Digital Humanities 2014, Lausanne, Switzerland

Workshop number 27

Are we there yet? NeDiMAH workshop on functionalities, synergies and pitfalls of major digital humanities infrastructures

Tuesday, July 8th 2014, 13.00-16.00 hours.

Workshop Organisers

Agiatis Benardou, Research Associate, Digital Curation Unit, IMIS-Athena Research Centre, Athens, Greece
Lorna Hughes, University of Wales Professor and Chair in Digital Collections, National Library of Wales, Aberystwyth, United Kingdom
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Abstract

This workshop brough together leading scholars involved in major digital scholarly infrastructure projects such as DARIAH, NeDiMAH, Europeana Cloud, ARIADNE, 3D ICONS, EHRI, DASISH, LARM, CLARIN, DiRT and DHCommons, in dialogue with practising digital humanists. Topics addressed included cultural heritage and digital media infrastructures, tools and services; the creation and curation of humanities digital resources; social and institutional issues of Digital Humanities infrastructures; and finally, lessons learnt from the role of digital humanities in pedagogy and academic curricula. It provided an opportunity for humanists to find out about cutting edge developments on major digital infrastructure initiatives in Europe and beyond, and to make their views matter on future developments in this field.

Scientific summary

The workshop was a follow on from the NeDIMAH-DARIAH-DIGHUMLAB event, "Cultural Heritage Creative Tools and Archives workshop (CHCTA)", which took place on 26-27 June 2013, at the National Museum of Denmark, Copenhagen, Denmark: http://chcta.wordpress.com . This event generated a publication proposal for a volume of proceedings in the Ashage Series, "Digital Research in the Arts and Humanities". The volume is in preparation with selected papers from the 2013 event submitted for inclusion, however the organisers of the event (who are also the editors of the volume) wished to extend the remit of the publication beyond what had been feasible within the constraints of the earlier event. Specifically, they wished to go

beyond simple descriptions of Research Infrastructure (RI) project presentations. The wider scope of this follow-on event posited an analytical framework that will contribute to a critical understanding of the current state of digital infrastructures vis-à-vis the potential of digital archives, tools and services for humanities scholarship, by addressing the following questions:

1. What are the objectives of each digital infrastructure project, and what are its intended users?

2. What are the functionalities and outcomes it aims to provide, and how do they serve the overarching goal of supporting and transforming humanities research?

3. To what extent were the needs of humanities researchers considered, and how is the digital humanities research community involved in the project?

4. Are there potential synergies, and actual collaboration, with other infrastructure projects? Conversely, are there any overlaps?

5. What are the main lessons learned from the life of the project so far? What are the pitfalls and potential failures, and what improvements could be achieved?

The aim of this workshop was therefore to explore not just the organisationsal and technical structures that form the basis of RIs, but to explore the methodological issues they raise. How are RIs enabling and supporting new methods of research in the digital humanities, or providing a framework for carrying out traditional research methods more effectively, using digital tools and methods?

The papers presented at this workshop will be reviewed and some will be added to the Ashgate volume, which will be published in October 2015.

Audience and format of the event

The workshop attracted an audience of both those involved in digital research infrastructure work, and to digital humanists who benefit from the use and contribute to shaping the plans for future developments of digital infrastructures, tools and services.

The workshop was part of the formal Digital Humanities 2014 programme. The proposal was therefore reviewed by the DH 2014 Programme Committees, and proposals for presentations at the workshop were invited by the organisers via an open call through the DH2014 organisation (this included widest dissemination on all existing DH networks). The proposals were evaluated and selected by a program committee of international experts.

Programme

1. Introductions

13:00   Welcome, introductions, and aims of the day
13:10   Review of questions to frame the discussion

13:20 Session 1: Short presentations
Chair: Costis Dallas

13:20 Georgoula, Sichani, Souyioultzogloi: *Where is the researcher? Research practices, digital scholarship and community engagement in creating a Humanities e-infrastructure: the DARIAH-GR case.*

13:30 Kamposiori, Warwick, Mahony: *The role of the digital in the art historian's personal workspace*

13:40: discussion

14:00 refreshment break

14:20 Session 2: Short presentations
Chair: Agiatis Benardou

14:20 Volk, Althaus, Clematide: *Crowdsourcing for Large-Scale OCR Correction in the Digital Humanities*

14:30 Edmond, Morselli: *CENDARI: Historical Research in a Digital Research Infrastructure.*

14:40 Dombrowski: DHCommons and DiRT: Development, Community-Building & Integration for DH Directories

14:50 Discussion

15:10 Session 3: Perspective and lessons learned
Chair: Lorna Hughes

15:10 Costis Dallas: E-Infrastructures and lessons learned from DARIAH

15:30 Session 4: Concluding panel and discussion .
Chair: Lorna Hughes
Concluding plenary discussion led Agitais Bernadou, Alastair Dunning, and Costis Dallas.

16:00 CLOSE

Participants

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Abstracts

1. Where is the researcher? Research practices, digital scholarship and community engagement in creating a Humanities einfrastructure: the DARIAH-GR case.

Dido-Danai Georgoula, Anna-Maria Sichani, Irakleitos Souyioultzoglou (DARIAH GR, Academy of Athens team).

The DARIAH GR project aims to create a first-level digital infrastructure for the Greek Arts & Humanities research community by providing a coherent model of best practices and metadata standards which enhances the accessibility and interoperability of the primary resources, and by creating new facilities for pioneering research such as ontologies and structured vocabularies both for research data and practices (Benardou et al.: 2013). Given the lack of an established institutional framework for the coordination and support of digital scholarship as well as the frequent reluctance of Greek researchers and stakeholders to enhance their research and workflow with digital practices (Katsiadakis & Kouriati: 2009), the emerging infrastructure initiative in Greece has to articulate its central goal: to place the researcher in the very epicentre of its structure.

Above and beyond the infrastructure, to what extent are the Greek researchers aware of the epistemological shifts that information technology is about to introduce to their current scholarship? Additionally, how could we ensure that the designed DARIAH resources and services will be in reciprocal liaison with the Greek research and education communities, thus ensuring that research activities and practices are directly embedded in the infrastructure, in a way that will reinforce and catalyse the existing research landscape (Anderson & Blanke: 2012)? Furthermore, in a critical reflection on the Digital Humanities landscape and scholarship (Svensson: 2010),

how could we elaborate and promote a strategy that will combine digital literacy, fruitful research awareness and community building?

This paper will argue that while the DARIAH initiative is designed by researchers, for researchers, in the case of Greece a community-based strategy parallel to the main project deliverables must also be developed and implemented. Having in mind that Humanities researchers are the core part of the DARIAH ecosystem, we strongly encourage considering the above-mentioned community not only as the starting point for the observation and documentation of research practices, or as the end-users of digital tools and services, but also as active participants and co-creators of the newly-born Greek Digital Humanities community, as envisioned through the DYAS network.

Within this community-based strategy, the familiarization of the Humanities researchers with the central notions, technologies and tools of Digital Humanities scholarship is much needed. Through a series of workshops and other community engagement activities (think tanks, blog, DH newsletter, THAT CAMP events), DARIAH-GR should perform a digital ambassador's role in order to promote a vast spectrum of digital technologies and to support their implementation and dissemination in research, teaching and publishing.

Among others, grassroots synergies between e-infrastructures- e.g. DARIAH and the scholarly practice-based taxonomy of digital tools proposed by Bamboo DiRT- is strongly encouraged. As a result, Humanities scholars will develop a higher degree of research practice self-awareness and will realize its transformation into the digital paradigm. We strongly suggest that a community-driven strategy will ensure a robust compatibility and sustainability framework and will add value to the services and tools created within the DARIAH GR plan.

References

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Katsiadakis H. & Kouriati K., 2009. "Current Status Survey on Greece DARIAH Digital Research Infrastructure for the Arts and Humanities".

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Dido-Danai Georgoula is a research associate at the DARIAH-GR team of the Academy of Athens. She has studied History and Archaeology at the National and Kapodistrian University of Athens (1997-2002), and holds an MA in Propaganda, Persuasion and History from the University of Kent, UK (2003). After gaining

professional experience in cataloguing, at the Historical and Diplomatic Archive of the Hellenic Ministry of Foreign Affairs (2001-2002), she worked as an audiovisual archives' documentation specialist (2005-2013) at the Hellenic Radio-Television Archive and Museum (ERT SA) and the Hellenic National Audiovisual Archive, being responsible for the documentation of archival footage, documentaries, tv series, as well as photographic material. Her research interests include media history, public history & memory, audiovisual documentation, and the use of digital technologies in the Humanities-especially digital history.

Anna-Maria Sichani is a research associate at the DARIAH GR team of Academy of Athens. She is currently working towards a PhD in Modern Greek Studies (National University of Athens) focusing on cultural politics of poetry during the Greek Junta (1967-1974). Anna-Maria holds also an MA in Digital Humanities (University College London, 2012) and she has solid professional experience in large-scale digital humanities projects, mainly in domains of einfrastructures (Centre of Greek Language) and crowd sourcing (TranscribeBentham). Her research interests include cultural and social history of literature as well as questions towards the literary establishment. While familiar with the academic and scientific landscape, she is very much interested in digital technologies and their innovative application to Humanities scholarship, mainly to literary and cultural studies, as well as in comparative media studies and digital pedagogy.

Irakleitos Souyioultzoglou is a research associate at the DARIAH-GR team of the Academy of Athens. He has received an MA in Islamic and Middle Eastern Studies from the University of Edinburgh, and he is currently a PhD candidate at Panteion University, Athens. His thesis focuses on the social and cultural history of the Greek communities in Egypt, and a range of relative subjects, such as the phenomenon of diaspora, the colonial conjuncture and the formation of collective identities. He has conducted field and archival research in Libya and Egypt, where he was actively engaged in the activities of the Hellenic Foundation of Culture in Alexandria. Within the DARIAH framework, his interests include the application of digital technologies for the representation of cultural information and the implications of the use of digital practices in Humanities research.

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2. Building Personal Collections: Supporting the Information Practices of Art Historians in the Digital Age

Christina Kamposiori, Claire Warwick, Simon Mahony

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Technological progress and mass digitisation of information resources have brought large changes to traditional scholarship in the Arts and Humanities during the past 50 years. Furthermore, as research conducted in the digital environment has grown, affecting the behaviour and habits of scholars, so has the need to support scholars' emerging needs. Building efficient, cost-effective digital infrastructure has, as a result, become a crucial component for research development; however, in order to achieve this goal, the behaviour and needs of various groups of scholars should be examined.

Considering art historians, they tend even today to be hesitant in the use of new technologies (Zorich, 2012, pp. 19-22; Cuno, 2012). However, this issue can be

better understood if we consider several factors that characterise 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 familiarity with new technologies which create different needs; the variety of difficulties usually faced by researchers when using digital material such as access problems, copyright issues, cost (Durran, 1997, pp. 2, 9-11; Rose, 2002, p. 40; Grindley, 2006, p. 6; Zorich, 2012, pp. 33-34). Yet, despite the difficulties, art historians have started to rely more on digital resources than previously (Beaudoin & Brady, 2011, p. 30), but the problems still persist with scholars trying to cope with services that do not meet their needs (Rose, 2002, pp. 37-39; Beaudoin, 2005, pp. 35-36; Zorich, 2012, pp. 13-16, 26-27).

Therefore, various studies have been conducted on the information behaviour and needs of scholars in art history the last 30 years with most of them focusing on the information seeking practices of researchers in the field; a key issue deriving from these studies has been the importance of personal collections for research and teaching (Bakewell, Beeman, & Reese, 1988, p. 19; Challener, 1999, p. 33; Elam, 2007, p. 5; Beaudoin & Brady, 2011, p. 31, Kamposiori, 2012a). Additionally, another interesting point that is inferred from these studies is that new technologies have not achieved to meet the organisational needs of art historians for over 20 years (Rose, 2002, pp. 37-38; Beaudoin, 2005, pp. 35-36).

Consequently, the issues mentioned above along with the fact that there is little information known on how scholars organise and manage information in the digital age - not only in art history but in other disciplines as well - (Palmer, Teffeau, & Pirmann, 2009, p. 16; Beaudoin & Brady, 2011, p. 32) set the objectives of this project. More specifically, the purpose of this study is to foster understanding of how scholars in art history create, design, use and manage their personal research collections together with the criteria upon which their decisions are made.

Thus, in the present paper, a review of the literature highlighting the importance of personal collections in art history along with the practices involved in the seeking, gathering and organisation of information is presented. Building a complete picture of scholars' practices and habits in the digital age is necessary for identifying the specific requirements of art historical research; moreover, achieving this goal can eventually lead to the effective support of scholarship in the field though the provision of customised digital tools and services.

The value of personal collections in Art History

In the field of art history, the collections scholars create tend to include the wide variety of resources they manage to gather throughout their research career (Challener, 1999, p. 7; Elam, 2007, p. 5; Beaudoin & Brady, 2011, p. 32; Kamposiori, 2012b, p. 619). Yet, because of the large analogue collections scholars have managed to create over the years, they often feel reluctant to move forward and use resources in digital format (Beaudoin & Brady 2011, p. 32). Moreover, many scholars maintain analogue collections along with the digital ones due to the fear of data loss in the digital environment (Palmer et al. 2009, p. 18).

In general terms, the reliance art historians develop upon their personal collections is a key issue in the field highlighted by several researchers examining the information seeking activity of art historians (Stam, 1984, p. 117; Challener, 1999, pp. 6-7; Larkin, 2010, pp. 49, 52). Larkin (2010, p. 52), especially, by using quantitative and demographic analysis, found that women art historians are keener to develop a

reliance on their personal collections than men; however, personal collections and the dependence on them was the only category in her research where this gender issue was revealed. For instance, when her participants were asked about regularly adding material to their personal libraries, more than half agreed without any gender difference being apparent.

Moreover, the personal pride scholars feel about their collections is an issue regularly mentioned. For example, Palmer et al. (2009, pp. 16-17), through their research, discovered that one third of their fine arts respondents, when advising their students about potential resources to use, suggested their own collections because they considered them to be "superior and more relevant". In Brockman, Neumann, Palmer, & Tidline (2001, p. 9) one of the participants referred to his personal library as the "credential catalog". Finally, Beaudoin & Brady (2011, p. 32) noted that personal image collections played an important role in the "work related image behavior of scholars" participating in their research.

Yet, it is not so surprising that scholars develop great reliance on their personal collections and feel proud about them. An early study (Soper, 1976) studying the personal collections of scholars in the sciences, social sciences and the Arts & Humanities revealed that, since these collections were built upon scholars' personal interests and were easy to access, scholars tended to use them as their first choice when they needed to find information (Soper, 1976, p. 409).

To continue, personal collections in art historical scholarship facilitate both research and teaching. Collecting visual material can constitute a solution to difficulties such as problematic illustration of some art periods, inaccessible or deficient institutional collections, difficulties in the web retrieval of images, and low quality of surrogates (Bakewell et al., 1988, p. 18; Durran, 1997, p. 11; also see Palmer et al., 2009, p. 18). Consequently, the ownership especially of 35mm slide collections is very common practice in art history (Bakewell et al., 1988, p. 20; Challener, 1999, p. 33; Elam, 2007, p. 5; Larkin, 2010, p. 53); more significantly, many of these collections may contain images never reproduced before which were captured and collected after many years of travelling and hard work (Bakewell et al., 1988, p. 18). Also, according to Grindley (2006, p. 6), copyright issues, incompatibility of metadata, sustainability and robustness can be key reasons for gathering material and building personal collections.

Seeking & gathering information

According to Palmer et al. (2009, pp. 9-10) searching for research material can be a rather complicated activity for scholars; still, it is fundamental for the initiation of the research process. In art history, the beginning of the research process and, therefore, the seeking of the needed information, is to a great extent linked with the scholar's intuition and memory. These two qualities, which are associated with connoisseurship, apply especially on the case when research starts from the examination of the artwork.
Brilliant (1988, p. 122), for example, noted that scholars in the field, after relying greatly on their visual memory to examine a work of art, attempt to search for related information objects. In fact, artworks can many times inspire the initiation of the art historical research process through enabling the discovery of the research subject and the generation of research questions. These questions, then, in combination with the experience of the researcher lead to the searching of the required material.
Bailey & Graham (2000) suggested that the types of information objects required each time for conducting a project in the field, as well as the way the research will continue, are determined by the research subject. Though, Bakewell et al. (1988, p.

111) argued that, at this early stage of research, every possible resource may prove useful; it seems then that works of art are "only the beginning of the quest" (Bakewell et al., 1988, p. 124). Considering the most important data in art history, they are the names, titles, places and dates referring to works of art (Reed, 1992, p. 734). Accordingly, Bates et al. (1993, pp. 14-15), in their study for the Getty Online Searching Project, confirmed the use of these terms during the seeking process in the Arts & Humanities. In terms of the information seeking practices scholars in the discipline prefer, chaining and browsing are amongst the most popular; direct searching, even though it is a possibility in art history, is not usually chosen by scholars as an effective searching activity.

In fact, chaining and browsing are two of the main reasons Beaudoin (2005, pp. 34-35) argued that art historians' information seeking behaviour matches Thomas Mann's (1993) Subject or Discipline Model and Library Science Model of information seeking, as well Marcia Bates' (1989) berrypicking searching model. According to these models, some of the characteristics fitting art historians' information seeking behaviour are the great reliance on libraries for browsing material and the use of bibliographies, citations, indexes and abstracts for tracking resources.

Furthermore, networking and communication are valuable activities for locating information. Informal communication with colleagues and other subject specialists, exchanging information at conferences and other types of meetings, as well as visiting publishers in person are some of the most useful ways for discovering resources in art historical research and keeping track of the progress in the field (Bakewell et al., 1988, pp. 41, 75-78; Reed, 1992, p. 752; Challener, 1999, pp. 7-8; Rose, 2002, pp. 36-37; Grindley, 2006, pp. 4-6; Kamposiori & Benardou, 2011, p. 4). Stam (1997, p. 29), specifically, referred to the communication between colleagues in the field as the "invisible college", constituting an important part of the information seeking behaviour of art historians. Being in the digital age, these activities are supported by a range of tools and services. E-mail, discussion lists, forums, blogs, online conferencing services and other online communities like twitter - even though its use is limited in art history - are some of the digital tools and services that enhance these activities and, thus, scholars' information seeking (Beeman, 1995, pp. 99 100; Grindley, 2006, pp. 4-6).

Lastly, although some similarities in terms of the information seeking behavior of different groups of art historians can be identified, there is a growing need to further examine some specific groups, whose needs and methods have been until now understudied. For example, the fact that scholars researching on interdisciplinary or non-traditional subjects confront difficulties while seeking for information demonstrates that their methods and needs lack thorough examination and support (Rose, 2002, p. 37). Therefore, in order to provide them with personalized tools and services for their research, it is essential to identify and understand the differences in their interests and methods they use. Finally, it is important to study not only the more profound searching activities that scholars employ, but also other research activities which may facilitate their information seeking activity, such as networking. Their support with appropriate digital infrastructure, then, will enhance art historical research as a whole.

Storing, filing, indexing and organising information

The building of personal collections in art history not only constitutes an ideal choice for dealing with various issues regarding research and teaching in the field, but also for creating collections that can be indexed and organised upon personal criteria (Bakewell et al., 1988, p. 19). However, as collections grow, the need for their

management emerges (Meho & Tibbo, 2003, pp. 582-583; Palmer et al., 2009, p. 18; Beaudoin & Brady, 2011, p. 32; Borgman, 2003, p. 2); in art history, especially, this can be a very challenging task due to the format variety and the personalised practices involved. For instance, Rose (2002, p. 37) noted that art historians studying non-traditional subjects have different information needs; as a result, such an observation inevitably generates questions regarding the collection, storing and organisational habits of different groups in the discipline.

In addition, as mentioned before, technology, in contrast to the impact it has had on the information seeking practices of scholars in art history, has not affected their storing and organisational habits. More specifically, Rose (2002, pp. 37-39) observed that scholars in the discipline continued to utilize traditional methods while storing, filing and organising information, as they could not afford the time and effort to learn new programmes that often did not meet their needs. Thus, participants in her study considered themselves primitive and low tech in this area of research, although they expressed the desire to learn more on how to use new technologies. Finally, in this study scholars expressed a desire for tools and services that will enable the storing and indexing of information; interestingly, this wish was first presented in the study conducted for the Getty's Art History Information Program in 1988 (Bakewell et al., 1988, pp. 103-104), but not yet fulfilled.

Moreover, Beaudoin & Brady (2011, p. 32) recognised the existing need to support art historians with the creation, management and preservation of their collections, especially image collections, as most respondents in their study agreed that their technological skills were not adequate for developing and maintaining them. Since many scholars did not follow any particular archiving methods concerning digital images in their collections, Beaudoin & Brady argued that information professionals should assist them in the filing and management process for enabling the future retrieval of information.

Furthermore, Bakewell et al. (1988, pp. 44, 49), in the published results of the Getty Art History Information Program, noted that art historians considered the systematic organisation of information to be a vital stage during their research process; some of their interviewees referred to their struggle of keeping track of information as a "matter of professional survival and success" (Bakewell et al., 1988, p. 44). This was indeed a challenging task and scholars in the study reported on the various problems they faced. These ranged from the difficulty to adapt new technologies to their needs, such as using a system that allowed them to view many resources at the same time, to personal habits complicating the process, like the tendency to lose hand-written information. Battin & Stam (1989, p. 23), also, referred to their research participants' difficulty to organise their own photographs and textual resources as well as to understand how other repositories were structured and organised.

Moreover, it is worthwhile mentioning Case's observation (1991b, p. 657) about the new burden today's scholars have to face regarding the storage and retrieval of information which has always been challenging for them; actually, the digital age has brought the additional problem of trying to keep track of digital information, along with piles of data in paper form. In another study of his (Case, 1991a, p. 75) in particular, he noted that historians who tried to organise all of their material eventually gave up as it was a very difficult task to accomplish. Finally, even in the most recent Ithaka S+R's report (Rutner & Schonfeld, 2012, p. 23) all of the historians interviewed still considered the organisation and management of the analogue and digital notes and resources to be a primary challenge for them.

Conceptual and habitual criteria for building personal collections

Despite the challenges, though, art historians have developed some personalized ways to record, store and organise their collected material while the means for achieving this purpose vary. Significant is also, that even though they may use digital technologies in other parts of their research, traditional means of indexing and filing information are still among the most popular. In Bakewell et al. (1988, pp. 48-49) scholars used different media for cataloguing verbal and visual information. The media used for filing verbal information varied from notebooks and data sheets to three by five inch file cards, whereas the visual material, such as slides or photographs, was organised mostly in boxes. Only a few of the interviewees had started using the computer at that time, but most of them were reluctant to stop using paper systems which they considered to be familiar and successful.

Some years later, in 1992, Reed (1992, p. 752) mentioned that art historians still "stored their knowledge in their heads and their data in boxes of three by five cards" while Lavin (1997, p. 198) in 1997 argued that art historians expected computers to enable them to arrange information as they did with cards. Continuing, Challener (1999, pp. 28, 33-34), in her research, noted that some scholars used a slide curator for cataloguing slides whereas one of them had already started to digitize her slides. Brockman et al. (2001, p. 24) found out that many of their participants praised the portability and simplicity of the filing cards and two of them used a reference manager to organise their bibliographies.

Rose in 2002 (2002, pp. 37-38), by examining the impact of technology on the information seeking behaviour of art historians, was surprised to find that more than half of them still used conventional methods for the record, storage and management of their data. Notebooks, index cards, loose-leaf binders for recording and organizing hand-written notes, bibliographies, computer printouts and copies from books were amongst the most popular. Moreover, subject dividers were used to sort information inside the notebooks and plastic sleeves were preferred for storing photographs. Index cards, in particular, were praised for their small size and the ability they offered for easy rearrangement of information. Other recoding methods included digital cameras for photographing art objects, thumbnail sketches when photographing was not an option and computers, since some of the art historians have started keeping notes directly on them. After the recording stage, scholars proceeded to the storing and filing process by using manila folders for organising loose-leaf papers, printouts and photographs and storing them in file cabinets or boxes where slide collections were also placed. Rose noted that only four of the scholars in her research used the computer to file information while one of them had bought Endnote (proprietary bibliographic management software) hoping to help her store and retrieve her references more efficiently.

Furthermore, personal criteria are often factors that determine the methodology upon which information will be recorded, catalogued and organised in art historical scholarship. In the study conducted by Bakewell et al. (1988, pp. 46-50), art historians seemed to follow a lot of different approaches for accomplishing these tasks. For instance, many scholars tended to organise their bibliographic references separately whereas the overall information material collected was usually organised by projects with the subject categories tailored to ongoing research. Similarly, the relationship between a scholar's projects affected the overall filling system they employed, as some art historians used to close the files when a project was completed and others attempted to develop systems that could facilitate potential relationships between their various projects. Also, some scholars in the field referred to the need they occasionally faced of opening closed files in order to synthesize further the material.

Another typical organizational system in art history, according to Bakewell et al. (1988, pp. 46-50), was the separation of information depending on teaching or research purposes, a system that applied especially to the organization of visual material, such as slides. Concerning visual material, particularly, some scholars tended to sort it chronologically or by style and they duplicated the images when it was necessary to file them in more than one project. Finally, others stored visual resources based on open-ended projects or projects that were finite by nature.

Additionally, very interesting are the findings of some authors in the literature regarding the conceptual process involved in the building of personal collections, which also connects this research stage with other scholarly practices. In Bakewell et al. (1988, pp. 44-45) the arrangement of information was described as a problem-solving process, essential for forming the intellectual inquiry in art history; for instance, a scholar in their study tried to make decisions about their project by organizing the research material in a specific way. Also, Case (1991a, pp. 76-77), through his research, identified a strong connection between the organizational stage of research and the writing process. More specifically, as the writing stage progressed, scholars tended to reorganize their cards and files accordingly so as to reflect the development of the scholarly argument and the transformation of their understanding of the topic. Furthermore, memory is strongly related to this stage of research in art history. For example, a scholar in Bakewell et al.'s (1988, p. 49) study admitted that their memory was strongly topographical, since they could easily remember things being in "a spatial rapport to one another".

In fact, the aforementioned comment reveals the key role the physical workstation plays in the organisational habits of scholars. Case (1991b, pp. 662, 665), after studying the physical workspace of historians and their habitual behaviour at this stage of research, observed that even the most untidy workspace was actually organised in a way that meant something to the scholar working there. For instance, some scholars organised their material based on the need to have things at hand while others organised it in a way that reminded them of their workload. He also discovered that four criteria were usually applied to the categorisation of information: spatial constraints; form; topic; treatment, purpose or quality.

To continue, historians in Case's (1991b, pp. 658-659) study, like art historians, relied very much on their memory for locating information and based the evolution of their filing and organisational systems on mental and physical aspects. Thus, he suggested that successful information systems should be created according to the patterns and needs scholars develop in the physical world and based on the motivation and purposes behind the practices scholars adopt. Accordingly, Borgman (2007, pp. 42-43), in her monograph, recommended that the creation of information systems should constitute a reflection of the real world. Also, in 2003, Borgman argued the following:
Personal digital libraries can be much more than repositories; they can facilitate malleability, mutability, and mobility of information resources. Thus, the next research front is to design tools and services that will enable individuals to create and manage their own personal digital libraries (PDLs). (p. 1)
Concerning art history, particularly, Beeman (1995, p. 96) mentioned that the ideal organisational system would take under consideration the organic quality of scholars' collections and the fact that art historians tend to organise their resources by project and not by subject. Bakewell et al. (1988, pp. 50-51), moreover, argued that art historians need a system that would "interfile and coordinate" their collected verbal and visual material, whereas a scholar in their research wished for a system that would allow them to organise the visual material according to the analytical techniques used in art history, such as iconography. Finally, since many art

historians seemed to work on many files and different formats of information at the same time, they would find useful a system that allows them to view various types of information at once (Bakewell et al. 1988, p. 49).

Conclusion and Future Study

To conclude, the problems art historians usually face when they engage with digital tools and services highlight the need for further study on their information practices and needs. Understanding the importance of personal collections for art historians and the criteria upon which the creation, design, use and management of these collections are based is essential for facilitating their research with personalised tools and services in the digital age. Furthermore, it is important to mention that despite the significance of the existing studies in the field, the majority of the literature is outdated and needs to be revisited as technology progresses, so that findings in this research field remain attuned to the constant development of technology. Hence, one of the main concerns of this ongoing project is to examine further, through its methodology, and hopefully understand the cognitive process behind the practice of collection building.

Current study proposes that a high level of understanding regarding the collecting and organisational practices of scholars can be achieved; in fact, the combination of interviewing and observation of the physical and digital collections of scholars with the use of specific theoretical frameworks for analysing users' information behaviour can bring fruitful results. Regarding the sceptical stance many researchers in the field keep towards new technologies, potential suggestions can include the development of collaborations between art history departments and digital humanities centres, the provision of institutional support and training on the use of new technologies for research and, most importantly, the inclusion of both senior and junior members in art history when taking decisions concerning the future of the discipline.

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3. Crowdsourcing for Large-Scale OCR Correction in the Digital Humanities

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In the Text+Berg project we digitized the yearbooks of the Swiss Alpine Club (SAC) from 1864 until today for building a multilingual heritage corpus of Alpine texts [Göhring and Volk, 2011]. Towards this goal we have collected all the yearbooks from 1864 until 2000 in printed form. From 2001 until 2009 the SAC has provided us with PDF files and since 2011 the SAC generates structured XML files out of their authoring system. Initially the books contained mostly German articles, some in French, and few in Italian and Rumansh. From 1957 onwards the SAC has published parallel French and German versions of the yearbooks, both of which we processed in the same manner.

After scanning all book pages we used commercial OCR (Optical Character Recognition) software to convert the scan images to text. This lead to mixed text recognition results. The text on some pages was excellently recognized whereas other pages contained a multitude of OCR errors. Our initial idea was to manually correct these errors in the OCR system since it preserves the mapping between words recognized in the text and the corresponding position on the page. But we soon realized that manual correction is very time-consuming even when working on well-recognized volumes of the 20th century.

It is prohibitively time-consuming for the volumes of 19th century where recognition accuracy is inferior because of more stains on the paper and old spellings that are not in the OCR system's lexicon. Therefore we investigated various means of improving the OCR quality and for automatic correction

of OCR errors. There are only few ways in which a commercial OCR system can be tuned. The most obvious way is to add "unknown" words to its lexicon. We collected words with old German spelling patterns (e.g. acceptiren, accepttieren, Mittheilung) and added them to the OCR system. In addition, we
inserted the names of the 4000 most prominent Swiss mountains and cities to the system. This has lead to some improvements of the OCR quality but a multitude of seemingly random OCR errors persisted.

Then we experimented with two ways of automatic error correction. First, we employed a second OCR system and merged the output of the two systems [Volk et al., 2010]. Second, we experimented with automatic error correction based on word similarities. If an unknown word (with length greater 12 characters) deviates only in one or two characters from another (known) word which frequently occurs in our corpus, then we automatically substitute the unknown word with the known word. After all these efforts many spurious OCR errors remain. It became obvious that we can only achieve a clean corpus if we organize a large distributed effort for correcting OCR errors via crowdsourcing. Therefore we have built Kokos (DE: Kollaboratives Korrektursystem) a collaborative correction system.

Kokos is based on the wiki idea of collaborative editing and also built on top of an open-source wiki system. We modified the wiki such that it displays the recognized text and the scan image side by side. See figure 1 below:

Figure 1: Screenshot of the Kokos Crowdcorrection System

In the recognized text each word is an editing unit. The user may click on each unit in order to open a small pop-up editing window. In this window he/she can modify the word and save it.

The corrected word becomes visible immediately in the text. When a user believes that he/she has corrected all errors on the current page, then the user will click on the "Page is finished" button in order to mark the page as correct. This button will automatically move the user forward to the next page.

We had Kokos ready for operation in the fall 2013 filled with 21'000 pages of all the SAC yearbooks from 1864 until 1899. Then the question was how to recruit volunteers for correction. In the January 2014 issue of its magazine the SAC has published a call for helpers in OCR correction of its yearbooks. Within days a crowd of dedicated contributors have registered and started to correct the OCR errors in Kokos. In the 4 months since then they have entered 200'000 corrections and have marked 16'500 pages as finished. On manual inspection we find no signs of vandalism and a very low rate of remaining errors of around 1.5 errors per page. We expect to have all pages of the 19th century yearbooks corrected by the time of the workshop. Our project is similar to [Holley, 2009] and [Wang et al., 2013] but differs with respect to text type and because of its multilinguality.

In our presentation we will report on our design decisions in building the Kokos system, our guidelines for OCR correction, our efforts in motivating and informing the contributors and our lessons learned in the project. We believe that crowdsourcing efforts will play an increasingly important role in digitization
and other Digital Humanities projects. Crowdsourcing can provide valuable human judgments on recognition, classification and annotations tasks on a large scale if the right factors in user interface design and community building are taken into account.

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4. CENDARI: Historical Research in a Digital Research Infrastructure.

Authors: Jennifer Edmond (Trinity College Dublin), Francesca Morselli (Trinity College Dublin)

Objectives and planned outcomes

CENDARI – the Collaborative European Digital Archive Infrastructure – is a collaboration of 14 European research institutions and aims to overcome national and institutional data silos of available historical resources on World War 1 (WW1) and Medieval European History. CENDARI is piloting a digital research infrastructure for historians that provides digital tools for the aggregation, interrogation and visualization of historical resources and enables the investigation of new research questions.

The project is currently developing three main outcomes: the Virtual Research Environment (VRE), a number of Archival Research Guides (ARG) and the Archive Directory, a rich underlying database of cultural heritage institutions and collections of archival data. The first will serve researchers to annotate and organize digitized records and finding aids, while the ARGs will serve as a thematic, curated, entry point to the archival holdings represented in the virtual environment. The VRE and the ARG are complementary tools to access the archival content in the Archive Directory and support the current practices of historians and researchers in that they favor real activities and research methodologies, and do not demand a change of actual research paradigms in favor of alien technologies.

The CENDARI research infrastructure supports this transition phase with its user-centered approach to digital technologies allows replicating offline-methodologies when these are more relevant for researchers.

Collaboration with research communities and research infrastructures

Collaboration with research communities is an important aspect for the project. Participation in conferences directed to historians (medievalist and modern), archivists and digital humanists is helping us to reach a broad community of researchers. The CENDARI summer school and the transnational fellowships are invaluable ways to get insight from historians about their changing practices and to have feedback about the virtual environment that we are building. To this purpose, during the prototyping phase of our tools, we organized participatory design workshops, where historians created video prototypes, mockups of research tools and other visualization features.

Collaboration also means connecting with other projects and research infrastructures, while exchanging common opportunities, progresses or difficulties. In particular, DARIAH.eu is involved in the current development and in the future sustainability of the CENDARI infrastructure. Other similar infrastructures include ARIADNE, EHRI and ECloud.

Identifying risks and pitfalls

As CENDARI is developing a number of innovative elements, there are consequently different levels of risk to be taken into consideration. On a content level, CENDARI is a research infrastructure that needs data in order to demonstrate its potential; however, since the project is not an aggregation infrastructure per se, we experience some difficulties in engaging with hidden and small archives.

On a research-community level, we have identified some pitfalls in the tension between the cherished norms of analogue research culture and the new avenues introduced by technological advances (e.g. digital publishing, sharing of research information). On a strategic level we have noticed a growing need for matching funding opportunities to the needs of the cultural heritage institutions in order to

make the relationship between research infrastructures and heritage institutions more effective.

Authors

Dr. Jennifer Edmond is Coordinator of the CENDARI project, based in the Trinity College Dublin - Long Room Hub. She has broad experience as a technology implementation advisor for the arts and humanities, and has led the development and implementation of the strategy for Digital Humanities at Trinity College Dublin. She manages a number of large scale funding grants as part of her role as Director of Strategic Projects for the Faculty of Arts, Humanities and Social Sciences in Trinity College Dublin.

Francesca Morselli is researcher for the CENDARI project, based at the Trinity College Dublin - Long Room Hub. Francesca has a broad experience in digital humanities projects for the accessibility of content from international heritage institutions. She in particularly interested in researching new forms and languages to connect digital cultural heritage to the end users, both in academic and professional environments. Francesca's current activities focus on engaging with cultural heritage institutions, assisting in the development of user requirements and developing archival research guides for the CENDARI's historians and archivists.

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5. DHCommons and DiRT: Development, CommunityBuilding & Integration for DH Directories

Quinn Dombrowski, UC Berkeley

DHCommons and the DiRT directory are two resources that provide a kind of infrastructure for digital humanities research an effect that will be strengthened by a current Mellon-funded initiative that will enable these sites to exchange contextually relevant information. Both projects were developed in the wake of Project Bamboo (20082012), a Mellon-funded initiative that took a technolog-centric approach to infrastructure development. This presentation will quickly cover the origins and development of DHCommons and the DiRT directory, before discussing the challenges each site has faced, and concluding with current opportunities for both projects.

The DiRT directory evolved from Bamboo DiRT, itself a redesign of the longrunning DiRT wiki under the auspices of Project Bamboo. DHCommons was developed independently, without grant funding or institutional support, following discussions at THATCamp Chicago (November 2010). It launched publicly as a centerNet initiative at the 2012 MLA convention with a workshop on getting started with digital humanities.

Unlike Bamboo and artshumanities. net, which attempted to include a wide range of activities within a single project, DHCommons and DiRT took a modular approach, each focusing on a single kind of data (projects/collaborators and tools, respectively). Having a clearly defined focus associated with an independent brand identity has helped differentiate DHCommons and DiRT in an ecosystem with many directories and guides.

Both DiRT and DHCommons have struggled to find the right level of human intervention and oversight for a fundamentally "selfservice" resource. While

DHCommons has data on projects in need of collaborators with particular skills, and individuals with skills that may match projects' needs, it places the onus on the user or project to seek out "matches". As a result, its promise of connecting people with projects has remained largely hypothetical. The original DiRT wiki was updated by an editorial board, but the Bamboo DiRT redesign opened the site up to contributions from any user, and included ways of crediting users for
their changes and additions. Nonetheless, DiRT did not see the anticipated surge in communitygenerated editing. Numerous established longterm DiRT users who frequently reference the site in presentations, on Twitter, and other public fora have never created an account. As a result, DiRT is returning to a workflow
primarily driven by an editorial board, while trying to lower the barrier to entry for basic tool submission.

With support from the Mellon Foundation DiRT and DHCommons are currently working on de-siloing their data by making public APIs available. Each site will also share data with the other, providing valuable contextual information (e.g. showing which projects are using a given tool). Implementation of the
TaDiRAH taxonomy on both sites will provide another means of linking data. DHCommons is working on incorporating project listings originally housed on arts-humanities. net, as well as project information from diverse international sources. The launch of the DHCommons journal, which offers peer review of
Midstage projects, has the possibility of bringing more projects into the directory, but may overshadow some of DHCommons' other goals.

Quinn Dombrowski is the Digital Humanities Coordinator in Research IT at UC Berkeley. She is the lead developer of the DiRT directory (dirt.projectbamboo.org) and the cofounder and technical editor for the DHCommons (dhcommons.org) project / collaborator hub. She was part of the program staff for Project Bamboo (20082012), a Mellon-funded cyberinfrastructure initiative for the humanities.

Author

Quinn received a BA/MA in Slavic Linguistics from the University of Chicago, and an MLS from the University of Illinois.