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Digital Humanities in Academic Library: Creating Narratives through Spatial Data

Abstract. A growing trend in digital humanities has been digital scholarship and the emphasis on usage of digital tools and methods in research, teaching, and publishing. Academic libraries as laboratories for humanities scholars (Christine Borgman) need to keep up with these changes. Digital humanities (DH) have become an important area of librarianship and demand for librarians with skills and expertise in metadata creation and control, digital repository management, information organization, intellectual property rights management, research data preservation, and visualization has been on the rise. This paper focuses on the English-language literature presenting visualization of spatial and temporal data in DH projects through rich narratives involving text, interactive maps, and map-enabled spatial data services. Using the examples of digital mapping projects developed and implemented in a large academic library, the article shows a case of big academic library on how spatial and temporal data visualization can be employed to tell stories, promote, and inform about cartographic resources of relevance to DH scholars, and provide self-help tools to empower users.

Keywords: digital humanities, visualization, digital mapping projects, academic libraries, University of California Los Angeles, UCLA Library, print and digital maps, spatial and temporal data, GIS, story map, ArcGISOnline, self-help tools, self-service tools, empowering users.

Background

According to the American Academy of Arts and Sciences' Humanities Indicators, since 1945 the number of granted bachelor's degrees in humanities in the United States has fluctuated, "rising sharply beginning in the mid-1950s, plummeting through the 1970s and early 1980s, and

then partially recovering"[1]. At four-year colleges and universities, the oldest disciplines representing the humanities are English language and literature, history, languages, non-English literature, linguistics, classical studies, religion, anthropology, archeology, musicology, folklore, and philosophy. Since the 1980s, newer disciplines such as communications, women's and gender studies, area studies, race and ethnic studies, study of art, and more recently, digital humanities have expanded the profile and disciplinary diversity of humanities.

Digital humanities (DH) originated from humanities computing when, in 1946, an Italian Jesuit priest, Roberto Busa, collaborated with IBM to create an alphabetical index of St. Thomas Aquinas' writing[2]. Until 2001 the term "humanities computing" was commonly used. In 2001, the term "digital humanities" was coined as the result of discussion on a new book title between Blackwell Publishing and the book editors – John Unsworth and Ray Siemens. Kathleen Fitzpatrick wrote: "Blackwell wanted a title that might appeal to a wider range of readers, and so proposed *A Companion to Digitized Humanities*. Unsworth countered with «Digital Humanities», to keep the field from appearing to be about mere digitization"[3]. Publishing *A Companion to Digital Humanities* was a turning point for a new discipline. The 2004 edition of this title is an open access e-book written by pioneers and leaders in humanities computing who presented not only background and history of the new discipline, but also its principles, applications, methods, and tools. In this article, DH is defined as "…new models of scholarship and institutional units for collaborative, transdisciplinary, and computationally engaged research, teaching and publication"[4].

An important component of DH are visualization methods with tools helping to organize data and information and visual displays crucial for organizing, analyzing, communicating, and creating narratives. This article concentrates on visualization of data pertaining to a place, location, and its characteristics – henceforth called spatial data in geographic information systems (GIS), and on using digital mapping as a method and a tool to make maps interactive. Why are visualization, GIS, and

[1] American Academy of Arts & Sciences. Bachelor's Degrees in the Humanities. Humanities Indicators, 2021, https://tinyurl.com/bdh8dw93 [accessed: 24.06.2021].

[2] For an open access edition of this title check Internet Archive. A. Burdick, J. Drucker, P. Lunenfeld, T. Presner, J. Schnapp, *Digital Humanities*, Cambridge 2012, https://tinyurl.com/mttvh3jd [accessed: 22.06.2021].

[3] K. Fitzparick, *The humanities, done digitally*, "Chronicle of Higher Education" 2011, 57 (36), B26

[4] A. Burdick, J. Drucker, P. Lunenfeld, T. Presner, J. Schnapp, op. cit., p. 122.

digital mapping of interest to DH? Why is it important for academic libraries to be familiar with DH and its visualization methods and tools? To address these questions the article will define and discuss library participation in DH and the use of digital mapping tools to contextualize text in space and time and facilitate access to cartographic resources.

DH and Academic Libraries in Literature

Scholarly literature presents different definitions and understanding of DH, however, most of them emphasize data gathering, digital text and tools, technologies, visualization, mapping, open access publishing, and teamwork. As Miriam Posner stated, "[d]igital humanities investigate how digital formats and tools are changing the way we share knowledge in the humanities"[5]. The DH, as a new discipline in humanities, is constantly developing and changing its definition. While *Debates in the Digital Humanities*[6] offers not only different understandings of DH in scientific literature, but also in blog posts. Jason Heppler, by pulling (crowdsourcing) definitions of DH from Twitter participants; @jaheppler, in *A Day in the Life of Digital Humanities*, presents 817 rotating definitions of DH on his website between 2009 and 2014[7].

DH defined as a new models of scholarship presents broad understanding of DH allowed to include libraries as institutions collaborating with DH researchers. Academic libraries are well equipped to support DH projects not only with their engagement in early digital activities by digitizing books, periodicals, maps, creating "born digital" (without an analog origin), "reborn-digital" (archived and preserved on the Web) materials and databases[8], but also offering primary resources and technical skills. Using the Library, Information Science & Technology Abstract (LISA) database, Chris Sula analyzed and visualized DH in library and information science literature since 2005 and found out that "…publications on digital

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[5] M. Posner, *Introduction to digital humanities*, 2017, http://miriamposner.com/classes/dh101f17/ [accessed: 22.06.2021].

[6] M.K. Gold (ed.), *Debates in the digital humanities*, Minneapolis 2012, https://tinyurl.com/3yuwctxm [accessed: 22.06.2021].

[7] J.A. Heppler, *How people define digital humanities. What is digital humanities?*, 2017, March 8, http://whatisdigitalhumanities.com [accessed: 22.06.2021].

[8] For a broader explanation of three major types of digital material used in DH see N. Brügger, *Digital humanities*, in: *The International Encyclopedia of Communication Theory and Philosophy*, eds. K.B. Jensen, R.T. Craig, J. Pooley, E.W. Rothenbuhler, John Wiley & Sons 2016.

humanities have nearly doubled in 2012"[9]. With growing interest in DH by libraries the question "[d]oes every research library need a digital humanities center?" was asked. In response, Schaffner and Erway conducted informal focus groups asking DH scholars about access to resources used in their projects, publishing, outcome sharing, and the level of technical skills needed to support it.

After analyzing responses, they proposed the following options for libraries providing support for DH scholars:

- package existing services as a "virtual DH center"
- advocate coordinated DH support across the institution
- help scholars plan for preservation needs
- extend the institutional repository to accommodate DH digital objects
- work internationally to spur co-investment in DH across institutions
- create avenues for scholarly use and enhancement of metadata
- consult DH scholars at the beginning of digitization projects
- get involved in DH project planning for sustainability from the beginning
- commit to a DH center[10].

The above proposed options stipulate different levels of support provided to DH researchers by academic libraries. And yet, regardless of the proposed options, libraries still need to concentrate on extending their repositories to accommodate and preserve DH digital objects. For some time, libraries have actively participated and provided content for large-scale digitization projects such as Project Gutenberg, Internet Archive, HathiTrust Digital Library, JSTOR, ProjectMuse, Archive of Americana, Early English Books Online, Google Books. However, as Malina Thiede noted "[as] librarians at academic institutions take on responsibility for preserving digital materials, they certainly have a role in ensuring that these DH projects are maintained and not lost"[11].

Availability of digitized content advances the usage of digital tools and methods in cross-disciplinary DH projects. Digital research tools are used to enhance and extend many tasks such as data and text analysis, web

[9] C.A. Sula, *Digital humanities and libraries: A conceptual model*, "Journal of Library and Administration" 2013, 53 (1), p. 12.

[10] J. Schaffner, R. Erway, *Does every research library need a Digital Humanities Center?*, Dublin 2014, p. 5, https://tinyurl.com/bddyxday [accessed: 22.06.2021].

[11] M. Thiede, *Preservation in practice: A survey of the New York City digital humanities researchers*, "In the Library with the Lead Pipe" 2017, May 17, https://tinyurl.com/375n79t9 [accessed: 22.06.2021].

scraping, crowdsourcing, data mining, creating digital exhibitions, making dynamic maps, visualizing data, and more. Miriam Posner emphasized the power of digital tools by asking "[so] how do you use a computer to do humanities work? Should we stick to word-processing, or is there a way to take advantage of newer tools, like digital maps and data visualization, for humanities work?"[12]. Visualization as a strategy to present data and information "…adopted by digital humanists (charts, graphs, diagrams, maps, and timelines) was mainly developed in the natural sciences, social sciences, statistics, business applications, and other fields"[13]. The instruments used in visualization can help DH researchers to analyze and present complex data and information.

Methods and Research Purpose

In this article visualization is discussed as a means for presenting spatial data involving both printed (analog) and digital maps. Maps as an example of a non-survey data category – next to images, sounds, videos and multimedia, are important research objects of DH projects. They serve many purposes, from showing changes over time through comparing places to navigating and finding specific locations. By using maps, we can narrate stories about places, locations, events, processes, objects, and issues. To effectively visualize, analyze, and manage maps, reliable tools are needed, and one of them is a geographic information system (GIS). In a broad sense, GIS is an information system that includes: (1) software tools for capturing, storing, managing, analyzing, and visualizing spatial data; (2) people who operate them, and (3) an organization, in which the system is embedded. In a narrower, instrumental sense, used in this paper, GIS is an integrated set of tools for capturing, storing, managing, analyzing, and visualizing spatial and temporal data[14].

This article showcases two categories of mapping projects developed and implemented in the University of California, Los Angeles (UCLA) at Charles E. Young Research Library (YRL). The first category is represented by three digital mapping projects to contextualize text in space

[12] M. Posner M., *Digital humanities 101: Introduction to digital humanities*, 2016, http://miriamposner.com/classes/dh101f16/ [accessed: 22.06.2021].

[13] J. Drucker, *Visualization and interpretation: Humanistic approaches to display*, MIT Press 2020, p. 76.

[14] More about GIS and libraries see A. Kallaher, A. Gamble, *GIS and the humanities: Presenting a path to digital scholarship with the Story Map app*, "College & Undergraduate Libraries" 2017, 24 (2–4), pp. 559–573.

and time, while the second category is exemplified by two digital mapping interfaces to empower users in self-help tools (facilitating searching, finding, and accessing print and digital maps). There are many software solutions for mapping and GIS including CartoDB, Google Earth, OpenStreetMap, and QGIS. In all projects presented in this paper, the Environmental Systems Research Institute (ESRI) products including ArcGIS Online software and Story Map App were used. These digitally born projects not only contributed to creating cultural records important in DH but also helped to preserve historically important events and empower users in providing self-serve tools to access cartographic resources.

The selection of presented project is justified by the author's direct participation in them. The author designed all projects and was involved in their implementations.

Digital Mapping Projects Providing Contextualization in Time and Space

UCLA is one of the largest public research institutions in the University of California (UC) system with many specialized libraries in multiple locations. The YRL, one of the largest libraries on campus, houses resources for humanities, social sciences, government information, special collections, and the UCLA Library's Henry J. Bruman Map Collection (Bruman Collection). It was named after the founder of the map collection, a UCLA geography professor Henry J. Bruman. The collection (around 750,000 maps) serves as the repository for maps from the nineteenth and twentieth centuries and other cartographic materials produced by federal and international mapping agencies and commercial vendors. It consists of maps from around the world with an emphasis on Europe, Latin American, southern California, Los Angeles County, and the City of Los Angeles. The Bruman Collection serves the UCLA campus community, UC system, and off campus patrons representing writers, movie producers, lawyers, consultants, architects, and residents of Los Angeles, California, and other states, as well as researchers outside the United States. The resources of the Bruman Collection, among others, were used in all projects detailed below.

Project 1: 300 Years of Bamberg Settlers in Greater Poland: The Importance of a Historical Landscape

The first project is a result of the funded research grant from the Librarians Association of University of California (LAUC). In the early 18th century, the City of Poznań, the capitol of Greater Poland (Wielkopolska), experienced a large immigration of German farmers from the area surrounding the City of Bamberg located in Upper Franconia – a province in the then Kingdom of Bavaria, today a state in southern Germany. Poznań city administrators gave new settlers land for farming in hope of raising grain production and stemming the catastrophic decline of crops in the wake of the epidemic of the Swedish Invasion and the Great Northern War in 1708–1710. In Polish history, this migrant German-speaking population from Upper Franconia has become known as "Bambrzy" (people from the Bamberg area). The migrants quickly assimilated with the Polish-speaking population of the Poznań region and contributed greatly to the local economy by introducing efficient agricultural, craft, and business practices. In the history of European migrations, this is one of few cases, in which the transboundary movement of people happened almost frictionless and led to lasting benefits for both the migrants and the hosts.

In researching conditions leading to the initial settling and subsequent integration of Bamberg's arrivals with the Polish population, the author analyzed literature on the subject, primary sources, extant documents, and maps as historical sources at: the State Archives of the City of Poznań, Adam Mickiewicz University Library, Poznań Bambrzy Association, and Bruman Collection. Incorporating a geographical interpretation of the settlement pattern into a historical analysis of the migration process, georeferencing historical maps to place them in a contemporary setting, and narrating space and time allowed the author to create an interactive GIS-based story map. The cover page of this story map is shown in Figure 1.

The outcome of this project has been a collection of spatial-temporal data on Bamberg's settlers in the villages surrounding the City of Poznań and a georeferenced spatial dataset for global researchers in social sciences and digital humanities. This digitally borne project is fully curated by the ESRI *ArcGIS Living Atlas of the World*[15].

[15] The ESRI ArcGIS Living Atlas of the World presents selected GIS projects from around the globe. It is available at https://livingatlas.arcgis.com/en/home/.

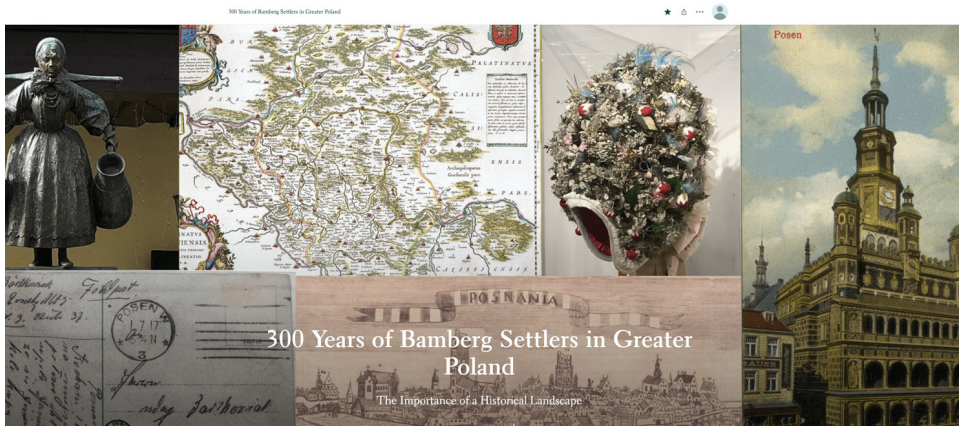

Figure 1. The cover page of story map telling about *300 Years of Bamberg Settlers in Greater Poland* (Source: [online] Available through ESRI ArcGIS Living Atlas of the World website https://tinyurl.com/ywyw2yfe [accessed: 22.06.2021])

Project 2: The Henry J. Bruman Map Collection's: UCLA Centennial Celebration

The second project offers a contextualization of the UCLA campus maps from 1919 to 2019. In 2019 UCLA marked its 100th year, and as part of research on UCLA's history the author with collaborators used archival documents, historical maps, photos, images, text, and interactive mapping tools to tell the story of the UCLA's campus. Scanned and georeferenced

Figure 2. The cover page of story map telling about 100 years of creating the UCLA campus (Source: [online] Available through ESRI ArcGIS Living Atlas of the World website https://tinyurl.com/2p8njbvz [accessed: 22.06.2021])

maps from the Bruman Collection participated in narration about the remarkable story of 100 years in creating the UCLA campus. This open to the public application, as shown on Figure 2, is curated by the ESRI *ArcGIS Living Atlas of the World*.

Project 3: The UCLA Library's Henry J. Bruman Map Collection

The third project is a novel multi-media information resource that combines photos, videos, and text to provide an engaging narrative about the UCLA Library's unique cartographic collection and a guide to map locations dispersed in three different library areas (Figure 3). It not only leads users through the Bruman Collection, but it also promotes its cartographic resources and makes access to them interesting and easy. As part of a subject research guide, it points users to resources and information about print and digital maps, atlases, aerial images, spatial data, and cartographic resources available in the library. Given that this project uses visualization both to enrich text and to facilitate access, it could also be classified in the second project category. The main goal of two projects presented below is to enable users to independently start their projects with maps.

Figure 3. The cover page of story map introducing the UCLA Library's cartographic resources (Source: [online] Available through the UCLA Library website https://tinyurl.com/3anmkjum [accessed: 22.06.2021])

Digital Mapping Interfaces to Empower Users in Self-Help Tools

Map collections take large spaces in academic libraries. With a general trend toward shrinking print resources, analog map collections are under vast examination. Additionally, searching and finding maps needs extra skills and knowledge. By using access to the UCLA ArcGIS Online, the author with geography students created two self-help tools to empower users.

Project 1: MapCallFinder

With the Covid-19 pandemic, library closure, and lack of reference assistance we created an e-help tool, MapCallFinder, to assist users in finding the proper location of print maps in the YRL building[16]. To make map searching easier for users, we used ArcGIS Online to present the Library of Congress Schedule G (responsible for geography) by call numbers for print maps located in open stacks. By clicking on a specific country or region on the online world map, the user can see call number ranges for that geographic location. Using the proper range of call numbers in the library catalog, the user can browse call numbers and see map holdings related to a geographic location. This e-help tool is part of the subject research guide under Searching for Maps at the UCLA Library.

Project 2: Online Index to the UCLA's Library Henry J. Bruman Topographic Map Collection

All map bibliographers know how hard it is to find a proper sheet in a topographical map series. The interactive online index of topographical map series provides a spatial index for maps at the scale of 1:250,000 plus links to the corresponding scan sheets and GeoTIFF format raster image files ready to be used in GIS applications[17]. We scanned all topographic map indexes in print located at the YRL building, created the Web Map Application service, and added all scanned topo sheets located in the Southern Regional Library Facility (SRLF). Each color grid cell indicates

[16] See the cover page of MapCallFinder presenting Library of Congress call numbers ranges for print maps. Source: [online] Available through the UCLA ArcGIS Online: https://tinyurl.com/2p86ut2f [accessed: 22.06.2021].

[17] See the cover page of Online Index to the UCLA Library's Henry J. Bruman Topographic Map Collection. Source: [online] Available through the UCLA ArcGIS Online: https://tinyurl.com/v7kkm9nf [accessed: 22.06.2021].

that a paper or digital map for the cell corresponding area is available in the library. Each individual grid cell contains basic information about its respective topographic map as well as the link to an image of the map. This is not a finalized project but a work in progress; more regions will be added in the future, so users can check for updates.

Conclusions

The academic libraries partnership with digital humanities is growing, but Miriam Posner pointed to some challenges in doing digital humanities projects in libraries, such as: insufficient funding and places for training opportunities, "lack of support for librarian-conceived initiatives" (libraries are focused on metrics and patrons' needs but some DH projects "don't meet any particular demonstrated need"), "lack of authority to marshal the appropriate resources", lack of time in a busy schedule covering many tasks, lack of initiative resulting from the lack of recognition, problems with a truly equitable relationship in collaborative projects with faculty, being afraid of failure, and a "lack of a real institutional commitment"[18]. Five years later Molly Poremski evaluated a profile of DH librarians using a survey distributed to academic librarians. The survey confirmed Posner's challenge related to the lack of proper funding and time for professional training. Most respondents learned skills relevant to work with digital humanities "on the job"[19].

Learning geospatial visualization and mapping skills by performing professional duties and seeing print and digital map potential in narrating the stories and improving access to maps influenced the five DH projects presented herein. When searching for an answer to why is it important for academic libraries to be familiar with DH and its methods and tools, Brian Mathews suggested: "Get beyond what's familiar. … Our jobs are shifting from doing what we've always done very well, to always being on the lookout for new opportunities to advance teaching, learning, service, and research"[20].

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[18] M. Posner, *What are some challenges to doing DH in the Library? Miriam Posner's Blog*, 2012, August 10, http://miriamposner.com/blog/what-are-some-challenges-to-doing-dh-in-the-library/ [accessed: 22.06.2021].

[19] M.D. Poremski, *Evaluating the landscape of digital humanities librarianship*, "College & Undergraduate Libraries" 2017, 24 (2–4).

[20] B. Mathews, *Think like a startup: A white paper to inspire library entrepreneurialism*, 2012, April 11, pp. 2–3, https://vtechworks.lib.vt.edu/handle/10919/18649 [accessed: 22.06.2021].

Based on the author's many collaborations with digital humanities scholars over the past decade it is sometimes worth to take a risk and to undertake a creative initiative without a close partnership with a digital humanities scholar. They are mostly not familiar with librarians' duties, tasks, and opportunities for improving access to cartographic resources. They are surprised and grateful to be presented with self-help tools empowering them. As has been the case with the projects described in this paper, streamline access to cartographic resources contributes to increased use of these resources in research and scholarly output.

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MARIA A. JANKOWSKA

Cyfrowa humanistyka w bibliotece akademickiej – tworzenie narracji za pomocą informacji przestrzennej

Steszczenie: Cyfrowa nauka i presja na wykorzystanie cyfrowych narzędzi i metod w badaniach naukowych, nauczaniu czy wydawaniu publikacji naukowych stają się coraz bardziej zauważalną tendencją w naukach humanistycznych. Bibliotekom akademickim, pojmowanym jako laboratoria dla badaczy działających w dziedzinach humanistycznych (Christine Borgman), nie pozostaje więc nic innego, jak nadążyć za tymi zmianami. Humanistyka cyfrowa (HC) stała się istotnym obszarem bibliotekarstwa, a zapotrzebowanie na bibliotekarzy posiadających umiejętności i wiedzę potrzebne do tworzenia i zarządzania metadanymi, zarządzania cyfrowymi repozytoriami, organizacji informacji, zarządzania prawami własności intelektualnej, przechowywania i wizualizacji danych – zwiększa się niezmiennie. Artykuł koncentruje się na angielskojęzycznej literaturze przedmiotu przedstawiającej wizualizację danych przestrzennoczasowych w projektach HC poprzez bogaty zestaw narracji obejmujący teksty, interaktywne mapy oraz usługi z aktywnym monitorowaniem danych przestrzennych w kartografii cyfrowej. Na przykładzie projektów wykorzystujących kartografię cyfrową, opracowanych i zastosowanych w dużej bibliotece akademickiej, artykuł przedstawia, w jaki sposób wizualizacje danych przestrzennych i czasowych mogą być zastosowane w bibliotece akademickiej w celu promowania i informowania o zbiorach kartograficznych, którymi zainteresowani są badacze HC, oraz w jaki sposób biblioteka może dostarczyć swoim użytkownikom narzędzi do samodzielnej pracy.

Słowa kluczowe: cyfrowa humanistyka, wizualizacja, projekty kartografii cyfrowej, biblioteki akademickie, University of California Los Angeles, UCLA Library, mapy drukowane i cyfrowe, dane przestrzenne i czasowe (czasoprzestrzenne), GIS, narracja typu story map, ArcGISOnline, narzędzia samodzielnej pomocy, narzędzia do samodzielnej pracy, upodmiotowienie użytkowników.

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