Partnering through Collections in Digital Humanities:

Looking at Researchers' Needs

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Introduction

Recent years have seen cultural heritage organizations undergo a cultural shift as part of an agenda with an increased focus on digital innovation and audience engagement. Opening up collections through digitization and making them accessible to scholars, students, and the general public has been a strategic priority for many institutions. Alongside the technological advances of the past decades, the proliferation of various types of digital information objects has brought large changes to traditional scholarship in the Arts & Humanities.

The emergence of Digital Humanities has been a result of the possibilities offered by the digital age, while the characteristics of the field reflect the shifting nature and role of scholarship in a modern society. More specifically, interdisciplinarity, openness, and collaboration are some of the core characteristics of scholarship in the field that make it distinct from scholarly practice in more traditional Arts & Humanities areas.[1] Moreover, as part of the nature of Digital Humanities work, scholars create, use, and communicate various types of digital data in previously unimaginable ways.

Libraries, archives, and museums have greatly contributed to the progress of the field and facilitated innovation through enabling scholars to access and use diverse types of digital information, often by providing enhanced digital services.[2]However, the role of memory institutions in the digital age is no longer limited to that of the content and service provider. In fact, there are more opportunities than ever to develop a culture of collaboration between heritage institutions and Digital Humanities scholars, which can transform both collections and scholarship.

Against this background, this article will reflect on the critical role that cultural institutions such as libraries and archives play in the production of knowledge in Digital Humanities through the expertise of their staff and collections. Firstly, we will look at current practices of these institutions when supporting or engaging in scholarship in the field. Then, after examining aspects of the scholarly workflow in Digital Humanities, we will discuss some of the areas where librarians and archivists can forge collaborations with scholars in the field, with the purpose of facilitating the research process and improving collections. This paper is based on work conducted as part of a recent report by Research Libraries UK[3] and has been motivated by the changes currently taking place in cultural institutions such as research libraries, archives, and museums, with the purpose of enabling greater access to collections and facilitating digital research.[4]

Memory Institutions and Digital Humanities

Library and archive collections have traditionally been a core source of primary and secondary material necessary for the production of knowledge across a range of areas in the Arts & Humanities. In the digital age the research potential and value of collections for scholarship have increased; through institutional digitization, a large amount of cultural content is now easily accessible to scholars who can use and interrogate it in new and innovative ways. In Digital Humanities, given the interdisciplinary character of research in the field, collections have also constituted the basis upon which to build collaborations necessary for the development and successful delivery of many projects in the area.

Yet, even though collection and information professionals have supported the digital endeavors of Arts & Humanities scholars since the mid-twentieth century,[5] only in the past decade have the discussions highlighting the role and value of libraries and archives as collaborators, rather than just as content and service providers, been intensified.[6] It is no coincidence that the same period has also seen the establishment of Digital Humanities as a recognizable field of academic study with an active community, departments, and centers across the world, and undergraduate and postgraduate programs where the new generation of scholars and practitioners is being trained.

Thus, libraries and archives, especially those that are attached or have close links to Higher Education Institutions, have increasingly been supporting scholarship in the area, not only through the provision of suitable content and services but also through the unique expertise and knowledge of collections held by their staff. In fact, scholars in the field have recognized librarians, archivists, and museum curators as the closest possible collaborators outside the academic world.[7]According to the 2012 CIC report, the most successful partnerships in Digital Humanities involved professionals from different areas, including librarians and archivists; the report lists a number of different types of projects based on such partnerships, focusing on tool development, the creation of thematic

collections, and large-scale digital libraries, as well as projects bringing together partners based on their interest in specific methodological approaches or use of tools (e.g., geographic information systems [GIS] or 3D imaging).[8] Yet, at that time, collaborations of this type were still relatively few,[9] and in 2015 Alix Keener also argued that very little research had been conducted on the emerging research partnerships between academic librarians and Digital Humanists.[10]

The report published in 2017 by Research Libraries UK (RLUK)[11] aimed to develop a better understanding of the role of libraries in scholarship in Digital Humanities, especially in the United Kingdom. This research showed how practices in its member libraries,[12] which have collections of unique and distinctive value (special collections, archives and, in some cases, museum collections), have been shifting towards greater engagement with their audiences. This finding was further investigated and confirmed in an RLUK project exploring the way research libraries achieve and evidence impact through their special collections and archives. Through the literature and study results presented in the report published in 2019,[13] it became obvious that there is a trend towards greater audience engagement in memory institutions, such as research libraries, in the UK and beyond; this has been the result of challenges faced due to the current economic climate and the need to prove the value of collections and services, but also of opportunities presented by the digital age to "open up" collections and reach new audience groups.

As part of the results of the 2017 study presented here, it was also discovered that librarians' roles very often involved contributions to the production of knowledge in areas such as Digital Humanities. The analysis of the gathered survey and case study results revealed that research libraries were actively collaborating with scholars in the building of various tools that could be used by the Digital Humanities community for research and teaching (fig. 1).
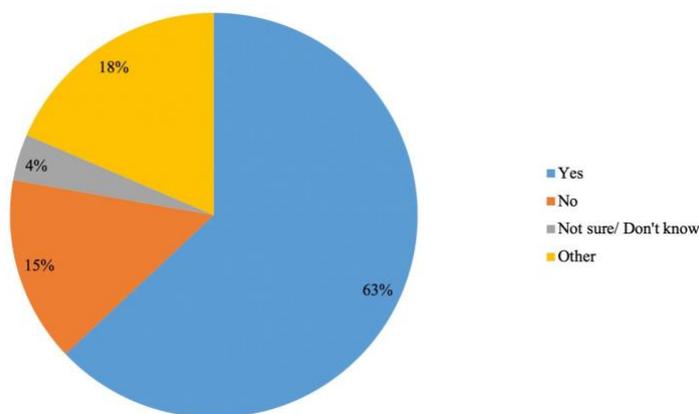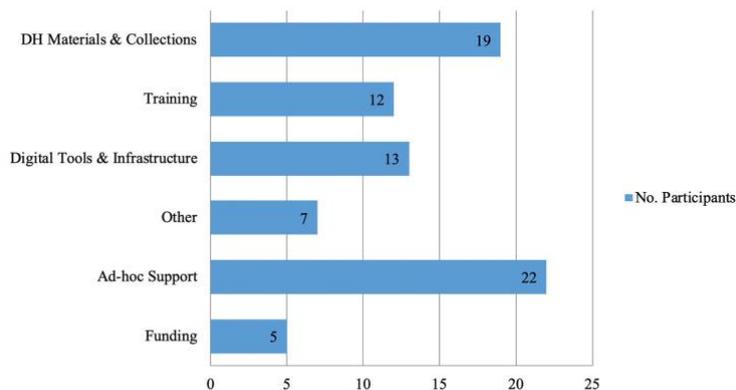

Fig. 2. Responses of RLUK members to the question "Are there any collaborative initiatives between the library and the DH community in your university? If DH collaborations are formed under different circumstances in your library, please describe in Other.

Fig. 3. Responses of RLUK members to the question "What types of services does the library offer to Digital Humanities scholars and students?

Creating digital content and tools based on institutional collections and archives was at the core of many collaborative initiatives and, as the survey results showed (fig. 2), collections and other relevant materials were among the most popular services offered to scholars in the field.

As the above graph shows, ad hoc support was another library service that was in high demand, and was often a first step which could lead to further discussions for collaboration. Keener also found that several of the participants in her study had formed collaborations resulting from an initial consultation with researchers,[14] while Elías Tzoc argued that providing ad hoc services can indeed be a good starting point for the development of partnerships.[15] The kind of relationships that library professionals build with researchers through providing ad hoc support become apparent through the below quote by a survey participant; however, as the nature of these interactions can often be of an informal nature, their visibility may be limited within the home institution.

"On an ad hoc basis we are doing many DH-like things, and some researchers and projects absolutely rely on us, but formally—in the University's eyes—the Library has a very limited role at present." [Survey Participant]

It was not surprising, though, to discover that researchers turned to library staff for support and advice when it came to their digital projects, or chose them as collaborators in research and teaching. Digital Humanities scholars frequently create and use digital tools (e.g., open access, commercial) in the context of their work, which are challenging to maintain beyond a project's lifecycle due to time limitations, lack of funding, or loss of expertise (e.g., when researchers change institution). Librarians can be the right partners to offer solutions to these kinds of problems, given their substantial expertise in data storage and management.[16]

By being engaged in such partnerships, libraries can increase the impact of their collections, get firsthand experience of the work that is being conducted in the field,

as well as the needs of researchers, and develop the skill sets of their staff. Moreover, this can result in building portfolios of successful collaborations that can lead to further funding.[17] An example of the beneficial effect that these partnerships can have on the library and its staff is illustrated in the following quotes by two of the case study participants in the aforementioned RLUK project:

"This collaboration brings us closer to our academic colleagues, which makes us more confident in inputting to this area of research where we feel we have a contribution to make." [Participant A, Sussex University Library-SHL]

"We feel we are pioneering a new role for the library, showing that libraries and librarians can be useful in new ways." [Participant B, University of St. Andrews Library]

Thinking about the broader sector, collaboration (with other institutions, businesses, and the academic community) is often viewed as the way forward for memory institutions to effectively respond to the challenges of the digital era, including those related to preservation and sustainability of digital infrastructure, limited resources, and knowledge and skills development, as well as those associated with the difficulty of remaining relevant and engaging efficiently with existing and new users.[18] The benefits of collaboration between institutions and scholars conducting digital research in the Arts & Humanities, more specifically, have been also stressed by another recent report.[19] In this publication, examples are provided of successful collaborations between cultural heritage institutions and scholars, arguing for the advantages of engaging in such partnerships, from advancing knowledge to facilitating use and re-use of digital resources. Yet, to ensure success, libraries, archives, and museums need to take some steps that will significantly enable the process of collaboration, such as making their collections and data as open as possible and providing lists of their digitized material. Additionally, it is worth noting that understanding researchers' needs was deemed an essential step towards developing efficient collaborative strategies.[20]

The issue of identifying the needs of scholars in Digital Humanities and the ways memory institutions such as libraries, archives, and museums can best meet them has been a regular concern of practitioners.[21] Lack of clarity around the definition of Digital Humanities[22] and the great diversity of topics, methodologies, and approaches followed in the field can make it challenging for institutions to plan strategically for developing useful services to support digital scholarship and finding areas where collaborations can be best forged with scholars. For the purpose of aiding strategic development for digital research, the next section will aim to build a picture of the practices and needs of Arts & Humanities scholars in the digital era when it comes to digital resources and collections. This will enable us to identify areas where it would be fruitful to facilitate collaboration between collection and information professionals and Digital Humanities scholars.

Understanding Scholarly Practice in the Digital Age

As digitization and digital resource creation efforts by memory institutions began to increase near the end of twentieth century, the need to study scholarly practices and needs to create resources and tools that could meet the requirements of their users, including the academic community, became more pressing. Given that Arts & Humanities scholars have been traditionally a core audience group for libraries, archives, and museums, several studies since the 1980s have been conducted with the purpose of shedding light into the evolving scholarly and information practices of researchers in this broad field of academic study. For example, there have been several studies that aimed to understand the key activities and needs of scholars during the different stages of research.[23] However, given the primary role of institutions at that time as content providers, a great amount of literature has focused on the first stages of research and, more specifically, the types of material scholars need, as well as the ways they look for information.

One of the most extensive studies over the last decades has been the Getty End-User Online Searching Project. The major part of the study, which was supported by the Getty Information Institute, was conducted between the years 1988 and 1990.[24] Its aim was to examine the information-seeking behavior of scholars by studying the searches they made and the techniques and terminology used while searching through the DIALOG databases. These early examinations of scholarly and information behavior[25] showed that researchers in the Arts & Humanities needed a great variety of resources and used a range of research methods, while emphasizing the solitary nature of humanistic research. Another significant finding of these studies of the early digital era was that researchers in the Arts & Humanities disciplines had different information needs from those in the sciences; for instance, scholars in these fields tended to use different terms (e.g., places or people) for searching information than scientists, and relied greatly on printed material even when digital resources were available. It may be pertinent to mention here that similar studies conducted much later discovered that, although some issues such as the use of digital resources had significantly increased, many of the findings of these earlier studies were still relevant.[26]

In addition, around the same period, studies examining the scholarly behavior and needs of researchers in the different fields of the broader areas of the Arts & Humanities began to appear. The prevailing argument was that the information needs of scholars in the various disciplines may differ significantly, so they could be more accurately identified and served if the disciplines were studied individually; particular attention was given to the historical discipline, given the great use that scholars in this area make of historical records, archival material, and other types of collections that libraries, archives, and museums hold.[27]

As technology progressed, the use of digital resources, such as digital collections, and tools became more widespread,

especially by scholars in the field of Digital Humanities. Accordingly, the interest of information and collection professionals shifted from examining the attitudes of Arts & Humanities scholars towards digital resources, and whether they are incorporated in their work, to looking at the way these are used and the effect they have on the scholarly workflow with the purpose of improving them and ensuring sustainability. A 2011 report commissioned by the Research Information Network (RIN) exploring the impact the digital age has had on the information practices of scholars, including the way they used digital resources at the time.[28] According to the authors, scholars had started working more collaboratively and made greater use of digital collections, but the technical skills and the uptake of innovative digital methodologies, such as text and data mining and visualization, were still low.

In 2015, after assessing the needs of scholars with regards to digital collections, Harriett Green and Angela Courtney argued that interoperability and data curation are necessary to drive use, while highlighting the importance of taking into account scholars' views during the development of relevant resources.[29] Other authors also argued that access to different types of materials and semantic interoperability are important when building digital infrastructure to support the working practices of Arts & Humanities scholars in the digital age, while proving lists with available resources, tools, and services can facilitate the building of communities of practice.[30] A more recent study examined the use of large-scale collections and data sets by humanities scholars for complex analytical purposes.[31] Based on its results, even though cultural heritage institutions increasingly make large data sets available to scholars, there are various difficulties that need to be overcome first to increase their use; these include issues around the fragmentation of communities, resources and tools, interoperability problems, the fact that these types of data sets are often complex and incomplete, and limited technical expertise of researchers in the humanities.

The above studies can indeed provide some useful insights into the scholarly practices and needs of Arts & Humanities researchers in the digital age, as well as into the steps that need to be taken to improve digital resources for the benefit of both institutions and scholars. Yet, since research so far has focused more on the needs of scholars in the text-based academic disciplines of the field (e.g., history, literature),[32] in this paper it is argued that, in order to engage efficiently with the whole Digital Humanities community, greater emphasis needs to be placed on understanding the practices and needs of scholars in the more visually oriented disciplines of the Arts & Humanities (e.g., art, architectural history). According to Sander Münster and Melissa Terras, scholars in the disciplines of "Visual Digital Humanities," as they named this broader area, consume and produce mainly visual data, while visual analysis and visualization techniques are commonly employed as part of the research process.[33] These characteristics mean that the practices and needs of scholars in the area can significantly differ from those in disciplines that make heavier use of text.

Art history, which is a discipline that can be categorized under this broader area of scholarship, can be an interesting case to briefly examine here. Until recently, studies were noting the hesitant stance that scholars in the field had towards the use of digital technologies.[34] However, this issue can be better understood if we consider several factors that characterize the field and make the employment of digital technologies for research purposes especially challenging: the diversity of information objects—types and formats—and methods used, the different career stages of scholars, and the various degrees of digital literacy.[35] Despite the difficulties, though, art historians increasingly rely on digital resources and tools for their work, while their frequent use of image libraries and other visual collections make them an ideal group to study for the purposes of improving access and use of relevant collections that memory institutions hold.

At this point, it is worth reporting on the findings of recent publications looking at the practices and needs of art historians when using digital resources, such as image libraries; these will hopefully prove useful to collection and information professionals for making informed decisions around digitization and digital resource creation to support scholarship in the area. Despite the progress that digitization initiatives have made over the years, as well as the increase in the availability of online material (especially secondary literature), art historians were found to lack digital access, particularly to primary resources and good-quality, open-access visual material.[36]

In fact, access problems perpetuated some of the habits of art historians noted in earlier studies, which are often associated with pre-digital or non-digital contexts, such as traveling to get access to particular types of primary resources. For example, scholars in certain areas of study, such as non-Western art, were found to face greater difficulty in finding the material needed for their projects online; unsurprisingly, the availability of digital resources on the Web tended to be greater in areas dealing with Western art of particular popular eras (e.g., the Renaissance, eighteenth- and nineteenth-century European art). On the other hand, digital scholars and those working on areas such digital art were more likely to confront issues around the re-accessing of data, due to the temporary character of the format of the resources they used in their projects and the supporting infrastructure (e.g., software).

The practices and needs of scholars should also be taken into account when designing digital resources that enable art historians to discover useful information. For example, material should be catalogued in a meaningful way for scholars, and the metadata quality should be enhanced as certain editorial choices can reduce the usefulness of the digitized content for scholars, who would then look for another resource online or, if possible, visit the resource physically.[37] Providing relevant information about the decision-making process with regards to digitization will also enable scholars to make informed decisions when using digital content and gain necessary details for the purposes of their work.[38] Concerning the visual material, finding high-quality images is of paramount importance for art historical research and teaching. Color accuracy is often one

of the main concerns when looking for and using digital resources containing visual material. More specifically, high resolution and color accuracy are necessary features of the digital images used in the study of art historical artifacts.[39]

Additionally, the interface design should be simple, to meet the needs of a diverse group of scholars (e.g., different degrees of technical ability), and the functionalities provided should encourage different types of searching.[40] Until recently, text box searching has been the prevalent method employed by users to discover information, yet this has been a limiting factor in exploring and using resources such as cultural collections creatively.[41] Current technological progress opens up new possibilities for creating interfaces that better reflect the needs of users, such as scholars in art history, who frequently engage with a variety of materials and rely heavily on the discovery and use of visual information.

The importance of browsing, especially visual material, as a searching method for scholars in the field to identify interesting content in collections for research and teaching has been stressed by several studies.[42] Browsing has been described as "a rich and fundamental human information behavior"[43] and has often been linked to serendipity, which in turn can trigger creative insights.[44] Previous literature has shown that, compared to many digital resources, printed material offers a better browsing experience and encourages serendipity; this also constitutes one of the reasons for the longstanding preference of many Arts & Humanities scholars for its use over digitized content.[45]

Various studies have reflected on the role of the user interface in fields such as Digital Humanities, including its role in enabling access to and interaction with a digital resource, and as a medium for making a scholarly argument through the presentation of information.[46] Part of the discussion has focused on the requirements for the design of user interfaces, which also links to conversations on user-centered design and improving usability of digital resources and tools in digital humanities.[47] Regarding browsing, Mitchell Whitelaw argued that the interface design of many existing digital resources does not often support this type of searching to a satisfying degree.[48] Improving the interface design of digital collections to respond to this need of scholars will enhance both access and use, as well as support the application of new methodological approaches employed by researchers as part of the "visual digital turn."

Given the increase in the availability of digital visual data based on collections and the recent computational advancements that enable its in-depth study, a greater number of scholars are interested in discovering and using it as part of their projects. Scholars in areas such as Visual Digital Humanities are answering new research questions through the application of innovative methodologies, including visualization, distant viewing, or other interdisciplinary tools and methods, such as convolutional neural networks (CNNs), which originate from the field of computer vision and are used for content and stylistic analysis of images.[49]

Memory institutions such as research libraries can better support the scholarly practices of researchers in these areas through facilitating access to digitized and born-digital visual material. Digital resources targeted to this group of researchers should be designed to enable visual exploration and enhanced interaction with collections through user-friendly interfaces and tools. This includes allowing users to get an overview of the material (or groups of information) in a collection, providing suggestions for similar content, and offering services that facilitate intuitive interaction with information (e.g., zooming in-out, flicking through). Collection items should be catalogued in a way that enhances discoverability and presented in ways that make it useful to researchers; this means that collection data, including metadata, are also usable for the purpose of conducting research at scale.

Several institutions have started using the International Image Interoperability Framework (IIIF) to provide an enhanced level of interactivity in and across image repositories, and thus also an improved user experience.[50] For example, the University of Edinburgh and the British Library, which have adopted IIIF, have underlined the advantages it brings for users of collections, ranging from high-resolution image zooming to enhanced search, annotation, and sharing of images.[51] However, in order for researchers to be able to fully benefit from the employment of more advanced image technologies by institutions, their habits when interacting with information in their personal workspace (e.g., storing, annotating, sharing information) should be also taken into account when developing relevant collections.[52]

As the number of scholars who are interested in using collections of visual material as data for their research increases, advice and support on issues of data storage and management will be essential; this is an area where libraries are currently developing substantial expertise and which can make them valuable partners in research.[53] Finally, enabling access to digital collections through different means, including the ability to view and download material, is necessary in order to meet scholars' evolving need to access and manage material across multiple devices and tools. The ability to extract and download data from collections, for which use is not restricted by copyright and can be processed for the purposes research, especially large-scale research, is increasingly becoming a need for many digital humanities scholars, regardless of whether they are interested in textual or visual data. This is something that cultural heritage institutions will need to take into consideration when digitizing and creating digital resources, as well as when designing services.

Having presented some key aspects of scholarly behavior in the broader area of Arts & Humanities in the digital age, the next section will summarize some of the main points raised throughout the paper, with the goal of making recommendations about areas of potential collaboration between memory institution practitioners and Digital Humanities researchers that could benefit both collections and scholarship.

Transforming Scholarship, Transforming Collections

So far, we looked at current practices and trends in supporting or engaging in Digital Humanities scholarship in memory institutions and examined some key aspects of scholarly behavior in the Arts & Humanities with the purpose of understanding the needs of researchers when using digital resources and collections. The main argument is that, since collections often constitute the basis for collaboration between library and collection professionals and Digital Humanities researchers, understanding scholars' practices and requirements when it comes to the use of digital collections and other digital resources for research and teaching can support strategic planning in institutions with the goal of facilitating or engaging in work in the field.

As it became evident, collaboration with different communities of practice appears to be the way forward for many institutions in order to respond effectively to the challenges of the digital era, from the increased pressure to make content available to different audience groups to tackling issues such as digital preservation, lack of resources, or the need to remain relevant in a fast-changing society. Actually, Digital Humanities is a field where information and collection professionals can significantly contribute, as well as build relationships that can prove beneficial for their institution. Certain authors have outlined four reasons that demonstrate the potential of the Digital Humanities field: it creates knowledge through new methods; scholars across the sub-disciplines are highly collaborative; scholarship in the area reaches a broader audience with built-in discovery tools; and its community has established major scholarly communication, professionalization, and educational channels for itself.[54] Yet, unlike scholars in other academic fields, Arts & Humanities researchers frequently lack the digital skills and infrastructure to build and maintain their projects.[55]

Therefore, the in-depth knowledge of collections—including of the issues that surround their management and preservation—that memory institution practitioners have, as well as their openness towards collaboration, make them ideal partners in many digital projects, especially those that are based on institutional collections. Yet it is worth mentioning that an invitation to participate in a collaborative project often comes from scholars, not from memory institution professionals. In these cases, even though they are still valuable, libraries, archives, and museums may not have the opportunity to influence how the project will be shaped to the extent that they can make a true impact on scholarship through their collections and staff expertise.

Thus, by being proactive and involving scholars in core institutional practices and processes, memory institutions can form a different type of partnership with their users that will not only help strengthen collections through incorporating their views and, as a result, meet their needs but also build strong relationships and prepare the ground for further collaborative projects where they can play a leading role. This approach can also increase scholars' awareness and understanding of the processes involved in

creating, managing, and preserving collections (e.g., acquisition and collection development processes; digitization, cataloguing, and structuring of information; and storage and preservation of physical and digital items), as well as of institutional priorities (e.g., funding, audience and community engagement, improving access to resources, research, and teaching support). Thus, it is more likely that scholars will take these into account during future collaboration propositions.

The processes of cataloguing, digitization, and metadata creation can be potential areas where this type of collaboration may prove fruitful. For example, and based on the practices and needs of scholars discussed earlier, there are still areas of academic study that lack access to certain types of materials, so taking the community's needs into account when deciding on prioritizing material for digitization can be beneficial to both scholars and institutions through saving resources. Apart from that, incorporating scholarly feedback when cataloguing material or creating metadata for collections that can be of particular interest to certain user groups can make collections easily discoverable and increase their use in research and teaching.

During the creation of digital collections and other types of resources, such as datasets, and tools for scholars in Digital Humanities, it is worth involving the academic community at an early stage to make sure that these meet their needs in terms of accessibility and usability. Understanding how these collections are going to be used during research, such as for text mining, visual analysis, or teaching, will significantly improve the way resources are structured and presented. As argued earlier, greater focus needs to be placed on supporting the needs of scholars in evolving areas of digital humanities, such as Visual Digital Humanities, who consume, process, analyze, and produce mainly visual data through using novel technologies and approaches (e.g., big data, distant viewing, visualization) that have become possible as part of the "visual digital turn" to answer new research questions. Developing awareness around progress in these areas of scholarship will allow memory institutions such as research libraries to provide the necessary tools and services to support scholars. For instance, creating resources with user-friendly interfaces that enable visual exploration of collections and encourage interaction with the material will not only increase usability and impact but will ensure sustainability as well.

Since many digital humanities scholars are increasingly interested in using collections as data, gaining access to appropriate datasets under licenses that enable its use and processing will become a requirement in different types of research (e.g., focusing on the analysis of textual or visual data), something that institutions should take into account when designing relevant services. Finally, providing appropriate training—either in-house developed training or promoting external training opportunities, such as those provided by initiatives such as DARIAH-EU[56]—to those scholars in the Arts & Humanities who lack the skills to work with digital collections in innovative ways can be another area where practitioners can make an impact and lay the groundwork for collaborative projects where the strategic priorities of libraries, archives, and museums can be at the

forefront. Research libraries, particularly, are currently developing expertise in areas such as data management and curation, skills that will be especially useful to digital humanities scholars who want to download, process, and use textual or visual data from collections as part of their work.

Conclusion

In this paper we aimed to reflect on the important role that memory institutions, such as libraries, museums, and archives can play in shaping scholarship through their collections and unique knowledge and skill sets of their staff. In a fast-changing and technology-driven society, collaborative practice can enable institutions to meet pressing challenges, such as lack of resources and infrastructure, but also to engage with their audiences in new and innovative ways. Partnerships with scholars in Digital Humanities can have significant benefits for institutions, while also enabling them to contribute and shape scholarship in the field. Yet understanding researchers' needs is crucial in order to plan strategically for the development of related resources and services and the identification of areas where collaboration can be best forged, such as by recognizing areas where scholars can contribute to the work of the library. Monitoring developments in the area of user studies will enrich the working knowledge that practitioners have of their communities' needs and help identify the most appropriate methods and approaches for examining scholarly practice and behavior to inform related services. In that way, libraries, archives, and museums can take a proactive stance towards the development of more equal partnerships where their priorities and agendas can have a prominent role.

Biography

Christina Kamposiori is the Programme Officer at Research Libraries UK (RLUK). She holds a PhD in Digital Humanities from University College London, an MA in Cultural Heritage Management from Panteion University, Athens, Greece, and a BA in Archaeology/Art History from the University of Ioannina, Greece. She has previously worked as a Teaching and Research Assistant at University College London and a Junior Researcher at the Digital Curation Unit/IMIS/Athena R.C, Greece in the context of the European project 'Preparing DARIAH'. Christina is interested in the role of the research library in supporting scholarship and fostering innovation in the digital age.

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[1] Lisa Spiro, "'This Is Why We Fight': Defining the Values of the Digital Humanities," in *Debates in the Digital Humanities*, ed. Matthew K. Gold (Minneapolis: University of Minnesota Press, 2012), 16–35.

[2] This is also evident in a number of publications in the fields of digital humanities and cultural heritage (especially over the past decade) showing how libraries, museums, and archives have contributed to the transformation of scholarship in the Arts and Humanities through the development and provision of digital collections and resources, as well as the support of expert information professionals. Some examples include:

Claire Warwick, Melissa Terras, and Julianne Nyhan, eds., *Digital Humanities in Practice* (London: Facet Publishing, 2012).

Simon Tanner, "The value and impact of digitized resources for learning, teaching, research and enjoyment," in *Evaluating and Measuring the Value, Use and Impact of Digital Collections*, ed. Lorna Hughes (London: Facet Publishing, 2012), 103–120.

Melissa Terras and Мелисса Террас, "A Decade in Digital Humanities," *Journal of Siberian Federal University: Humanities & Social Sciences* 9, no. 7 (2016): 1637–1650.

Agiatis Benardou, Erik Champion, Costis Dallas, and Lorna Hughes eds., *Cultural Heritage Infrastructures in Digital Humanities.* (London: Routledge, 2018).

Georgia Angelaki, Karolina Badzmierowska, David Brown, Vera Chiquet, Joris Colla, Judith Finlay-McAlester, Klaudia Grabowska, Vanessa Hannesschläger, Natalie Harrower, Freja Howat-Maxted, Maria Ilvanidou, Wojciech Kordyzon, Magdalena Król, Antonio Gabriel Losada Gómez, Maciej Maryl, Sanita Reinsone, Natalia Suslova, Mark Sweetnam, Kamil Śliwowski, and Werla Marcin, *How to Facilitate Cooperation between Humanities Researchers and Cultural Heritage Institutions: Guidelines.* (Digital Humanities Centre at the Institute of Literary Research of the Polish Academy of Sciences, 2019), accessed June 14, 2019, https://doi.org/10.5281/zenodo.2587481.

Lotte Wilms, Caleb Derven, Liam O'Dwyer, Kirsty Lingstadt, Demmy Verbeke, and Marian Lefferts, *Europe's Digital Humanities Landscape: A Study From LIBER's Digital Humanities & Digital Cultural Heritage Working Group* (LIBER: Association of European Research Libraries, 2019), accessed August 21, 2020, https://doi.org/10.5281/zenodo.3247286.

Mahendra Mahey, Abigail Potter, Aisha Al-Abdulla, Armin Straube, Caleb Derven, Ditte Laursen, Gustavo Candela, Katrine Gasser, Kristy Kokegei, Lotte Wilms, Milena Dobreva-McPherson, Paula Bray, Sally Chambers,

Sarah Ames, Sophie-Carolin Wagner, and Stefan Karner, *Open a GLAM Lab*, Digital Cultural Heritage Innovation Labs (2019), accessed August 26, 2020, https://glamlabs.pubpub.org/.

Finally, it is worth mentioning the "DCDC Conference: Discovering Collections, Discovering Communities," accessed August 25, 2020, https://dcdcconference.com/. The conference is a collaboration between Research Libraries UK (RLUK), The National Archives, and Jisc, which since 2015 (next conference in 2021) has hosted speakers and delegates from across the academic and cultural heritage sectors in the UK and beyond. A great number of papers in the past included examples of the positive impact of memory institutions on digital scholarship; several of the past talks have been recorded and can be viewed on the conference website.

[3] Christina Kamposiori, *The Role of Research Libraries in the Creation, Archiving, Curation, and Preservation of Tools for the Digital Humanities* (Research Libraries UK, 2017), accessed October 21, 2019, https://www.rluk.ac.uk/portfolio-items/the-role-of-research-libraries-in-the-creation-archiving-curation-and-preservation-of-tools-for-the-digital-humanities/.

[4] For example, see Matt Greenhall, *Digital Scholarship and the Role of the Research Library* (Research Libraries UK, 2019), accessed July 1, 2019, https://www.rluk.ac.uk/digital-scholarship-and-the-role-of-the-research-library-an-rluk-report/.

[5] This becomes apparent through the oral history interviews in Julianne Nyhan and Andrew Flinn, *Computation and the Humanities: Towards an Oral History of Digital Humanities*, 1st ed., Cultural Computing (Springer International Publishing, 2016), accessed October 1, 2019, https://link.springer.com/book/10.1007%2F978-3-319-20170-2. See also Susan Hockey, "The History of Humanities," in *Companion to Digital Humanities*, eds. Susan Schreibman, Ray Siemens, and John Unsworth (Oxford: Blackwell Publishing Professional, 2004), accessed September 20, 2019, http://www.digitalhumanities.org/companion/.

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[7] Susan Hockey, "Digital Humanities in the Age of the Internet: Reaching Out to Other Communities," in *Collaborative Research in the Digital Humanities*, eds. Marilyn Deegan and Willard McCarty (London: Ashgate Publishing, Ltd., 2012), 81–92 (87).

[8] CIC (2012), *CIC Digital Humanities Summit Report: Executive Summary*, accessed September 20, 2019, https://u.osu.edu/ulman.1/files/2012/10/CIC-DH-Report-Sept-2012-Final.pdf, 3–4.

[9] Hockey, "Digital Humanities in the Age of the Internet," 87.

[10] Keener, "The Arrival Fallacy."

[11] Kamposiori, "The Role of Research Libraries in the Creation, Archiving, Curation, and Preservation of Tools for the Digital Humanities."

[12] Research Libraries UK (RLUK), *Members*, accessed September 30, 2019, https://www.rluk.ac.uk/members/.

[13] Christina Kamposiori and Sue Crossley, "Evidencing the Impact and Value of Special Collections" (Research Libraries UK, 2019), accessed September 30, 2019, https://www.rluk.ac.uk/special-collections-impact-report/.

[14] Keener, "The Arrival Fallacy."

[15] Elías Tzoc, "Libraries and Faculty Collaboration: Four Digital Scholarship Examples," *Journal of Web Librarianship*10, no. 2 (2016): 124–136 (134).

[16] Some recent examples demonstrating the active role of libraries in DH projects can be found in Tzoc, "Libraries and Faculty Collaboration: Four Digital Scholarship Examples" and Kamposiori, "The Role of Research Libraries in the Creation, Archiving, Curation, and Preservation of Tools for the Digital Humanities," 37.

[17] This became particularly evident through the results of the 2019 RLUK report looking at the way research libraries evidence and measure the impact of their special collections and archives. Participating in projects based on collections, often in collaboration with digital humanities scholars, was an effective method for building a portfolio of successful, impact-enhancing activities that could lead to further funding. For more information, see Kamposiori and Crossley, "Evidencing the Impact and Value of Special Collections."

[18] Expert Panel on Memory Institutions and the Digital Revolution, *Leading in the Digital World: Opportunities for Canada's Memory Institutions* (Council of Canadian Academies, 2015), accessed October 1, 2019, https://cca-reports.ca/reports/leading-in-the-digital-world-opportunities-for-canadas-memory-institutions/, 112.

[19] Georgia Angelaki et al., "How to Facilitate Cooperation between Humanities Researchers and Cultural Heritage Institutions."

[20] Ibid., 8.

[21] For example, see Kamposiori, "The Role of Research Libraries in the Creation, Archiving, Curation, and Preservation of Tools for the Digital Humanities," 23.

[22] For more information on the debate around the definition of the field of Digital Humanities, see Melissa Terras, Julianne Nyhan, and Edward Vanhoutte, eds., *Defining Digital Humanities: A Reader* (London: Ashgate Publishing, Ltd., 2013).

[23] One of the most cited studies has been that by John Unsworth, "Scholarly Primitives: What methods do humanities researchers have in common, and how might our

tools reflect this?," presented at the *Humanities Computing: Formal Methods, Experimental Practice Symposium* (King's College London, 2000), accessed June 20, 2019, http://www.people.virginia.edu/~jmu2m/Kings.5-00/primitives.html.

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Susan Siegfried, Marcia J. Bates, and Deborah N. Wilde, "A Profile of End-User Searching Behavior by Humanities Scholars: The Getty Online Searching Project Report No. 2," *Journal of the American Society for Information Science* 44, no. 5 (1993): 273–291.

Marcia J. Bates, Deborah N. Wilde, and Susan Siegfried, "Research Practices of Humanities Scholars in an Online Environment: The Getty Online Searching Project Report No. 3," *Library & Information Science Research* 17, no. 1 (1995): 5–40.

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Marcia J. Bates, "Document Familiarity, Relevance, and Bradford's Law: The Getty Online Searching Project Report No. 5," *Information Processing & Management* 32, no. 6 (1996a): 697–707.

Marcia J. Bates, "The Getty End-User Online Searching Project in the Humanities: Report No. 6: Overview and Conclusions," *College & Research Libraries* 57, no. 6 (1996b): 514–523.

[25] Some additional examples of early studies into the needs of researchers in the Arts and Humanities include:

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[26] For example, see:

William S. Brockman., Laura Neumann, Carole L. Palmer, and Tonyia J. Tidline, *Scholarly Work in the Humanities and the Evolving Information Environment* (Digital Library Federation, 2001).

Jon Rimmer, Claire Warwick, Ann Blandford, Jeremy Gow, and George Buchanan, "An Examination of the Physical and the Digital Qualities of Humanities Research," *Information Processing and Management* 44, no. 3 (May 2008): 1374–1392.

Carole L. Palmer, Lauren C. Teffeau, and Carrie M. Pirmann, *Scholarly Information Practices in the Online Environment: Themes from the Literature and Implications for Library Service Development* (OCLC Research, 2009), accessed June 20, 2019, http://www.oclc.org/content/dam/research/publications/library/2009/2009-02.pdf.

Claire Warwick, "Studying Users in Digital Humanities," in *Digital Humanities in Practice*, eds. Claire Warwick, Melissa Terras, and Julianne Nyhan (London: Facet Publishing, 2012), 1–21.

[27] For example, see:

Margaret F. Stieg, "The Information of Needs of Historians," *College and Research Libraries* 42, no. 6 (1981): 549–560.

Elizabeth Bakewell, William O. Beeman, and Carol McMichael Reese, *Object, Image, Inquiry: The Art Historian at Work*(Los Angeles: J. Paul Getty Trust, 1988).

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Helen R. Tibbo, "Primarily History in America: How U.S. Historians Search for Primary Materials at the Dawn of the Digital Age," *The American Archivist* 66 (2003): 9–50.

[28] Monica E. Bulger, Eric T. Meyer, Grace de la Flor, Melissa Terras, Sally Wyatt, Marina Jirotka, Katherine Eccles, and Christine McCarthy Madsen, "Reinventing Research? Information Practices in the Humanities," (London: Research Information Network, 2011).

[29] Harriett E. Green and Angela Courtney, "Beyond the Scanned Image: A Needs Assessment of Scholarly Users of Digital Collections," *College & Research Libraries* 76, no. 5 (2015): 690–707.

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[31] Melissa Terras, James Baker, James Hetherington, David Beavan, Martin Zaltz Austwick, Anne Welsh, Helen O'Neill, Will Finley, Oliver Duke-Williams, and Adam Farquhar, "Enabling Complex Analysis of Large-Scale Digital Collections: Humanities Research, High-Performance Computing, and Transforming Access to British Library Digital Collections," *Digital Scholarship in the Humanities* 33, no. 2 (2018): 456–466.

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[33] Sander Münster and Melissa Terras, "The Visual Side of Digital Humanities: A Survey on Topics, Researchers, and Epistemic Cultures," *Digital Scholarship in the Humanities*, accessed May 29, 2020, https://doi.org/10.1093/llc/fqz022.

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Trish Rose, "Technology's Impact on the Information-Seeking Behavior of Art Historians," *Art Documentation: Journal of the Art Libraries Society of North America* 21, no. 2 (2002): 35–42.

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[36] Christina Kamposiori, Claire Warwick, and Simon Mahony, "Accessing and Using Digital Libraries in Art History," *Digital Research and Education in Architectural Heritage. 5th Conference, DECH 2017, and First Workshop, UHDL 2017, Dresden, Germany. Revised Selected Papers. Communications in Computer and*

Information Science (New York: Springer International Publishing, 2018), 83–101.

[37] Münster et al., "Image Libraries and Their Scholarly Use in the Field of Art and Architectural History," 380.

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[39] Melissa Terras, "Artefacts and Errors: Acknowledging Issues of Representation in the Digital Imaging of Ancient Texts," in *Codicology and Palaeography in the Digital Age* 2, eds. Franz Fischer, Christiane Fritze, and Georg Vogeler (2011), 43–61.

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[54] Ying Zhang, Shu Liu, and Emilee Mathews, "Convergence of digital humanities and digital libraries," *Library* Management 36, no. 4/5 (2015): 362–377 (365–369).

[55] Also in Terras et al., "Enabling Complex Analysis of Large-Scale Digital Collections."

[56] An example of the type of training that research libraries can provide to digital scholars can be found at Bodleian Libraries, University of Oxford, *About us*, Centre for Digital Scholarship, accessed August 26, 2020 https://www.bodleian.ox.ac.uk/digitalscholarship/about, while the training material by DARIAH-EU can be found at DARIAH-EU, *Training and Education*, accessed August 26, 2020, https://www.dariah.eu/activities/training-and-education/.