

Digital Cities

A Collaborative Engagement With Urban Heritage

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Abstract—The urban body is never at rest, the changing needs and desires of inhabitants in the present – with an eye to possible futures – continually shaping, and being shaped by, the urban fabric of the past. No single narrative can capture this ongoing negotiation between place and people; it must be understood as a plurality of narratives bound into the urban body. In this paper we will present ‘Digital Cities’, a multi-disciplinary, cross-university collaborative undergraduate course exploring the use of new tools, techniques and methods from digital and spatial research in the mediation of historical material culture and the built environment. We will argue that such platforms can enrich and diversify the possibilities for digital storytelling within scholarly, educational and creative settings, both within and outside of academia.

Keywords—built heritage; digital storytelling; remediation; public humanities; education

I. THE URBAN BODY

Rather than being fixed and immutable, the urban body is in a permanent state of transition, one that persists through, rather than in spite of, its transformations. The changing needs and desires of inhabitants in the present – with an eye to possible futures – continually shape the urban fabric of the past, an ongoing and vibrant negotiation in which we too are shaped. As the philosopher and sociologist Maurice Halbwachs wrote: “The group not only transforms the space into which it has been inserted, but also yields and adapts to its physical surroundings. It becomes enclosed within the framework it has built. The group's image of its external milieu and its stable relationships with this environment becomes paramount in the idea it forms of itself, permeating every element of its consciousness, moderating and governing its evolution.” [1] The trajectory of this cultural emergence cannot be known in advance. Each iteration captures different agencies at play, individual, collective, political and aesthetic wills acting in confluence, ambivalence or contradistinction to shape our living environment. Whilst some potentials are fulfilled, others remain only in the domain of the possible. As such, no single, linear narrative can capture this ongoing negotiation between place and people; rather, the dynamic urban body must be understood as a plurality of actuated and possible narratives bound into the urban body. In telling these stories we have recourse both to the form and experience of the urban environment as it stands now – sites of past cultural inscription

still active in the present – and the enormous body of extant visual, textual and aural materials generated in the process of cultural emergence. In the digital era, the wealth of archival material accessible today gives us unprecedented access to this plurality of perspectives from the past.

II. CONTEMPORARY DIGITAL PRACTICES

An archive – or, within digital media practices, a database representing a network of content – can be a source for many stories. Through enabling the exploration of their contents and visualizing internal resonances and relations, digital practices are opening up the means by which archives can be activated to different narrative effects [2]. Digital practices are also changing how cultural artifacts themselves can be remediated [3], such as through a manual process of digital reconstruction using 2D and 3D editing tools or algorithmically using data acquired through photogrammetry and laser scanning technologies. These forms of remediation offer opportunities for a more creative reuse and re-contextualization of digital materials within and outside of digital spaces. Many contemporary co-creative and recombinant-media practices, for example, employ notions of the remix [4] – the collection, sampling, alteration, development and re-combination of digital and analogue materials – to make room for diverse points of view in discussions surrounding data and data contextualization [5]. Through locative practices including mapping and mobile annotation, remediated archival materials and cultural artifacts more broadly can now be brought into novel spatial, temporal and contextual relationships with physical urban sites and their contents.

Critically, many of the current generation of commercially available digital tools are not designed for the highly specialized user, having, instead, a wider user-base in mind. Increasingly accessible and affordable, these technologies are finding use in a variety of scholarly, educational and creative settings, offering new possibilities for documenting, exploring and responding to local urban heritage.

Within academia, these technological developments are supporting the emergence of new practices at the boundaries of traditional disciplines such as art history, archaeology and computer science, driving both the application of alternative methodologies from non-traditional sources and the development of new epistemic approaches to research

problems. New means to measure and chart urban artifacts for the generation of digital models are expanding the capacity of scholars to experience and interact with site-specific artifacts. Furthermore, the incorporation of these digital materials into representative temporal and spatial sequences – interactively capturing different underlying layers of material evidence and research process – are widening opportunities for artifact contextualization and comparison [e.g. 6].

Outside of academia, artists, designers and activists too are developing creative practices around tools that enable and chart new connections between space, urban objects, data and human behavior; “urban computing” is now driving a reconfiguration in the usage and ownership of the *commons* [7] – a term that applies to both public space and discourse.

Indeed, it is in the commons that both diverse and shared-interests across scholarly, educational, political and creative practices can come together in matters of urbanism for which strictly single perspective approaches are insufficient, driving a widening and deepening of debate through engaging different affected communities and interest groups.

III. DIGITAL CITIES: COURSE CONCEPTS

In the Spring semester 2013, Duke University (Durham, North Carolina, USA) and Jacobs University (Bremen, Germany) offered the undergraduate-level course ‘Digital Cities’, exploring the use of new tools, techniques and methods from digital and spatial research in the mediation of historical material culture and the built environment. In the course, students sought to use strategies of digital storytelling and locative media practices to re-connect archival materials with their wider historical, cultural, social and urban contexts.

The design of the Digital Cities course drew on the concept of the “humanities lab”, as developed, for example, at Duke University, UNC Chapel Hill and Stanford University, one that brings in students as Junior research collaborators operating within a larger, sustained, academic endeavor. “Scaffolded” in this way, the course could serve as a test-bed for combining theory-based and practical work in exploring new competences in contemporary research. When taught in successive years, such course formats can support the extension and re-assessment of earlier project work as new data, technologies and practices emerge.

Using videoconferencing and social media tools, we sought to bring together expertise that would rarely be supported by a single institution, drawing on a more diverse student and teaching body reflecting a wider variety of cultural values and interests. Indeed, rather than using such tools to exploit economies of scale (as seen, for example, with the trend towards ‘massive open online courses’, or MOOCs [8]), we wished to demonstrate their value in supporting simultaneous locale-specific projects conducted in a student-centered seminar environment from which a creative cross-fertilization of methods and perspectives could be promoted.

In this way, the course built upon, and expand into new local contexts, the innovative work being developed within the digital humanities at Duke and Jacobs Universities, namely: the Duke Wired! lab which supports practice-oriented research into material culture with public outreach and education at the core

of their mission, and the research center ‘Visual Communication and Expertise’ at Jacobs University, which integrates research methods from the humanities, social, behavioral and technical sciences to understand the perception, processing and communication of visual information.

Digital Cities thus brought together a number of advances in technology-based teaching and research practices coming out of the Digital Humanities, but in a way that endeavored to promote new levels of cross-institutional and cross-community interaction. Indeed, we would like to suggest that such a framework may be suitable for scaffolding onto other established ‘hubs’ such as local heritage groups, creative studios, museums and schools. We believe such collaborations could play a key role in developing original research questions addressing the digital mediation of place, space and narrative across spatially-predicated disciplinary and cultural borders.

IV. DIGITAL CITIES: STRUCTURE AND CONTENT

Regular, joint videoconferencing sessions were used to conduct seminar-style classes and technology workshops, building on the multi-disciplinary expertise of educators and researchers across the two participating institutions. Bringing together the fields of neuroscience, art, history, digital media theory/practice the course aimed to equip students with the foundation required to address challenging issues in the area of Digital Heritage.

Jacobs University offered classes concerning the form, experience and meaning of urban space. Firstly, drawing on the brain sciences, the class addressed the mapping of the body and external world in the brain, including topics such as Metaphor and the Body, Emotion and Embodied Cognition, Mirror Neurons and Social Relationality, and Memory Structure and function. These ideas were expanded upon through notions of ‘collective’ and ‘cultural memory’, addressing the position of architecture and urbanism as sites of inscription and identity. Finally, classes turned to the subject of cities at times of crisis and war, using case studies to explore the historical, political and social contexts of reconstruction, the role, influence and responsibility of architects, and principles of reconstruction, preservation and conservation.

Building on these perspectives, Duke University offered classes addressing Digital Media Theory (including key principles of digital media, media as software and concepts of remediation), Digital Storytelling (including strategies such as non-linear narrative and interactivity, story as process and collaborative storytelling), Digital Places (exploring the relation between location and digital media in general as well as different concepts of locative media) and, finally, Digital Cultural Heritage (building on basic definitions of Western cultural heritage and its key institutions to address the relationship between material culture and digital remediation).

Shared technology classes focused on a wide range of techniques addressing the creation, contextualization and dissemination of digital content. Students were introduced to the 3D modeling software Google SketchUp (Fig. 1A), equipping them with the skills needed to model complex urban structures from architectural plans and historic photos. In subsequent classes, students were shown how to: generate

photo textures from real-life sources that could be used to render their models (Adobe Photoshop), place their models within virtual, annotated maps (Google Maps and Google Earth) and create animations of their work with text and voice overlay (Adobe After Effects). Other forms of model contextualization addressed included the creation of narrative-driven educational games (Unity, OpenSim) and the use of augmented reality tools that enable the geo-location of authored digital content using mobile technology (Layar). Contemporary research developments in full-immersion virtual reality environments at Duke University (DiVE) and laser scanning technologies at Jacobs University were also explored.

In addition to theory and practical work in class, students completed a variety of fieldwork exercises. This served to familiarize students with their respective cities and actively engage them in comparing and documenting digitally-mediated and embodied (e.g. hand sketching, Fig. 1B) forms of urban engagement. A dedicated class blog facilitated the sharing and discussion of observations.

The final weeks of the Digital Cities course were dedicated to the creation of project work. Each student-led group chose a local site, developing their own approach to, and rationale behind, the remediation of archival materials. In the rich variety of urban sites chosen, the insistence on original scholarly research, the remediation of archival materials in both digital and physical spaces, the adoption of different temporal perspectives on the past, present and future, and the interest in engaging diverse audiences and communities, the enormous potential for diverse scholarly and creative narrative-making was evident. Completed projects were published using the open source platform Scalar, enabling additional networks of connections between different project-related media items to be created, explored and discussed.

A. Duke University Projects

Working with community archives and drawing on the expertise of local historian Trudi Abel, student-led group projects at Duke University addressed the rise, decline and re-invention of Durham's industries, focusing on how each has shaped Durham's urban heritage, and the relevance of that heritage for the Durham communities of today. Duke students employed the Augmented Reality [9] browser 'Layar' which allows users to overlay digital media content onto a real-time camera image of the physical world on their mobile device. Digital overlays can be activated at specific locations (geo-located) or in response to the scanning of a QR code or urban artifact. Such an approach can enable a deeper engagement with the materiality of a site and its inscribed histories, extending the impact and reach of community-driven archival work through engagement with other communities – whether scholars, students, local inhabitants, or visitors to the city.

The first project addressed the American Tobacco Campus (ATC), a former industrial site currently undergoing an extensive program of urban and commercial redevelopment. Aimed at adding a digital, augmented reality layer to the urban and cultural artifacts from Durham's industrial past showcased at the ATC, visitors were invited to imagine themselves during the economic boom of the 1950s, exploring the ATC complex

and learning about the working life of a tobacco company through the eyes of a character from that era (Fig. 1C).

The still living traditions of the Durham Brazing & Welding Works on Roney Street – one of the few businesses to survive Durham's twentieth century industrial decline – was the focus of the second project. Following the concept of "Forensic Architecture" [10] students used Layar and QR codes to re-mediate stories inscribed in the site's artifacts (Fig. 1D). Aimed specifically at Duke University Students, these artifacts served as portals to multimodal presentations exploring the site's past and present, contrasting the lives of blue collar Durham families with the affluent Duke family.

In the final project, students sought to reanimate the history of the long-demolished Washington Duke Hotel, once the city's finest hotel and tallest structure. With only the space formerly occupied by the hotel remaining ("bare square"), the project group used Layar to remediate the hotel's documented spaces at their original locations, drawing on original brochures, menus, contemporary accounts and video footage to engage the user in a spatial and cognitive evocation of a lost place; a mental reconstruction and re-mapping of the past.

B. Jacobs University Projects

At Jacobs University, projects concentrated on a single city district and its transformation over time. The "St. Catherine District" in the Bremen Old Town has an internal topography that – even to the present day – has been shaped by the largely-destroyed 14th century Dominican monastic complex of St. Catherine [11, Fig. 1E]. Of key interest was charting the influence of the physical urban fabric and the functional role of monastic structures on successive iterations of this complex and highly dynamic site. Blurring a single linear narrative for the site, projects aimed to explore its historical past as well as un-actuated and possible future trajectories.

Focusing on the continuity of site boundaries within the district, project group one initiated the first scholarly reconstruction of the monastery as it may have appeared at the time of the reformation¹, before going on to show how structural and boundary elements have continued to survive through the 18th and 19th centuries to the present day (Fig. 1F). Drawing on the technique of "Serial Vision" – defining a path through the most memorable and significant elements of an urban landscape [12] – Layar was used to create an interactive city guide with texts, images and 3D models bringing this 800 year story of urban change to a contemporary audience.

The second student-led project addressed the aborted plans for the International University Bremen (IUB) of 1946-1950, to be built from the ruins of the former St Catherine monastery complex [13], itself the site of Bremen's first university in the 17th century. With the aim of promoting closer ties between the student communities of Jacobs University and the University of Bremen (founded 1999 and 1971 respectively), students devised a virtual "mirror world" campus to be built using the OpenSIM game engine and based on the IUB designs unearthed in the Bremen State archive through the Digital

¹ The project is now subject to further work in association with the Bremen State Office for the Preservation of Historical Monuments.

Cities course; an online, shared interactive space for the fostering of collaboration and understanding, inline with the original IUB proposal.

Responding to striking parallels between the educational aims of the proposed IUB and the current Jacobs University, the final project group asked how these shared goals might be renewed. Building on their own extensive survey and focus-group research, students developed a design concept for a new satellite campus in the St. Catherine District, echoing its long history of scholarly and educational work. Drawing on a variety of 2D/3D digital and non-digital media practices in the development and presentation of their ideas, the group proposed a design that reflected the needs and values of both the Jacobs community and the city of Bremen, whilst responding to the rich architectural and cultural heritage of the St Catherine District.

V. SUMMARY

In this paper we have presented Digital Cities, a multi-disciplinary, cross-university undergraduate course, one adopting a Digital Humanities Lab approach to the exploration of historical material culture and the built environment. We hope to have shown that such a collaborative framework can support the creative development and production of a diverse range of narrative-driven and original scholarly project work. In serving distinct, locale-specific hubs of activity – whilst encouraging discussion around similarities and differences in approach – we believe that such a platform is capable of supporting many different traditions of inquiry, and, therefore, of fostering unique cross-institutional and cross-community collaborations. Platforms that can promote interactions across multiple creative, scholarly, educational and political boundaries could play an increasingly important role in those matters of urbanism for which many different stakeholders are present. In both diversifying and enriching participation, the deeper complexities and values of our urban heritage may be better revealed and acted upon.

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REFERENCES

- [1] M. Halbwachs. *The Collective Memory*: Transl. from the French by Francis J. Ditter, Jr. and Vida Yazdi Ditter. New York: Harper, 1980, p. 130. [Original published 1950].
- [2] F. Cameron, "Digital Futures I: Museum Collections, Digital Technologies, and the Cultural Construction of Knowledge," *Curator*, vol. 46, no. 3, pp. 325–340, 2003.
- [3] J. D. Bolter and R. Grusin, *Remediation - Understanding New Media*. Cambridge Mass., London, England: MIT Press, 1999.
- [4] E. Navas, "Remix Defined," *Remix Theory*, 2012. [Online]. Available: http://remixtheory.net/?page_id=3. [Accessed: 21-Jun-2013].
- [5] E. Gordon and A. de Souza e Silva, *Net Locality – Why Location Matters in a Networked World*. West Sussex, UK: Wiley-Blackwell, 2011.
- [6] M. Forte, "Virtual Archaeology: Communication in 3D and Ecological Thinking," in *Beyond Illustration: 2D and 3D Digital Tools for Discovery in Archaeology*, B. Frischer and A. Dakouri-Hild, Eds. Oxford: Archaeopress, 2008.
- [7] J. Geiger, "Entr'acte," *Leonardo*, vol. 45, no. 4, pp. 338–347, 2012.
- [8] Johnson, L. et al. "NMC Horizon Report: 2013 Higher Education Edition". Austin, TX: The New Media Consortium, 2013, pp. 11-14.
- [9] J. Smart, J. Cascio, and J. Paffendorf, "Metaverse Roadmap – Pathways to the 3D Web," 2007, p. 12. [Online]. Available: <http://metaverseroadmap.org/MetaverseRoadmapOverview>.
- [10] E. Weizman, "Forensic Architecture: Notes from Fields and Forums". Hatje Cantz, 2012.
- [11] R. Stein, "Das Dominikanerkloster und die St. Katharinenkirche," in *Romanische, gotische und Renaissance-Baukunst in Bremen*, Hauschild., Bremen, , 1962, pp. 187–196.
- [12] A. Dutoit, "Looking as Inquiry: Drawing the Implied Realm," in *Drawing / Thinking: Confronting An Electronic Age*, M. Treib, Ed. New York, London: Routledge, 2008, pp. 148–159.
- [13] H. Kickert, "The Plan of an International University Bremen after WW2 & Why it Failed," B.A. Thesis, Jacobs Univ., Bremen, Germany, 2013.

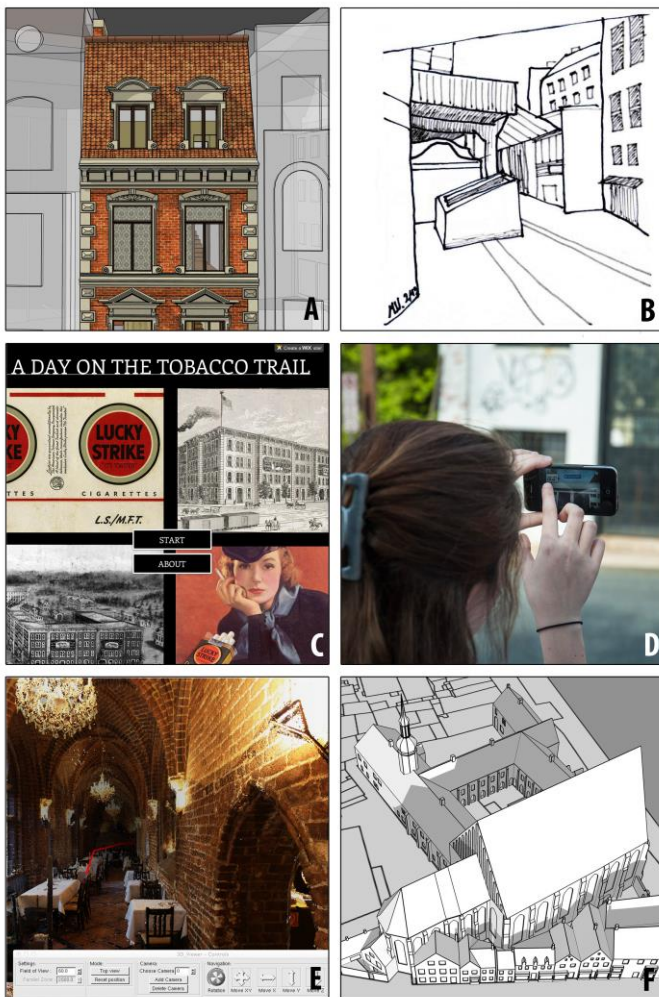


Fig. 1. A, A digital 3D model of a house in the St Catherine District, Bremen, created by a student using Google Sketchup. B, A student fieldwork drawing of the St Catherine District. C, The home page of a mobile web-application created for the student project "A day on the Tobacco Trail". D, A student demonstrating the Layar project on site at the Durham Brazing & Welding Works. Photo: Florian Wiencek. E, A coloured 3D point cloud image of a remaining fragment of the St Catherine monastery acquired with laser scanning technology, courtesy of Andreas Neuchter (Jacobs University). F, A group project proposal for how the former St Catherine monastery may have appeared at the end of the 18th century.