeana,²⁸ digitised newspaper corpora or virtual exhibitions. However, the availability of digital instruments in traditional teaching is directly related to the disposition and skill set of the respective lecturers.

In order to broaden students' horizons about the Digital Humanities, cross-faculty classes are a good way of engaging both computer science and humanities students in shared projects. Computer scientists who engage in Digital Humanities necessarily need to learn to understand a humanities research question. They have to know which tools, approaches and algorithms to use for a specific discipline. As future Digital Humanities IT specialists, they should have at least a basic knowledge of the requirements of engineering techniques to be able to differentiate between the communicated needs and the real needs within a software project.

Humanities students on the other hand have to learn how to communicate their needs and wishes, and more importantly they have to gain an understanding of what is realistic to ask of a software developer within a limited time frame and with limited resources. Both humanities and computer science students need to learn how to interpret the outcome of their shared project, how to read a graph, a topic model or the precision and accuracy of a machine learning model.

Contrary to the fear of many 'traditional' humanities scholars, Digital Humanities programmes do not attempt to turn humanities students into software developers. They rather foster capacity building by introducing students to tools to work with digital data, e.g., 3D modelling techniques, to database retrieval methods or to text mining skills.

When it comes to teaching basic programming and data processing techniques, lecturers can reuse existing resources from their own institutions, or Digital Humanities related online material.²⁹ Resources almost definitively exist within the home university, across faculties or schools. For example, IT skills modules which are already part of the education for students in the social sciences could be transferred to the humanities, requiring little tailoring depending on the field of application. The algorithms and methods will not be substantially different; what will be different is the specific application of the algorithm – a transfer effort that requires determination, creativity and skill from teachers and students.

Hosting so-called Hackathons is a good way to engage students from various disciplines of the Digital Humanities. Students will be presented with data and a set of possible tasks from which they can choose or present their own idea, before they form groups to collaborate and realise the task under the guidance of a more senior researcher within a limited time, usually a few days. For example, a recent Hackathon hosted by the ACDH (Austrian Centre for Digital Humanities) had students engage with the DARIAH Course Registry open API (Application Programming Interface).³⁰

What the Humanities Contribute to a Digital World

The Responsibilities of the Digital Humanities I

Preserving and Creating Access

In a digital world, we are confronted with an almost unlimited amount of information. Every person who uses the internet receives and produces information every minute they spend online. In a way, the internet is a huge archive of human activity in the twenty-first century and an invaluable data source for current and future generations of researchers. This vast amount of information is impossible for individuals to process. Instead, the role of the humanities scholar is to identify which types of information are worth studying in the future. What is worth keeping? What kind of research questions might arise in the future, and how do we have to maintain the data in order to allow them to be answered? Which forms of metadata do we have to store? What role does provenance play when we study digital data? It is impossible to answer these questions without scholarly expertise from the humanities and social sciences.

However, this does not only apply to born-digital data. In times of great urgency, such as war or impending natural catastrophes, humanities researchers step up and identify cultural heritage that needs to be saved or – if that is impossible – at least digitally *preserved*.

The destruction of cultural heritage is one of the most traumatic events for nations, cultural groups or ethnic minorities. Archaeologists all over the world watched the painful destruction of Palmyra in Syria, a heartbreaking crime against the Syrian people. To prevent this UNESCO world heritage site from being erased not only physically but also from the memory of the public, digital reconstruction efforts have been undertaken by different initiatives, e.g., Creative Commons.³¹ Now that the physical reconstruction of Palmyra is underway, the digital reconstructions are still available and can be used as an object of study for comparison between old and new Palmyra. Naturally, reconstructing these sites digitally can never be a substitute for experiencing the real-life site. What a digital model can serve as, however, is a blueprint for physical reconstruction. It can also be a study object for students and scholars who are not able to access objects or sites. Furthermore, such models are a snapshot of the state a monument or object is in at a given time – therefore digital modelling is at the same time a means of documentation and accessibility. The same applies, possibly even more so, to intangible cultural heritage, be it the oral history of a vulnerable community or a language at risk of becoming extinct.

In addition to preservation efforts, the humanities also help to identify objects in collections that have a problematic history. We learn which artefacts or pieces of art need to be repatriated to their original owners through provenance research. In general, the humanities are prepared to be uncomfortable where needed, for example pointing out colonial or Nazi plunder in museums, libraries and archives. The digitisation of these artefacts might help ease the pain of parting for the institutions.

All in all, humanities scholars help us find a path in a jungle of unclassified data, they identify the need for action in a digitised world and they step up to address uncomfortable issues.

The Responsibilities of the Digital Humanities II

Digital Humanities Research Ethics

Digital humanists have the responsibility to produce research that follows standards of research integrity. This does not only include matters of plagiarism or conflict of interest, but also includes wider questions, such as biased data, matters of privacy and data protection, and fairness in mentorship and teaching (Stenmark and Winn 2016).

When pursuing humanities research on human-produced data, e.g., on social media platforms, scholars should be held to the same standards as scientists who conduct studies on human subjects. Matters of data privacy and research ethics need to be taken into consideration in the design of the research project.

Digital Humanities projects, especially those that involve the use of large amounts of data for applying machine learning, need to consider the possibility of dual use. Open systems, APIs, open source code and data need to be carefully shielded against malicious exploitation. Currently, the detection of *fake news* is a prominent topic in natural language processing. However, there is a certain grey area in the definition of *fake*. Where does unknowingly making a false statement end and where does spreading fake news intentionally begin? If a classifier is not carefully modelled and reviewed, it might be misused by a third party in order to censor certain voices.

Overcoming Traditional Humanities Bias

The Digital Humanities have the potential to identify – and thereby overcome – existing biases in research data and topics, such as the over-representation of Western, white, male writers in the traditional canon of literary works (cf. Pollock 2017) or traditional collections of art. Big data methods, such as distant reading, have the most potential when applied to large collections of data, thereby extending their research focus to non-canon authors and artists. Today, we can (semi-)automatically compare corpora of canon and off-canon literature regarding their representation of gender, heritage, social status or other intriguing effects. Moreover, the identification of bias in corpora is now an active area of research in computational linguistics and related fields. This allows us to point out flaws in traditional canons in a qualitative manner.

Overcoming Technological and Computational Bias

However, information technology, and with it DH applications that use a certain technology, is not without bias either. If we consider, for example, the over-representation of the English language in natural language processing and computational linguistics, we as digital humanists find ourselves to be *both producers and possible resolvers of bias*. Most of our resources are in English, to the extent that the natural language processing community had to make it a rule to explicitly name their language of research in publications (Bender 2011).³² Existing reviewing practices in natural language processing are also strongly biased against research on other languages: whether an algorithm is defined as state-of-the-art is generally determined by its performance on English, which is seen as a de facto universal benchmark language for natural language processing, because it dwarfs all other languages with respect to the number of available data sets (for training and testing) and tools. As a consequence, a researcher who proposes a new method of analysis for another

language must, as a rule of thumb, demonstrate that it significantly outperforms existing algorithms on English as well. While the research community is largely aware of this bias, it is still deeply engrained in current reviewing practices and therefore is hard to overcome.

The fact that most language resources are only available for English and that such resources are crucial not only for developing new technology – state-of-the-art models are often statistical and typically require data for training – but also for evaluating it, also has severe practical consequences. The resulting tools and models work best for the English language and, moreover, for the specific variety of English written and spoken by its typically middle-class, white, Western, male developers. This in turn leads to further discrimination against anybody and anything that is perceived as deviating from this ‘norm’.

In contrast to technology companies which sell their software with the promise that their product works perfectly for everyone when it does not, researchers have the responsibility to be open and honest about the weak spots of their applications. Raising awareness to those biases and monitoring them carefully gives the Digital Humanities in general, and computational linguistics in particular, the chance to reflect and take measures in creating more balanced resources.

The more we are aware of and outspoken about the existing bias of natural language processing towards English, the more researchers might want to work on languages that are not well researched and the more willing reviewers will become to regard publications that do not focus on English as a valuable scholarly effort. For so-called under-resourced languages, the community might have to start with the most basic step of building corpora on which tools and algorithms can be developed and, even more crucially, can be tested. Corpus building is also important for the preservation of languages that are threatened with becoming extinct. However, these early steps often require hands-on work that is rarely (seen as) sufficiently ‘innovative’ to be considered for publication in top journals.

The tendency of Digital Humanities projects to make their source code freely available can help researchers of under-resourced languages. Open source software can help to narrow the gap between well-studied languages and under-resourced languages, because it allows scholars to adjust and extend existing tools for their target language. They can try existing methods without spending unnecessary time and resources on development, and they can build upon already existing tools. Public research projects that receive funding from the state have no reason not to publish their source code following the open source principle.

Innovation in Digital Humanities

While the Digital Humanities research community is mostly aware of its biases, it seems that pointing out these problems does not result in systematic change. Analyses like Hall (2019) tend to be greatly applauded at DH conferences, without creating the impact that is desperately needed. It seems – at least for the European Digital Humanities community – that we are innovative in the technological sense but lack innovation of scholarly thought.

In contrast, it appears that the European DH communities, in particular the digital literary studies, try very hard to fit in with the ‘traditional humanists’ by re-proving what is already known through data-driven approaches. Furthermore, while traditional humanities naturally claim the prerogative of interpretation of their specific research question,

the Digital Humanities tend to be very careful when it comes to interpreting their data or the effects they study. They tend to rely on existing theories, which are to be questioned or proven, but seldomly dare to make a 'hard' statement on what their findings indicate. The authors do not claim to be free from this insecurity. The Digital Humanities inherit this *hedging* from the sciences, where it is generally impossible to prove a theory or a causality. This leads to the Digital Humanities behaving like an ancillary science, because they do not generally find ways to create new theories even though they have the potential. What the European Digital Humanities need is a healthier mix of scientific approach, e.g., reiterating old theories through digital methods, and the application of the traditional humanities dispute.

Cultural Understanding and New Communication

Digital societies can be toxic and dangerous when they target individuals or minority groups. Echo chambers create a feeling of community for radical views of all shades which can lead to real-life threats to those who stand up against them. Social media platforms repeatedly fail to address this problem and turn a blind eye towards certain kinds of radicalisation that happens under their nose. Social media and online news platforms serve as knowledge and opinion brokers which directly influence public opinion, and consequently impact real-life political and social events.

Can the humanities step up and create a new form of online understanding? The humanities have always been the disciplines that help identify what holds our societies together – online and offline. They need to identify the new rules that apply in a space where there are no physical borders. It is an important task for the new humanities to help create an online environment which promotes freedom, accepts diversity and eradicates fake feelings of shared values when those values are hateful and toxic.

The first key towards this mammoth task is to *understand* online communication, which is particularly difficult when this communication changes with every new channel or social media application. We need to study linguistic and social phenomena that occur in social networks and how they get transferred to the real world. For instance, we need to identify the drivers of dangerous fake grass-roots movements and study how much influence bots have in the perception of morals and values in online communication. The tools to gather these insights exist in natural language processing and data science applications.

However, policy makers show little consequences to those findings. We need quicker decisions to prevent hate speech and crime online, before the means of communication change following the technological advance.

Conclusion

It is hard to define what exactly the Digital Humanities are. Instead of trying to find a definition that pleases all, we discussed the Digital Humanities from different points of view. We defined a set of digital methods that are prevalent in DH research projects, and discussed the institutionalisation of the Digital Humanities through the representation of GLAM institutions. We reviewed how (digital) museums as an example of Digital Humanities institutions reacted to the COVID-19 crisis. Furthermore, we discussed the chances that DH brings regarding public engagement and higher education. Lastly, we examined the potential and responsibilities of the humanities in a digital world.

The Digital Humanities do not exist to rescue small or under-funded disciplines, neither

will they miraculously resolve biases either on the technological or the traditional side of research. Digital Humanities, however, do have the potential to create visibility of smaller disciplines, foster intercultural and interdisciplinary research, and point out those aforementioned biases through ‘hard data’ analyses.

In order to overcome those biases, however, the Digital Humanities will have to take a long hard look at their own community and become less white, male, Western and less ‘canon’ themselves. Only then can they create an impact on the traditional humanities and truly deserve to belong to the ‘new humanities’. The responsibility of the Digital Humanities involves also stepping up to face challenges in online communication, e.g., in the fight against hate speech.

Policy Recommendations

Shared Responsibilities

- In Digital Humanities research efforts, humanities scholars and science and engineering researchers need to share responsibilities equally among each other. While scientists and IT engineers need to keep matters of data privacy, questions of dual use and adhere to open standards and FAIR data principles, humanists must educate themselves and others on these matters, but also reflect on biases in the data they provide and the material they study.

Openness

- The Digital Humanities must embrace open research on all levels: sharing data openly where privacy concerns permit it, making source code and tools freely available following the open source principles, and publishing research output in open access monographs or journals. Openness on all levels must be considered part of Digital Humanities’ best practice. When research is conducted with public funds, this openness must be non-negotiable.

Sustainability and FAIR Principles

- Humanities research projects should adhere to FAIR principles (Wilkinson 2016). That means long-term *findability*, *accessibility*, *interoperability* and *reusability*. FAIR humanities data do not only enable innovation on an academic level, but also pave the way to new forms of public engagement of the humanities. FAIR data are a key to sustainable humanities research, because they allow for verification of research processes and results. They also enable scholars from low-resourced institutions to access and engage with research. Through FAIRness, the academic disciplines of the humanities can become more collaborative, and more open in general.

Understudied Works and Languages

- As a relatively young field, the Digital Humanities should be brave enough to study new data sources and off-canon works, recommend new canons and identify previously unstudied or neglected material by the application of digital tools. They should help researchers of niche disciplines and topics by enabling knowledge sharing. By identifying new material in low-resource languages, the DH can help elevate the status

of those languages and provide source material for the development of natural language processing tools, e.g., for automatic machine translation.

Self-Reflection

- The European Digital Humanities have a need for self-reflection, on an institutional level, but also as a community. We need to draw consequences from biases that have been identified, instead of applauding the identifier and forgetting the implications. The European DH community needs to become more political.

Notes

1. © EuroGeographics for the administrative boundaries in Figures 14.2–14.7
2. <https://blogs.ucl.ac.uk/definingdh/further-reading/>
3. <https://whatisdigitalhumanities.com/>
4. <https://www.hypotheses.org>
5. See, for instance, Hepworth and Church (2018).
6. For example, <https://libguides.mit.edu/c.php?g=176357&p=1158575> or <https://guides.nyu.edu/dighum/tools>
7. <https://www.dariah.eu/network/members-and-partners/>
8. Pooling Activities, Resources and Tools for Heritage E-research Networking, Optimization and Synergies.
9. <http://webdoc.sub.gwdg.de/pub/mon/dariah-de/dwp-2019-40.pdf>
10. Data available under <https://data.europa.eu/euodp/en/data/>
11. For example, ERC Starting or Consolidator Grants.
12. European Association for Digital Humanities.
13. <http://heranet.info/about-us/who-we-are/>
14. <https://textgrid.de/>
15. <https://fleuronweb.wordpress.com/author/fleuronweb/>
16. <https://www.clarin.eu/covid-19>
17. <https://www.kaggle.com/allen-institute-for-ai/CORD-19-research-challenge> (last accessed 28 July 2020).
18. <http://noisy-text.github.io/2020/covid19tweet-task.html>
19. <https://www.ne-mo.org/news/article/nemo/nemo-survey-on-museums-and-covid-19-increasing-online-activities-of-museums.html>
20. <http://www.crowdfunder.com>
21. <https://www.mturk.com/>
22. <https://blogs.ucl.ac.uk/transcribe-bentham/>
23. <http://bombsight.org>
24. This is also evidenced by the fact that citizen science platforms increasingly aim to recruit citizens who may be staying at home; cf. <https://www.citizenscience.org/covid-19/> or <https://www.buergerschaffenwissen.de/zuhause-mitforschen>
25. <https://covid-19archive.org> (last accessed 28 July 2020).
26. <https://www.intoxicatingspaces.org/schools/> (last accessed 28 July 2020).
27. <https://voyant-tools.org/>
28. <https://www.europeana.eu/en>
29. For example, <https://programminghistorian.org>
30. <https://github.com/acdh-oeaw/ACDHchHackathon2020>. Top three projects: <https://bellerophon-pegasus.github.io/CORIANDER/>; <https://medium.com/@marta.p/dh-education-knowledge-map-creating-knowledge-webs-via-hypertext-cfb6cc094c17>; <https://br0ast.github.io/ACDH-2020/>

31. https://www.architectmagazine.com/technology/an-open-source-project-to-rebuild-palmyra_o
32. <https://twitter.com/hashtag/benderrule?lang=en>

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