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Mapping Urban Performance Culture: A Common Ground for Architecture and Theater

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This chapter focuses on the utilization of digital mapping in an undergraduate interdisciplinary course at a public urban university, the New York City College of Technology (City Tech). In the course *History of the Theatre: Stages and Technology*, digital mapping facilitates collaborative pedagogy for analyzing and presenting research findings on New York City urban geography, environment, and history. Guided by co-instructors from architecture and performance history, *History of the Theatre* explores the intersections of architecture and theatre from Ancient Greece to the present moment. The central assignment in the course is a scaffolded semester-long research project on historical theater buildings in New York City. The project incorporates digital map-making to facilitate research into the social and cultural forces that shape theatrical production and architectural design in the urban milieu.

In the first stages of the assignment, students research production histories and architectural design elements of existing theater structures, fostering the development of archival research aptitudes and place-based observation and documentation skills. The assignment culminates in a virtual place-based study using Global Information Systems (GIS) mapping: using georeferenced data and mapping software, students situate the theater within the context of local economic, social, and physical features. GIS mapping software is used to access, analyze, and graphically represent layers of data, and as applied in our course, supports virtual place-based research. Learning how to present and interpret data with digital mapping applications

supports general education outcomes and can be incorporated into a variety of disciplines across the undergraduate curriculum. As a virtual place-based application, digital mapping offers "ground upon which humanities scholars can collaborate with investigators engaged in scientific and quantitatively-oriented research."[1]

The chapter begins with a discussion of the value of virtual place-based learning in the context of interdisciplinarity and general education. Next, we provide a description of a digital mapping research project, structured to facilitate collaborative, problem-based inquiry with the use of digital tools. Finally, we describe the manner in which materials are presented during the semester and provide examples of student work.

The Value of Virtual Place-based Learning in Interdisciplinary Teaching

There are myriad ways digital interfaces have empowered humanistic inquiry and literacy. The challenge for humanities educators is to conceive of ways to integrate digital technologies without requiring advanced knowledge of computer engineering and coding. Examples of such applications are the online mapping tools ArcGIS (ESRI), QGIS, and GeoDa, whose basic functions can be taught in one or two classroom sessions. As a method of investigation through the virtual production of place, digital mapping offers a powerful means for interdisciplinary work among English, history, theatre, geography, economics, urban studies, architecture, sociology, cultural studies, and other disciplines.

Literature on place-based pedagogy is extensive but virtual placed-based learning is less studied. Place-based learning has been interpreted in many ways but can be summarized as being "concerned with context and the value of learning from and nurturing specific places, communities, or regions."[2] Most descriptions of place-based learning include the shared

pedagogical approach of using local communities as laboratories for inquiry-led, problem-based, active learning. Descriptions of virtual-place based learning vary more widely and have been described as anything from the design of virtual learning environments to digital game-based assignments. In *History of the Theatre*, virtual-place based learning involves GIS mapping to conduct in-depth research on urban architecture, infrastructure, culture, and audiences in New York City. Students begin with a research assignment following traditional methods of place-based pedagogy and then broaden their research subjects in virtual space, using georeferenced data and digital mapping software. In-person observation allows students to investigate and experience environments, communities, institutions, and works of art through multiple senses and modalities, while virtual geographic domains enable the integration of quantitative data in research projects. Additionally, digitized images and maps are available in open repositories and can be embedded in virtual environments to produce a fuller sense of place and materiality.

GIS mapping is a powerful computer application that translates complex data into simple graphic terms, and in the general education setting, provides a learning tool that can be used in many undergraduate courses across humanities and technology fields. It is a high-impact pedagogy, providing creative, interactive methods for visualizing complex quantitative information in tangible and compelling ways.[3] GIS mapping can project layers of demographic, historical, and environmental information that concretizes abstract thought and produces spatial narratives that "provide rich connotations and attachments to the humanities' storied-narrative style."[4] Because GIS mapping has the ability to graphically represent and juxtapose many types of data it is an inherently interdisciplinary tool that, when used in classrooms, fosters an understanding of the relationships between distinct areas of study.

In the context of a college of technology, our course aims to promote consideration of the human forces that contribute to the construction of the urban environment and, conversely, how spatial representations and designed places inform social interaction and cultural production. More broadly we teach cultural history through an interdisciplinary engagement with data science and technology, underscoring the interconnectivity of quantitative knowledge and theory, data and interpretation. Historically speaking, as an expression of empirical space among layers of imagination and ideology, map making is an activity that resides at the intersection of the arts and sciences.[5] Digital mapping provides even greater capacities for intersections between informative and creative knowledge since in cyberspace "time and space themselves are malleable constructs. It is possible, for example, to locate the virtual learning environment in a time period other than the present—a historically significant period as called for by a course in archeology, or one which has not yet been constructed for a course in architecture."[6] In other words, while maps are utilitarian and informative, they also exhibit perspectives and culturally specific ways of seeing the world. Through the act of data collection, reorganization, and design, students learn a valuable lesson about the interpretation of evidence. Documentation and memorialization are processes of selection—restoration and removal, remembering and forgetting—and part of an ongoing production of contemporary culture.

Virtual Place-based Learning in an Interdisciplinary Course in Theatre History

History of the Theatre is offered by the Humanities Department at City Tech and fulfills a general education requirement for all students at the college, which means that students who register for the course come from a wide range of backgrounds and possess disparate aptitudes. The backbone of the course is a chronological survey of major theater movements in the West

from the Greeks to the present. Unlike many other undergraduate theater history courses, *History of the Theatre* does not include the study of plays (directly) or biographical information about artists, partly because the 3-credit course is taught in one semester. Rather, the syllabus focuses only on physical stages and performance technologies, which has facilitated meaningful avenues for cross-curricular conversations between the departments of Humanities and Architectural Technology. Although City Tech does not offer a degree in theater, the course is a requirement for a bachelor's degree in entertainment technology, and architectural technology majors commonly register for the course. The majority of the students at our college of technology are enrolled in STEM and professional studies majors and have had little exposure to the performing arts. The interdisciplinary approach to theatre history offered in this course provides cognitive portals into the arts that might not otherwise exist.

The semester-long scaffolded GIS mapping project on New York City theater architecture, production, and audiences accounts for approximately twenty-five percent of the overall grade for the course. As a city rich in historical and contemporary theatrical traditions, and the place where our students live, study, and work, New York City is a living archive that offers unparalleled opportunities for place-based learning. Before initiating research for the mapping project, students learn about the historical development of theater and architecture in the city from the nineteenth century to the present, concentrating on the ways in which economics, immigration, and urban development and infrastructure shaped the formation of performance cultures in New York City. Lectures and readings are supplemented with backstage tours of theaters such as the Harvey Theater at the Brooklyn Academy of Music, Joseph Papp's Public Theater, and the Samuel Friedman on Broadway. These activities provide a historical foundation and environmental scan of contemporary performance culture that will inform

subsequent research and the development of GIS maps. Students are also taught basic skills in bibliography, image attribution, data mining and spreadsheets, and digital mapping prior to commencing work on the project.

GIS data collection and mapping are used to creatively and critically engage students using sets of data, archival material, and digital media to discover connections between performance culture and the built environment. Architects, city planners, developers, and municipal agencies all conduct site analyses prior to embarking on the design of any construction project. The importance of these kinds of studies is presented to students as a way of introducing the multiplicity of factors that contribute to the design of the urban landscape. The act of mapping data relevant to a theater's urban context, such as adjacent building typologies, land use, zoning, location of transportation and municipal infrastructure, and demographics helps students perceive theatrical activity and spatial design as outcomes of social, aesthetic, and technological forces. Robert Summerby-Murray writes of a similar approach used in the study of historic buildings in a geography course:

> The emphasis in this approach is not on the use of GIS technologies as a mechanistic tool or on the technicalities of software design, innovation and modification but rather on the scientific inquiry processes by which geographic phenomena are measured, generalised, analysed and represented and how these processes are sharpened through the use of GIS technologies.[7]

In *History of the Theatre* students are introduced to GIS as a tool to graphically represent and analyze layers of data in order to gain a deeper understanding of performance culture in an urban community.

Description of GIS Research Project

The scaffolded research and mapping assignment progresses in three stages. Initial engagement with the physical, living archive of historical performance spaces lays the groundwork for the further articulation of place in the virtual environment of GIS mapping. Students engage with the urban archive by visiting existing theater buildings where they sketch, take photographs, read documents from physical archives, and learn from theater managers and other practitioners. Next, research continues in digital archives and databases. Students use virtual mapping to investigate the surrounding neighborhoods in order to make meaningful connections between theatrical production and reception. Lastly, students conduct analyses and convey their findings in formal classroom presentations. We have designed the project to give entertainment and architecture technology students mentorship opportunities with students from other disciplines. In small group activities, disciplinary-specific knowledge from theater and architecture is reiterated through peer-to-peer interactions.

Stage 1: Place-Based Research

Working in teams of two or three, students select an active theater to research. The instructors provide a list of theaters that are architecturally significant (e.g., the Signature Theater, designed by Frank Gehry), represent an innovative reuse of a preexisting structure (e.g., St. Ann's Warehouse, a repurposed eighteenth-century tobacco warehouse), or are historically meaningful (e.g., Lowe's King's Theater, an early twentieth-century vaudeville and photoplay theater). Student teams conduct place-based research by attending a performance at the theater and documenting their observations with hand sketches, photographs, and written notes. A list of research questions encourages careful examination of the practical and decorative features of the facade, audience spaces, and stages:

> *How does the building relate to its physical surroundings? What are notable features on the facade? Discuss the semiotics of place: what impressions do the design elements make and how do they shape expectations about the performance? Describe decorative and practical elements in the auditorium and other audience spaces: lighting, balconies, lounges, aisles, etc. How is the seating arranged in respect to the performance space(s)? Is the stage a thrust, arena, or proscenium type? What is the acoustic quality of the space? What kinds of technologies are available to support the performance (amplification, projection, etc.)? Finally, describe how these various aspects supported, enhanced, informed, or detracted from your experience as an audience member.*

Having an architecture or entertainment technology student embedded in each team proves advantageous for these site visits. Site observation and documentation is a typical skill taught in architecture curricula so architectural technology students can help others who may be less adept at hand sketching. Entertainment technology students can point to stage structures and equipment that were discussed in class. After the place-based interrogation of the site, teams then conduct research in primary and secondary sources that deepen their understanding of the theater building. A series of prompts guides their research:

> *When was the theater building constructed and for what use? Who were the architects? If it is a purpose-built theater, what kinds of plays were first performed there? If it is a converted space, what was the original use of the building and when was it converted? What changes did the architects have to make to adapt the building so it could be used as a theater? Today, what is the artistic mission of the resident company or producing directors? Is the theater a nonprofit or for-profit house? What kinds of plays or musicals do they present, and for what kinds of audiences?*

With their written responses to the above prompts, students submit an annotated bibliography, photographs (with Creative Commons attribution), and sketches. This first stage of the project is due around the middle of the semester. Stage 1 of the assignment provides an opportunity to teach students how to conduct place-based research through attentive firsthand witnessing and documentation of the primary source (the theater, the production), and then supplementing their

understanding of the place with secondary sources. This establishes a foundation of knowledge for a virtual exploration of place.

Stage 2: Virtual Place-Based Research

In the second stage of the project, teams of students conduct research in open digital archives on the neighborhoods in which their subject theater is located. They project this georeferenced data onto a digital map in graphic form. Data mining and storage, and software integration and application, is taught in three class periods over a six-week period, which allows time for students to familiarize themselves with the software and work collaboratively outside of the classroom designing their maps.[8] The objective of this stage is to provide an activity that demonstrates to students how cultural production (by artists, technicians, and producers) is inherently intertwined with cultural consumption (by audiences). Students also learn how urban planning and infrastructure shape the geography and economics of theatrical production.

Students are given a hypothetical scenario modeled on professional concerns in urban planning and development and are asked to use georeferenced data to conduct an analysis of community demographics, urban infrastructure, and zoning:

> *You have been hired to conduct an analysis of the demographics, urban infrastructure, and land use of the neighborhood of your theater. The theater company aims to produce shows that will attract local audiences. They also want to understand urban infrastructure that will facilitate access to the theater. What types of information would help the company understand their community best? What conditions prevent or encourage access to the theatre? Describe the target audience: who would be served by the theater? What kinds of plays and entertainment would attract the local community?*
>
> *In order to answer these questions, gather data on the following:*
> - *Population density and demographics of residents, commuters, and tourists.*
> - *Infrastructure (public transportation, parking, sidewalks and thoroughfares).*
> - *Local zoning ordinances, building typologies, and land use.*
> - *Crime and noise pollution.*

Students are introduced to open data available from federal, municipal, and private archives. In many cases, this information has already been georeferenced in .CSV file format so that it can be read and projected onto virtual maps with mapping software. Demographic information is available from census data, and land use and local building information may be available from city and local planning offices, such as NYC Open Data. Datasets that have been gathered by users of ESRI's GIS software are available through the ESRI portal. New York State's Freedom of Information law and Commission on Public Information and Communication has facilitated the liberation of vast amounts of data on city demographics, crime, housing, and environmental issues. Additionally, the city maintains several mapping tools through the NYC.gov portal, such as *NYC Map*,[9] built upon countless points of informative data. Released in 2013 by the Department of City Planning, *PLUTO*[10] is another ever-expanding database containing extensive land use and geographical data used by researchers, developers, community organizations, and students for understanding economic, housing, health, and safety conditions at the local level. Given the large amount of data available online about New York City, it is necessary for instructors to provide guidance on how to locate, upload, and organize the data. While federal and municipal sources are generally reliable, data needs to be evaluated for accuracy. Students are taught how to locate data that is up-to-date, comprehensive, and relevant to their research.

As they navigate these various databases, some students collect demographic information to assess taste in theatrical forms. Throughout the semester, we discuss how economic and social class and cultural tastes are intertwined. In particular, we follow the trajectory of Shakespearean drama, classical opera, and melodrama as they are produced and experienced in different historical periods and communities, and how production and reception reflect the aspirations and tastes of audiences. In the following example of a student project, demographic data lead to the

team's conclusion that new plays developed in educational outreach programs would be a viable approach to production. Their map of upper Manhattan showed a dense and predominantly low- to middle-income population. The team argued that a nonprofit community theater could support emerging artists and employ young adults, which could lead to the development of a cultural center and job opportunities for local residents (Figure 6.1).

Place Figure 6.1 Here

Figure 6.1. "Harlem Story Map", Li Pan and Trisha Pham, https://arcg.is/0rXLfG

In the presentation of their material, the team compared their vision with the historical theater community of the Harlem Renaissance, a topic of study earlier in the semester.

Students also gather information on commercial and theatrical activity in an area in order to evaluate potential audiences. In a project focused on midtown Manhattan, research revealed intensive commercial activity and a population of high-income residents. In their analysis, the team was able to unpack the relationship between the high-brow culture of Lincoln Center for the Performing Arts and the retail activity in the neighborhood. This led to an in-class conversation about the changes to the neighborhood since the construction of Lincoln Center in the 1960s and how that municipal project effectuated major changes to the urban landscape, including the displacement of Hispanic and black communities. (Figure 6.2).

Place Figure 6.2 Here

Figure 6.2. "Columbus Circle/Lincoln Center", Flore Cadet and Areli Amado, https://arcg.is/Sf8HK

Once the teams of students have collected data that will appropriately answer the research questions listed above, they are taught how to conduct basic functions in the online version of the mapping application ArcGIS. ArcGIS is used in this course because it easily integrates with two of the larger resources for open data, ESRI Open Data and ESRI Living Atlas. The online version is particularly useful for collaboration among team members since it can be accessed by any computer with an internet connection. Also, City Tech has an institutional license to operate the professional version of the software allowing more advanced architectural technology students to build more sophisticated interactive maps.

Once students are able to comfortably validate and import relevant sources of data they are taught different options for graphically representing data drawn from open databases. Since the amount of georeferenced information on the internet is overwhelming, students are shown how to curate the data, evaluating for relevance and reliability in particular. We provide a general review of data visualization in various fields such as the environmental and social sciences, geography, and history in order to show a range of methodologies for representing abstract information. As the notable scholar and expert on data visualization Edward Tufte writes,

> [a]t their best, graphics are instruments for reasoning about quantitative information. Often the most effective way to describe, explore, and summarize a set of numbers—even a very large set—is to look at pictures of those numbers. Furthermore, of all methods for analyzing and communicating statistical information, well-designed data graphics are usually the simplest and at the same time the most powerful.[11]

Most GIS mapping applications allow users to adjust colors and transparency of mapping areas and vectors, and create add-ons like legends and timelines to maximize the impact and highlight specific data fields. Students are shown how to operate these functions and are critiqued on the graphic legibility of information in their presentations. Students are tasked with creating a

minimum of five graphic displays of their data that represent the urban artifacts and conditions of their assigned neighborhoods.

Stage 3: Summary, Analysis, and Presentation

At the end of the semester, student teams conduct formal presentations of their findings in class. In these presentations, they describe local audiences, the degree of access to the neighborhood, and draw conclusions about the kinds of productions that would best address the preferences of local communities. ArcGIS StoryMaps is introduced as a tool that allows users to import maps created in ArcGIS into a slideshow that combines textual narrative, visual content, and interactive features (timelines, zooming, pop-up windows, animation, etc.). For each slide containing a map, students are asked to include narrative text that describes the data and graphic overlays, provide citations to sources, and to articulate orally why the data is relevant to their study. They must conclude by summarizing how all the different pieces of data cumulatively informed their responses to the queries of the hypothetical theater producers. In the following example of student work, a comparative analysis of different data sets informed the recommendation of a location in Brooklyn for a new theater. The student created a map with layers of information on transportation access, population density, income levels, and the locations of existing theaters. Using this map, he was able to cross-reference fields of data to identify the most viable area for the construction of the new theater. The determination was based on ease of access, the lack of competition from other theaters, and the presence of middle- and high-income populations that could support a commercial venture (Figure 6.3).

Place Figure 6.3 Here

Figure 6.3. “Best New Theater Prospects in Kings County”, Robert Helle, https://arcg.is/15HP9f

Further Suggestions and Conclusion

The GIS mapping assignment has been an effective means of teaching how social and material conditions in an urban environment inform the design and construction of performance spaces while also introducing a digital communication skill for virtual-place based research. Students have been able to find, analyze, and visually represent relevant data across disciplines in order to formulate well-reasoned conclusions. Building teams of students from different disciplines was particularly useful in facilitating mentorship and peer-to-peer learning opportunities. The project covers a wide array of skills and materials that may be unfamiliar to many students in an interdisciplinary class, so it was designed in such a way to capitalize on the variety of skill sets that students bring to the class, including data collection and organization, practical knowledge about theaters, and familiarity with computer applications, graphics, and drawing. Positive student interactions outside of class resulted in the accumulation of shared knowledge which was often demonstrated in their final presentations. These collaborations fostered a collegial atmosphere and contributed to the success of projects.

Employing GIS mapping as a tool to conduct virtual place-based learning can be applied in disciplines such as English, history, and economics, as well as other seemingly exclusive domains. Teaching how to analyze and interpret illustrated data can be applied to almost any learning outcome involving geography or spatial narrative. Before embarking on the design of a teaching module based in GIS mapping, instructors should conduct a review of publicly accessible data in order to ensure that relevant information is available in open archives, and that it has been georeferenced, so that it can be easily used in classrooms. As discussed above, there are also benefits to focusing assignments on local communities to allow for integrated research between virtual place-based and embodied place-based modalities.

GIS mapping and data research is a powerful method of problem-based inquiry in technological and humanities disciplines. It is a pedagogy for analyzing and presenting research findings at the intersection of different fields, fostering collaborative learning. Digital mapping can be used as the shared mechanism for students from different backgrounds to situate research questions in the context of the built urban environment, deepening their understanding of the innumerable forces affecting the conditions of neighborhoods and communities. Teaching students to collect, visualize, and analyze data can be applied across undergraduate curricula and used as a way of identifying common ground.

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[8] We have used Carto and ArcGIS in *History of the Theatre*, however there are a number of open-source or free online applications that are designed for lay people and integrate with .CSV data files found in most digital databases for mapping.

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