Collection Data in the Cultural Gap The Dissemination of Knowledge in a Precarious State at the Intersection of Museums, Art History and the Digital Humanities

Gasser, Sonja
University of Bern, Switzerland; Ludwig-Maximilians-Universität München, Germany
sonja.gasser@wbkolleg.unibe.ch

Table of contents

1. Introduction

The culture of museums differs from the culture at universities in terms of their missions and interests in dealing with collection data. While museums manage the collections in databases, provide online access to the artifacts or offer mediation applications, academics focus on the content-related, research-based examination of collection data. Scholars in art history and digital humanities increasingly participate in a digital knowledge culture in which viewing images of artworks from a database and reading accompanying information on a public interface proves unsatisfactory. Times have changed and data itself has become a desired research subject. When museums, art history, and the digital humanities increasingly recognize each other's different cultures and how they are affected by the digital transformation, this prepares the ground for a sustainable exchange of knowledge in the digital realm as well. Currently, the cultural knowledge that could emerge from insights gained through the analysis of digital images and metadata from art collections is at risk of being stuck unreachable in databases. This paper explores the conditions under which knowledge is constituted based on digital technology by providing a comprehensive overview of the most up-to-date developments in the field of museums and in digital art history. Part of the theoretical argument is to identify what the stumbling blocks to an efficient, promising, and future-oriented use of collection data are, but also to critically address limitations of technology-driven art historical research.

2. Fundamentals

The aim of this meta-study is to situate the fundamentals of digital art history and digital museum collections within technological discourses in the digital humanities. Digital collections of art museums and their conditions are the starting point for interrogating the application of digital humanities methods for art historical research. Art history in the digital age means going beyond recreating the traditional methods and approaches in a digital environment. Nevertheless, there are also technological implications that set limits to the effectiveness of a digital art history. A condensed synthesis of technological developments, based on a comprehensive survey of literature, in the domain of museums, art history and digital humanities culminates in a thorough discussion of digital determinants of art historical knowledge. In the following, collection data and its implications for knowledge are considered first from a museum perspective, then from an art historical perspective, to finally arrive at what knowledge is under digital conditions and what the current problems are.

3. Museums and digital objects

Museums have a long-standing expertise in meaning-making with objects (Hooper-Greenhill 2000). Even if exhibitions still dominate museum knowledge production, pressing questions about what changes for museums (Giannini / Bowen 2019) and their objects (Niewerth 2018) under the conditions of digital technology are discussed. Moreover digital collections, database and applications offer new possibilities for digital representation and mediation of art (Wiencek 2019). Applications that use collection data are still rare due to the challenges of missing organizational structures, personal skills and financial resources that would enable museums to develop convincing digital applications (Glinka 2018). Nonetheless, numerous promising projects propose visualizations as interfaces and to explore collections interactively (Glinka et al. 2017; Windhager et al. 2019), whether through timelines (Kräutli 2016; Vane 2019) or interactive exploration of high dimensional data in 3D-visualizations

(Kenderdine et al. 2013). Interactive visualizations provide alternative and attractive insights for users in contrast to common collection interfaces and serve in art history and the digital humanities as means for gaining new insights (Glinka / Dörk 2018). For knowledge to emerge from visualizations, this requires that museums competently use technology for their purposes and that the data is available in machine-readable form for research projects at universities. A museological, art historical and technological view on data must be possible. Digital transformation means for museums far more than just digitizing collections, but includes profound organizational changes with new responsibilities and forms of collaboration (Pöllmann / Herrmann 2019). Digital collections are situated in an ecosystem of collection's digitization, access, research with data and the creation of custom applications (Andraschke / Wagner 2020) with an underlying interest in semantic networks based on metadata standards (Matschinegg et al. 2019).

4. Digital art history

Fundamental volumes have been published in digital art history (Kuroczyński et al. 2018; Brown 2020) which show the broad spectrum of digital methods that can be applied to art historical data. Research in digital art history consists of two main strands: applying digital humanities methods and creating or using tools (Dressen 2017). A digital literate art history asks rather for the conditions of the digital image (Kohle 2013) and analysis possibilities from a technological perspective (Reyes-Garcia 2017) than to study artworks by viewing the image content as in classical art historical research. Applied technologies and methods include computer vision, machine learning, and neural networks for searches by image based similarity (Bell / Ommer 2018; di Lenardo / Kaplan 2017), creating sophisticated 3D-models of historical architecture, reconstructions and simulations with semantically enriched levels of information (Hoppe et al. 2020; Kuroczynski et al. 2019; Messemer 2020; Underhill 2019) and research in digital environments (Crissaff et al. 2018; Schneider 2019). The aim is to gain new insights with completely different approaches and research questions that ground on technological preconditions. Interpretation in digital art history is dependent from quantitative and qualitative methods, but a set of assumption that influences the interpretation is also inherent in every dataset or tool (Sebastián Lozano 2017: 3). Quantitative methods that become part of digital art history should not be seen uncritically (Bishop 2017). Applying digital technology to art historical content requires a consistent research question that is not trivial from the perspective of art history. Art history with its visual focus poses specific challenges within the digital humanities (Drucker 2013), but scholarship is equally characterized by interdisciplinary collaboration (Berg-Fulton et al. 2018; Zorich 2012) as in the digital humanities in general (Antonijević 2015).

5. Knowledge in the digital age

As we have seen, knowledge constitutes itself also in digital environments, which is only successful without trying to imitate the physical world (Eigenbrodt / Stang 2014: 3). What should be strived for is a culture of open science in the sense of free access and exchange of knowledge (Reichmann 2017) between museums, art history and digital humanities nourished by digital technology. The still quite separated and diverse cultures should be broken up in favor of a common knowledge culture that is oriented towards the FAIR principles (Wilkinson et al. 2016) and Open Data Policies (like the one by Rijksmuseum). Giving adequately access to knowledge in the digital age means mainly: 1) for museums to make the collection data available for free use (Zorich 2013) in machine-readable form; 2) for art history and the digital humanities to publish possibly open access (Effinger 2018) and data driven (Schelbert 2017) as well as to use and publish open source tools. Regarding digital collections, both the museum perspective on data as well as the scholarly perspective from art history and digital humanities are necessary. Knowledge – formerly published in print in exhibition catalogues and academic publications – should nowadays be made available in digital form. Otherwise, today's knowledge is willingly reduced to older traditions of doing research in art history as well as presenting, communicating and mediating art from museum collections. An advanced use of digital technology, digital humanities approaches, and staff with appropriate skills in the museums and in art history contribute to the digital knowledge society.

6. Precarious state of knowledge

Art historical knowledge production results to a large extent from the symbiosis of museums exhibiting art and publishing exhibition catalogs and the theorization of art in art history. The challenge is to move this essential relationship into the digital realm and enable access to data, today's preferred, adequate form of access to information. Even if discussions of digital technology are present in all fields, a flow of knowledge determined by digital conditions is by no means guaranteed nowadays. Not only in the digital age, the life cycle of knowledge consists of creating, storing, processing, sharing, using and researching (Eibl et al. 2006). In digital terms, this life cycle of knowledge is interrupted at several stages in museums, art history and digital humanities for different reasons and with different impacts. With regards to the museums that typically provide access to online collections by offering to search for artworks and display the records, the cycle for the digital dissemination of knowledge stops at sharing. This is fatal for art historians with an interest in digital methods and digital humanists whose work starts at this point. Museums need to be conscious for other perspectives on data that arise from the digitization of collections as well as a growing use of digital technology in scholarship which increases the demand to reuse that data. Only then, computer-based image analysis and visualization become possible for the interpretation and new insights into image collections. Since digital technology has entered the humanities, and

thus art history, not having access to art historical data prevents applying and contributing to digital humanities tools and methods with the consequence of not being able to participate in cutting-edge digital humanities research.

Appendix A

Bibliography

1. **Andraschke, Udo / Wagner, Sarah (eds.)** (2020): *Objekte im Netz. Wissenschaftliche Sammlungen im digitalen Wandel*. Bielefeld: transcript Verlag. DOI: 10.14361/9783839455715.
2. **Antonijević, Smiljana** (2015): *Amongst Digital Humanists. An Ethnographic Study of Digital Knowledge Production*. Houndmills: Palgrave Macmillan. DOI: 10.1057/9781137484185.
3. **Bell, Peter / Ommer, Björn** (2018): “Computer Vision und Kunstgeschichte. Dialog zweier Bildwissenschaften”, in: Kuroczyński, Piotr / Bell, Peter / Dieckmann, Lisa (eds.): *Computing Art Reader. Einführung in die digitale Kunstgeschichte*. Heidelberg: arthistoricum.net 61–75. DOI: 10.11588/arthistoricum.413.c5769.
4. **Berg-Fulton, Tracey et al.** (2018): “A Role-Based Model for Successful Collaboration in Digital Art History”, in: Klinke, Harald / Underhill, Justin / Surkemper, Liska (eds.): *International Journal for Digital Art History. Digital Space and Architecture*. Munich: Graphentis 153–180. DOI: 10.11588/dah.2018.3.34297.
5. **Bishop, Claire** (2017): *Against Digital Art History* < https://humanitiesfutures.org/papers/digital-art-history/> [24.01.2018].
6. **Brown, Kathryn (ed.)** (2020): *The Routledge Companion to Digital Humanities and Art History*. New York: Routledge. DOI: 10.4324/9780429505188.
7. **Crissaff, Lhaylla et al.** (2018): “ARIES. Enabling Visual Exploration and Organization of Art Image Collections”, in: *IEEE Computer Graphics and Applications* 38, 1: 91–108. DOI: 10.1109/MCG.2017.377152546.
8. **di Lenardo, Isabella / Kaplan, Frédéric** (2017): “The Large-Scale Search for Small Details. Redefining Patterns in Art History”, in: Bonnefoit, Régine / Rérat, Melissa (eds.): *The Museum in the Digital Age. New Media and Novel Methods of Mediation*. Newcastle upon Tyne, UK: Cambridge Scholars Publishing 55–64.
9. **Dressen, Angela** (2017): “Grenzen und Möglichkeiten der digitalen Kunstgeschichte und der Digital Humanities. Eine kritische Betrachtung der Methoden”, in: *kunsttexte.de* , 4: 1–17. DOI: 10.18452/18692 < https://edoc.hu-berlin.de/bitstream/handle/18452/19402 /Angela%20Dressen%20-%20final.pdf?sequence=1> [24.01.2018].
10. **Drucker, Johanna** (2013): “Is There a ‘Digital’ Art History?”, in: *Visual Resources* 29, 1–2: 5–13. DOI: 10.1080/01973762.2013.761106.
11. **Effinger, Maria** (2018): “Wissen verbreiten – im Open Access publizieren. Infrastrukturen für die Digitale Kunstgeschichte”, in: Kuroczyński, Piotr / Bell, Peter / Dieckmann, Lisa (eds.): *Computing Art Reader. Einführung in die digitale Kunstgeschichte*. Heidelberg: arthistoricum.net 269–285. DOI: 10.11588/arthistoricum.413.c5827.
12. **Eibl, Maximilian et al. (eds.)** (2006): *Knowledge Media Design. Theorie, Methodik, Praxis*. München: Oldenbourg. DOI: 10.1524/9783486593433.
13. **Eigenbrodt, Olaf / Stang, Richard (eds.)** (2014): *Formierungen von Wissensräumen. Optionen des Zugangs zu Information und Bildung*. Berlin: De Gruyter Saur. DOI: 10.1515/9783110305777.
14. **Giannini, Tula / Bowen, Jonathan P. (eds.)** (2019): *Museums and Digital Culture. New Perspectives and Research*. Cham: Springer. DOI: 10.1007/978-3-319-97457-6.
15. **Glinka, Katrin** (2018): “The Process Is Part of the Solution. Insights from the German Collaborative Project museum4punkt0”, in: *Museum International* 70, 1–2: 90–103. DOI: 10.1111/muse.12195.
16. **Glinka, Katrin / Dörk, Marian** (2018): “Zwischen Repräsentation und Rezeption. Visualisierung als Facette von Analyse und Argumentation in der Kunstgeschichte”, in: Kuroczyński, Piotr / Bell, Peter / Dieckmann, Lisa (eds.): *Computing Art Reader. Einführung in die digitale Kunstgeschichte*. Heidelberg: arthistoricum.net 235–250. DOI: 10.11588/arthistoricum.413.c5825.
17. **Glinka, Katrin / Pietsch, Christopher / Dörk, Marian** (2017): “Past Visions and Reconciling Views. Visualizing Time, Texture and Themes in Cultural Collections”, in: *Digital Humanities Quarterly* 011, 21–41 < http://www.digitalhumanities.org/dhq/vol/11/2/000290/000290.html> [27.08.2017].
18. **Hooper-Greenhill, Eilean** (2000): *Museums and the Interpretation of Visual Culture*. London: Routledge Taylor & Francis Group.
19. **Hoppe, Stephan et al. (eds.)** (2020): *Digitale Raumdarstellung. Barocke Deckenmalerei und Virtual Reality*. Heidelberg: arthistoricum.net. DOI: 10.11588/arthistoricum.774.
20. **Kenderdine, Sarah / Shaw, Jeffrey / Gremmler, Tobias** (2013): “Cultural Data Sculpting. Omnidirectional Visualization for Cultural Datasets”, in: Marchese, Francis T. / Banissi, Ebad (eds.): *Knowledge visualization currents. From text to art to culture*. London, New York: Springer 199–220. DOI: 10.1007/978-1-4471-4303-1_11.
21. **Kohle, Hubertus** (2013): *Digitale Bildwissenschaft*. Glückstadt: vwh Verlag Werner Hülsbusch. DOI: 10.11588/artdok.00002185 < http://archiv.ub.uni-heidelberg.de/artdok/volltexte/2013/2185> [12.06.2021].
22. **Kräutli, Florian** (2016): *Visualising Cultural Data. Exploring Digital Collections Through Timeline Visualisations*. PhD Thesis, Royal College of Art < http://researchonline.rca.ac.uk/id/eprint/1774>

[13.05.2016].
23. **Kuroczynski, Piotr / Pfarr-Harfst, Mieke / Münster, Sander (eds.)** (2019): *Der Modelle Tugend 2.0. Digitale 3D-Rekonstruktion als virtueller Raum der architekturhistorischen Forschung*. Heidelberg: arthistoricum.net. DOI: 10.11588/arthistoricum.515.
24. **Kuroczyński, Piotr / Bell, Peter / Dieckmann, Lisa (eds.)** (2018): *Computing Art Reader. Einführung in die digitale Kunstgeschichte*. Heidelberg: arthistoricum.net. DOI: 10.11588/arthistoricum.413.
25. **Matschinegg, Ingrid et al.** (2019): "Daten neu verknoten. Die Verwendung einer Graphdatenbank für die Bilddatenbank REALonline", in: *DARIAH-DE Working Papers* , 31: 1–36 <urn:nbn:de:gbv:7-dariah-2019-3-5> [03.11.2019].
26. **Messemer, Heike** (2020): *Digitale 3D-Modelle historischer Architektur. Entwicklung, Potentiale und Analyse eines neuen Bildmediums aus kunsthistorischer Perspektive*. Heidelberg: arthistoricum.net. DOI: 10.11588/arthistoricum.516.
27. **Niewerth, Dennis** (2018): *Dinge – Nutzer – Netze. Von der Virtualisierung des Musealen zur Musealisierung des Virtuellen*. Bielefeld: transcript. DOI: 10.14361/9783839442326.
28. **Pöllmann, Lorenz / Herrmann, Clara (eds.)** (2019): *Der digitale Kulturbetrieb. Strategien, Handlungsfelder und Best Practices des digitalen Kulturmanagements*. Wiesbaden: Springer. DOI: 10.1007/978-3-658-24030-1.
29. **Reichmann, Werner** (2017): "Open Science zwischen sozialen Strukturen und Wissenskulturen. Eine wissenschaftssoziologische Erweiterung", in: *TATuP Zeitschrift für Technikfolgenabschätzung in Theorie und Praxis* 26, 1–2: 43–48. DOI: 10.14512/tatup.26.1-2.43.
30. **Reyes-Garcia, Everardo** (2017): *The Image-Interface. Graphical Supports for Visual Information*. Newark: John Wiley & Sons Incorporated. DOI: 10.1002/9781119474166.
31. **Schelbert, Georg** (2017): "Art History in the World of Digital Humanities. Aspects of a Difficult Relationship", in: *kunsttexte.de* , 4: 1–10. DOI: 10.18452/18694 < https://edoc.hu-berlin.de/bitstream/handle/18452/19404/Schelbert%20-%20final.pdf>.
32. **Schneider, Stefanie** (2019): "Museum Analytics. Museale Sammlungen neu und anders entdecken", in: *Museumskunde* 84, Online-Erweiterung < https://www.museumsbund.de/wp-content/uploads/2020/04/final-schneider.pdf> [17.06.2020].
33. **Sebastián Lozano, Jorge** (2017): "Digital Art History at the Crossroads", in: *kunsttexte.de* , 4: 1–14. DOI: 10.18452/18695 < https://edoc.hu-berlin.de/bitstream/handle/18452/19405/Lozano%20final.pdf?sequence=1&isAllowed=y> [24.01.2018].
34. **Underhill, Justin** (2019): "The Twilight of Presence. Pictorialized Illumination in Leonardo da Vinci's Last Supper", in: *Leonardo* 52, 1: 44–53. DOI: 10.1162/LEON_a_01343.
35. **Vane, Olivia** (2019): *Timeline Design for Visualising Cultural Heritage Data*. PhD Thesis, Royal College of Art < https://www.oliviavane.co.uk/research/TimelineDesignForVisualisingCulturalHeritageData_OliviaVane.pdf> [15.12.2019].
36. **Wiencek, Florian** (2019): *Digital Mediation of Art and Culture. A Database Approach*. PhD Thesis, Jacobs University Bremen < http://nbn-resolving.org/urn:nbn:de:gbv:579-opus-1008454> [08.02.2019].
37. **Wilkinson, Mark D. et al.** (2016): "The FAIR Guiding Principles for scientific data management and stewardship", in: *Scientific Data* 3: 1–9. DOI: 10.1038/sdata.2016.18.
38. **Windhager, Florian et al.** (2019): "Visualization of Cultural Heritage Collection Data. State of the Art and Future Challenges", in: *IEEE transactions on visualization and computer graphics* 25, 6: 2311–2330. DOI: 10.1109/TVCG.2018.2830759.
39. **Zorich, Diane M.** (2012): *Transitioning to a Digital World. Art History, Its Research Centers, and Digital Scholarship* < http://www.kressfoundation.org/uploadedFiles/Sponsored_Research/Research/Zorich_TransitioningDigitalWorld.pdf> [11.05.2016].
40. **Zorich, Diane M.** (2013): "Digital Art History: A Community Assessment", in: *Visual Resources* 29, 1–2: 14–21. DOI: 10.1080/01973762.2013.761108.