The Spaces Between: Mapping gaps in the Assemblages of Digital City Renderings

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Abstract

This article argues that using assemblage theory within the context of learning design technologies can help to not only reveal the constraints that inform students' work but also the human and nonhuman actors that are absent. Through a months-long study of 3 urban design students learning to master the design rendering software, SketchUp, we can see that although students rely on personal, spatial, technological, social, theoretical, and supervisory constraints, that their attention to community based discourses is lacking. This signals an opportunity for Communicating and Designing Across the Curriculum faculty to help create more fully contextualized design assignments that are rhetorically aware.
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Composition scholars and instructors have adapted pedagogical and research practices to include attention to new media technologies that impact the way that our students are designing and will be asked to design in the future. Indeed McElroy (2015) notes that "As members of the field, we have attended to design in numerous productive ways, more recently as prompted by the changing cultural and technological landscape. With the advent of markup languages, networked interfaces, mobile and cloud computing, social media, and Web 2.0, composition scholars have worked to understand the implications of these developments for writing, composing, and semiotic production" (p. 148). Assemblage theory helps to illuminate the various human and nonhuman actors that are entangled in each one of these design situations and how our students negotiate among the various affordances that each type of design allows.

Although tracing assemblages help to tease out the disparate tools and artifacts that go into a design, I argue that assemblage thinking can be used both to show the constraints that undergird a design and also to provide a sense of what important elements might be omitted. Through a study of three urban planning students learning to use the design rendering software SketchUp, I articulate how their designs are influenced by six major types of constraints (personal, spatial, technological, theoretical, social, and supervisory). Yet, when the assemblages that constitute these renderings are mapped out, it is evident that student-participants have placed little attention on real-world stakeholders' discourses that would be crucial for creating rhetorically sound and effective designs.

Drawing on composition theory, technical communication scholarship, and studies in urban design, I showcase how mapping out the assemblages of design reveals opportunities for those of us working in communicating across the curriculum (CAC) and designing across the curriculum (DAC) roles to help contextualize design assignments to better prepare students for authentic design experiences.

While not as widespread as CAC, DAC initiatives seek to promote design thinking in courses (Drake, 2014) and to provide students with opportunities to communicate visually. For example, seeing that most mechanical engineering (ME) courses will require students to take on an element of design[1], Tennyson, Eggert, and Bunnell (1998) sought to create a course to teach ME students about the decision making process itself. That is, the authors created a gateway course that would illuminate aspects of design that students could apply in their future coursework. Doing so, they write, would help students "to make better decisions in their engineering practice as well as in their follow-on courses required in the undergraduate degree" (p. 193.3). More recently, in Doepker and Dyn's (2007) special issue on design engineering education in the *Journal of Mechanical Engineering*, Kadlowec et al. (2007) described their eight-semester course sequence in which students not only study the principles of design, but apply them through various team-based projects. The authors felt that the capstone design course offered in their program was limiting in that students took it near the end of their academic careers; thus, the authors created this sequence in which they infused principles of design throughout students' engineering curriculum to ensure that they received sustained attention to design principles from one class to another.

Outside of engineering, designing across the curriculum initiatives have been implemented to teach students to compose multimodally. Ehrmann and Balestri (1992) open up discussions of designing that cross curricular contexts beyond engineering into realms such as chemistry and urban planning. For them, designing is a "personal process of analysis and synthesis, replete with trial and error as [students] work to create a product [while attending] to such subtle issues as expectations of their intended audience and an internal sense of satisfaction or closure" (p. 2). In other words, designing contains a rhetorical component to it, and if students can learn to incorporate design thinking into their projects across the curriculum, as Ehrmann and Balestri assert, they can master how to engage in critical thinking and writing processes in their coursework and in their later careers. Therefore the authors put forth a model for designing across the curriculum in which students will have opportunities to work multimodally with numerous design tools—everything from pads and paper to test tubes and paint in order to gain recursive practice with design (Muthyala, 2018, offers more current analyses and arguments for supporting multimodal design in the curriculum as well).

Given this attention to design, it's important to not only implement design practices but also to find ways to study them in order to make sure that students, particularly paraprofessionals hoping to design for a career, are learning important aspects of design. To this end, I see a turn towards assemblage theory as an opportune move that will facilitate such exploration. In the following article, I

- review the literature regarding assemblage theory as it pertains to composition, technical writing, and urban studies.
- provide a brief history of urban design as a field of study
- describe this study's methods, which involved mapping the assemblages that make up design student's urban design renderings and conducting follow up interviews with them
- showcase how mapping assemblages allows us to see both what elements undergird a design project as well as which elements are missing
- elaborate on implications that mapping design assemblages might have for composition and designing across the curriculum pedagogy.

Constructing Assemblages

Assemblages in Composition

To look at composing as an assemblage means seeing all texts—visual, textual, multimodal, etc.—as constructed from various other texts, each stemming from a wide range of contexts. For this reason, in their oft-cited work on assemblages, Johnson-Eilola and Selber (2007) argue against using language that emphasizes "original" student work.

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[1] See Eder (1991), for example.

Because all work contains traces of previous texts (see Porter, 1986), plagiarism policies that stress originality discount the ways that writers remix their work through the use of previously created messages and systems such as templates, boilerplate information, and links to outside multimodal content. These assemblages are not only permissible, but are often socially expected by the community in which the writer composes. In other words, composing involves more than setting out to create something new. To paraphrase Edwards (2016), new texts are compiled, aggregated, and juxtaposed from already existing texts, which are themselves composed from an assemblage of other texts (p. 47).

As digital technologies continue to evolve, writing professionals and students face a continually changing landscape for completing design projects. Each of which brings forth opportunities to assemble and create. Still, many in the field of composition have cautioned against the potential of introducing students to technologies in mechanistic, nonrhetorical ways that foreclose thinking critically about technology (Alexander & Rhodes, 2014; Walker & Hawk, 2010, p. ix). With regard to new media composing technologies, Tinnell (2012), has argued that thinking about technology in terms of assemblages and ecologies might inspire such careful attention to technology.[2] In doing so, we gain a more robust understanding of the different elements and actors that play a role in the construction of a text. Or, as Reid (2017) articulates, an assemblage "puts the natural and the social, the nonhuman and human realms back together. In connecting humans and nonhuman objects within an ontological space, assemblage theory articulates language and symbolic behavior as a relational capacity that emerges within a network of human and nonhuman objects" (p. 27). These networks move us toward a more robust view of the constructed nature of composing, not solely a product of a writer but as constructed through a multiplicity of experiences, texts, artifacts, and technologies.

To illustrate, Michaud (2017) notes how several of the genres that we assign in our courses are constituted of a variety of assemblages. When creating blogs, for example, students "experiment with a range of different assemblage skills—the use and placement of visual images; the intersection of textual and nontextual elements; the incorporation of video footage; the multimodal use of color, design, and layout; the 'how to' of writing for nonacademic audiences; and the development of a nonacademic style or voice appropriate to a wider audience of readers/viewers" (p.93). In looking at these elements that circulate within a piece, the complexity of composing is made more salient.

As we can see, discussions of assemblages have focused on how designers incorporate already-made texts and artifacts into their designs and also on the different skills, elements, and features that are available to designers when they are creating something new. I find that having a broader definition of assemblages—one that captures not just stable texts and characteristics of technologies—is illuminating in that it opens us up to consider more abstract elements that shape the complex web that gives a design its shape. Or, as Preston (2015) states, "To regard writing as an assemblage is to insist that what is important about writing is not its capacity to represent ideas but rather, what writing does, from whence it comes, and how it reproduces. Writing always and already functions with and connects with other assemblages—other writings, histories, memories, places, people, ideas, events, and so forth" (p. 39). In other words, assemblages are inherently ecological, comprised of the relationships between an array of things and concepts, each adding to and/or conflicting with each other all in the creation of a text. In this way, assemblages break students (and instructors) away from the idea of authorial genius—the professional composing in ways that are individual, independent, and controlled by a stable subject.

Within the context of design, focusing on assemblages can teach students who are learning design software that their designs are not solely their creations, but emerge from a complicated network of other constituents, many of which arising from not-fully-conscious actions. More importantly, as outside stakeholders frequently play a role in shaping the design—either directly through a client/professional transactional relationship or indirectly through making sense of community needs—design students can begin learning how to incorporate complex data from these stakeholders into their assemblages. I seek to further the work on assemblages by placing attention to how we can make them more visible, which can help us direct designs in more agentive ways. Rather than merely observing assemblages and noting them, we can intervene to provide students with opportunities to craft more agentive and rhetorically aware designs.

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[2] I should note that recently there has been more of an attempt to make salient the differences between ecological approaches and assemblage thinking in composition. As Ehrenfeld (2018) has discussed, "terms such as 'ecology,' 'network,' and 'system' have functioned as universalizing metaphors" making it difficult to "consider the ways that the nodes of a web might be linked, amalgamated and assembled." He argues for a more robust methodology in tracking the distinct dynamics involved within these types of webs. Stemming from this, Angeli (2018) has proposed that mapping assemblages offers a potential way to account for the interconnections within ecologies, networks, and systems. That said, because I do borrow from and consult work that combines frameworks (or at least switches seamlessly between the terms "ecology" and "assemblage", I occasionally use the former term in this article (see for example Tinnell, 2012; Morey, 2012; Reid, 2017; Gries, 2012).

Assemblage Theory in Urban Studies

Within urban studies, the concept of assemblages has also begun to take hold. In such a context, theorists argue that "Urbanism is produced through relations of history and potential, i.e. of the multiple and interrelated temperalisations—of capital, social relations, cultures, materials, and ecologies—that produce the city but that have been and continue to be resisted and subject to alternative possibilities" (McFarlane, 2011, p. 652). Implicated herein are cultural, material, political, economic, and ecological aspects that comingle to make a city. Certainly the idea of cities being assembled together has a long history, so much so that Spiro Kostoff (1990) sought to define the particular elements that were common to all city spaces across time in his text, *The City Assembled*. He writes that in this long project, he "wanted to explore . . . the urban geographer's concept of the urban fringe belt; the role of the parish in the spatial structure of the Christian city; the origin of the residential square; the nature of the bridge-street; and other such familiar devices out of which urban form assembles itself with verve and imagination and mischief" (p. 8).

Yet what assemblage theory adds to these observations is a theoretical framework that finds interconnections between not just the buildings themselves but amongst the wide net of human, nonhuman, and discursive elements that all work together as a city functions. Or, as Dovey, Rao, and Pafka (2018) state, assemblage theory is a "loose set of alliances between different modes of thought" which is necessary in urban studies because "the city is such a multiplicitious phenomenon that requires different modes of thought in order to understand the many different ways in which it operates" (p. 271). For instance, (Dovey & Pafka, 2014) utilize assemblage theory to argue for a more intraconnected understanding of density—one that moves beyond blunt standard policies and numerical data, as these elements do not capture how increased building density impacts and is impacted by sidewalk usage, attempts to create community within the building, and nearby open spaces. Indeed, the idea of assemblages can be applied not just to the infrastructural makeup of a cityspace but also to the human-nonhuman constitutive relations that allow for individuals to actually maneuver through spaces (see, for example, de Souza e Silva & Stuko's, 2009, edited collection on digital urban playspaces). In this way, mobile technology, signage, and natural landmarks can become a part of an urban assemblage. In short, assemblage theory makes it more possible to think of city as a verb rather than a noun, as in *to city*, which does a better job of capturing the movements and interconnections that are apart of urbanism (Edbauer, 2005).

Interestingly, the extant scholarship that connects assemblage theory to cityspaces treats cities as ready-made assemblages, with little attention to the assemblages implicated in the design of cities. That is, researchers understand that assemblage thinking can help us conceptualize how different constituencies come together to produce and maintain a city, but the starting point for these conversations has usually come from theorizing what is already there and not from designers' renderings that must first be interwoven into the already built assemblage. While we may see such design work as existing outside of the urban assemblage itself, it is still relevant to map and articulate it given that it contains its own set of constituents, many of which are (or should be) connected to the urban assemblage itself. We can see how design work is both a part of urbanism yet also carries its own assemblages. To illustrate a parallel example, even though city policies are certainly a part of an urban assemblage, McFarlane states that policy itself is "assembled not just through structures of political economy, but through particular atmospheres of reception in the boardroom or coffee room, the materiality of policy documents themselves (e.g. the agentic force of the texts and their visual and modes of presentation), serendipitous moments and juxtapositions, and forms of friendship or conflict, all of which operate with different and contingent forms of power and impact" (p. 652). In this same way, it is important to determine what makes up the assemblages of design renderings if they are to be successfully incorporated into preexisting city spaces. As I discuss below in a brief overview of the history of urban design, perhaps the reason that urban planning theorists and researchers overlook issues of design is because of the frayed history between the two fields.

A Brief History of Urban Design

Urban design is not a profession in itself, in that it has no accreditation standards or overseeing body (Banerjee, 2011, pp. 208-209). As a field and as a practice it has a long and tangled history rooted in architecture and urban planning, vacillating between the two throughout the 20th century. Harvard offered the first courses in "civic design" in 1909 housed within the landscape architecture program (Anselin, Nasar, & Talen, 2011, p. 197). Although there had been professional training in the design of cities prior to this, Harvard's course would teach students to "deduce fundamental principles of organization, afterward applying these to some of the problems of the modern city" (Pray,

1910, pp. 66-7) in a systematic fashion and thus prepare students to design on a city-wide level. With time, civic design became known as urban planning; by 1923 urban planning had grown into a specialization at Harvard and into a separate degree program by 1929. In addition to expanding curricula, special issues of architectural academic journals devoted to issues of city design were published, which eventually paved the way for journals specifically dedicated to urban planning concerns. Combined, these developments helped to legitimate city design as a field.

Despite the initial strong bond between urban planning and architecture, the two fields began to split at the mid-century. This bifurcation began with the University of Chicago's Urban Planning program, which was housed in the Sociology department, not in Architecture. Unlike other programs in Architecture departments, Chicago's program would require that students establish a "body of theory or philosophy underlying planning" and develop "specialized techniques which have been found relevant, necessary and sound in the course of empirical practice" (Perloff, 1957, p. 137). As more planning programs developed (or moved to) Social Science or Public Policy schools, Planning in academia came to be "dominated by applied social science research, moving away from an exclusive focus on physical form toward a wider range of social, environmental, and economic concerns" (Anselin et al., 2011, p. 197).

When the wicked planning problems of the 1950s and 60s arose (Rittel Horst & Webber, 1973), planners became more aware of the social problems caused by spatial injustice. The building of highways and other planning projects displaced hundreds of thousands of low income households throughout these decades (Altshuler & Luberoff, 2003, pp. 83-84). This led to the dissolution of many culturally-rich ethnic and racial enclaves in cities, forcing residents to enter discriminatory housing markets. The impacts of these decisions pushed planners towards a re-articulation of spatial equity as one of their principle foci. Planners began to talk about decentering spatial practices and focusing instead on how users of space made meaning of their places. Lynch (1960) studied how to design cities that people felt to be intuitive based on their experiences of the city; Jacobs (1960) argued for a city that centered on people and not cars as a way to reinvigorate cities that were becoming depopulated due to white flight to the suburbs; Arnstein (1969) advocated for true citizen participation in planner's policy decision making, not mere tokenism.

These initiatives refocused planning's priorities to rest more on the analysis of demographics, on steering policy, and on interpreting the use of city patterns by residents. This move away from design left a gap that architects quickly filled. As a response to the lack of attention to design in the creation of city and town spaces, architects began to promote a new set of design principles in the 1980s and 1990s referred to as New Urbanism (Steiner, 2011, p. 213). These principles aimed to tackle the social problems that communities had experienced since the great migration from cities by focusing entirely on design. Given space constraints here, I will only mention that New Urbanist theory has been very contentious and has opened up a conversation regarding whether planners should reclaim design, taking it back from architects (Ellin, 1996, p. 186). As a result, at the turn of the century, many Planning programs have begun to reinfuse design into their curriculum. Ironically, because planners abdicated design in the 1950s to focus on social and demographic issues, these courses that are meant to teach urban planning students to design city spaces are taught by architects—those who subsumed city design in the 80 s and 90 s.

The return to design for planners has not been smooth or met with unanimity. In 2011, the *Journal of Planning Education and Research* published a special issue dedicated entirely to the controversy of whether planners should also be designers. Some claim that urban planning, having been the original home for urban design, should once again subsume it. Indeed, given planners' attention to/intention toward equity, their designs would be more user-centered than those produced by architects (Gunder, 2011). Others, conversely, call on planners to reach out to architects, not in an attempt to wrench the role they play in urban design from them, but to learn about their practices in order to build more unity among place-making professions. Thus, the goal is to seal a rift that has negatively impacted both planning and architecture (Steiner, p. 215). It is within this argument about design that the participants in my study find themselves enmeshed. Given its history, when urban designers compose their renderings with digital technologies, they are borrowing from not only planning, but architecture and public policy as well. Thus, mapping assemblages can help tease out these entanglements and make them visible.

Methods

As part of a larger project to assist urban planning professionals investigate design communication practices, I engaged in a study to track how urban planning students learned to use design rendering software. Turning towards the concept of assemblages seemed the most relevant as I was interested in discovering not simply the tools that designers use, but the relationships that facilitate and afford such use. To find participants, I analyzed the *Guide to*

Undergraduate and Graduate Education in Urban and Regional Planning published by the Association of Collegiate Schools of Planning, which lists information on all planning programs in the United States and Canada. After receiving IRB approval, I contacted the chairs of all programs that noted that they had concentrations or coursework in urban design, and asked the chairs to circulate a call for participants for the study. To be eligible, students needed to be working on a design or redesign project over the course of several weeks or months and to allow me access to track their iterative designs over that period of time. My call was then circulated within the student list serves of each program. I received responses from 4 eligible students; 3 completed the study. Below, I include information regarding each.

Participants

Jake, a Caucasian man in his late 20s, was in his first quarter at WestCoast University.[3] He had held numerous positions after graduating with a BA in Political Economy from a different state university some five hours away from WestCoast U. He began his career working as a housing counselor for individuals returning from prison. Following his time in direct services, Jake completed a public policy fellowship with City Hall, and worked with the local Public Utilities Commission to develop policies and programs for conserving water. Following Hurricane Sandy, Jake had decided to return to school to work on the issue of climate change. He reported to have first become interested in architecture when he was younger, but was drawn to planning because it "worked on a larger scale."

Lola, an Asian-American woman in her mid-20s, was also a first semester student in a Master's of Urban Planning program at WestCoast University. After graduating with her BA in Urban Studies and Planning from a different university, some four hours away from WestCoast U, she had taken 1.5 years to work in the transportation planning department of a large planning, engineering, and construction management organization. During her employment there, Lola was responsible for preparing working papers, evaluating land use, transportation, and parking policies, and creating maps and public handouts using ArcGIS and Adobe Illustrator. She was drawn to planning after having visited Europe and experienced walkable communities in cities like Florence, Italy.

Ron, an African American man in his late 20 s, was finishing up his final semester in a Master's of Urban Planning and Public Affairs program at Midwest University in Chicago. For Ron, city design had always been an area of interest going back to when he would construct city skylines out of ketchup bottles, cups, and anything else that was on the dinner table. At first he considered applying to programs in Architecture, but worried that he would not be able to pass the math requirements. Still wanting to work with cities, he learned from his father that urban planning might be a way for him to do what he loved with less of a focus on math. After looking up the entry on Wikipedia for "urban planning", Ron thought that it would be a good fit because "Instead of architecture where you design the building, urban planning is the big picture, you design the layout of where that building should go and how it's going to affect the human scale." Prior to attending Midwestern U's program, he had worked for four years at a firm that managed building facilities.

Materials

Over the course of a semester while they were enrolled in an urban design course, I collected various information from participants. The data for this study originated from:

Course syllabi

Syllabi were collected so that I could review the different texts that help build students' knowledge and skills of urban design. At the same time, I reviewed the different policies and goals, means, and outcomes that each instructor had proposed for students in these documents.

Rendering draft scans

Because my participants were housed in programs across the United States, meeting face-to-face to discuss their iterative design processes was not possible. Instead, I asked students to document their iterative design choices throughout their design process by photographing their renderings or saving screen captures that they could email to me at

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[3] Names of individuals, participants, and academic institutions have been changed. Other identifiable information has been omitted whenever possible.

three mutually agreed-upon checkpoints in the semester. In this way, the material visibly changes from one iteration to another, helping reveal the different human and nonhuman constituents that come into play when students redesign. For example, a comparison of Lola's renderings shows how the space goes through a slow and meticulous refitting process through subtracting and adding elements such as cars, people, parking meters, plant life, and pavers (video available at www.fernandosanchez.org). In this way, the spaces that participants design are assembled together through disparate human and nonhuman pieces, each revealing what matters to the participant and how she envisions the makeup of her rearticulated space. The transformation from street to pedestrian gathering space necessitates the removal of pavement and parking meters, the introduction of greenery, and the slow but steady representation of people gathering around the space.

Three reflection essays

To track the numerous processes that go into their designs, students were asked to keep a journal of their composing process in which they detailed significant turning points or obstacles in completing their work. Students submitted these reflections with their completed design iterations. Often, students were given a few prompts to help them organize their thoughts. While the reflection essays were a beneficial way of learning about what students may have been drawing from as they composed (how their purpose may have changed; what theoretical ideas came to mind), reflection may have also provided them with an outlet for thinking more purposefully about their work (Kurt & Kurt, 2017; Schon, 1988).

Three interviews

Skype interviews were conducted with participants no more than three days after they submitted their designs and reflection essays. I used a modified version of Odell, Goswami, and Herrington's (1983) discourse-based interview protocol during these conversations because such a method is better suited to obtain implicit composing knowledge. Much like Odell, Goswami, and Herrington, I am "using interviews to identify the kinds of world knowledge and expectations that informants bring to writing tasks and to discover the perceptions informants have" about their composition tasks (p. 228). This approach involves asking students why they chose certain options in the composing process over others, and what knowledge they are drawing from as they compose over a series of multiple texts (p. 229).

Interviews were semi-structured, based on the participants' individual design and their reflection. Moreover, questions were asked that dealt with participants' background and interest in urban planning and design, and their attitudes and beliefs in general about planning (see Spinuzzi, 2013, pp. 99-101). These questions helped link students' work to larger, ideological frameworks—for example, whether students were drawing from a theoretical perspective that favors sustainability, usability, New Urbanism, and so forth.

Assemblage maps

Students were asked to create a map of the assemblages that they produced. The instructions they received specified: "On a blank sheet of paper, draw a circle with the words 'final redesign' inside. Then, start connecting all of the people, writers/teachers/concepts, artifacts, articles, objects, and values that are responsible for its creation and any revisions you made to it. Then, because I may not be able to interpret your map, write about all the different relationships that you see here." Although this is not entirely how assemblages are characterized, for the purposes of this study, it sufficed in having students consider human and nonhuman entanglements.

Designs and Redesigns

Jake: Sustainability

Jake initially was interested in designing a parklet at the end of a sidewalk, which he had hoped would allow people to sit back and appreciate the sights from the surrounding culturally-vibrant neighborhood. Parklets typically take up one or two parking spots on a street and are extensions of a sidewalk, outfitted with a bench and greenery. However, Jake noted that he soon abandoned the idea because "I realized how much of my drawing space was dedicated to a [7-Eleven] parking lot on the other side of the street, and started to see the parking lot as an asset rather than something I wanted to hide. The setback parking lot, after all, was what provided me the open space to enjoy an expansive view

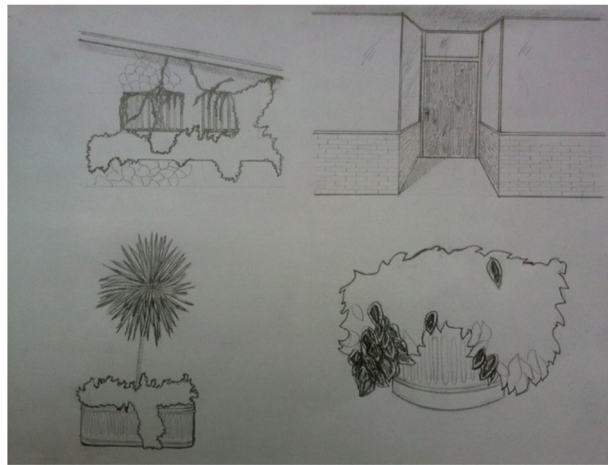Fig. 1. The 7-Eleven parking lot that Jake focused on for his redesign project.

Fig. 2. Jake's brainstorming sketches.

of all the historic buildings across the street." Having shifted gears, Jake focused primarily on the 7-Eleven parking lot (Fig. 1) and working through some ideas that would help inspire his design.

The brainstorming process, at least for Jake, involved taking time to concentrate on the observation of the space. Much like his syllabus recommends, Jake wanted to see the retail street holistically, noting how it worked and how people interacted with it. He chose to concentrate on "what we liked about the street before jumping to a vision for an improved version. Too often planners bring their assumptions about 'good design' to a project before spending the time to get to know a place, in all of its funkiness." To get at this funkiness, Jake drew a few aspects of the environment, which he reported "encouraged me to appreciate the complexity of simple details. Indeed, when we review some of his brainstorming sketches (Fig. 2), we can see how certain elements drew Jake in more than others.

Shrubs, plantlife, and greenery dominate Jake's inventional sketching. Though he does include a drawing of a door (most likely a business on the street), three of the four drawings capture the natural aspects of what he witnesses while on this street, which is interesting given that this space is an urban setting. With all of this sensory input detailed and logged, Jake settled on a redesign project that still spoke to the natural elements and green potential of this particular corner of the street. He noted that after abandoning his parklet idea, and taking note of key features surrounding the parking lot,

> I began to think of design interventions that might invite 7- Eleven shoppers to stay and potentially notice the other qualities of the street that originally attracted me. . . . Having worked at the [city] Public Utilities Commission while they were rolling out their stormwater design guidelines, I thought about the potential to capture stormwater at the site of the parking lot. If permeable pavement were installed in place of the current concrete slab, some earth and grass could potentially be exposed, thereby breaking down the gap between the city and the environment.

Fig. 3. Jake's final redesign using Sketchup.

Fig. 4. The street that Lola chose to focus her redesign on.

Fig. 3 showcases the final design that Jake produced for his class, wherein we can see a reimagining of that space. Permeable pavers are installed, replacing the concrete slab in the parking lot. At the same time, the nondescript, lifeless wall that adjoined the convenience mart is now adorned with a vertical garden of plantlife.

Lola: Walkability

In sharp contrast to Jake, Lola's project was relatively straightforward. She did little second-guessing regarding the location she wanted to select or the redesign elements that she desired to implement. Because Lola lacked a personal vehicle and because she was a first-quarter student still getting acclimated to the university area, Lola felt that her options for selecting a site to redesign were somewhat limited. Essentially, she chose a street that she frequently used, and noted that it could be made more conducive to pedestrian traffic, particularly as it is in a densely packed area of campus (Fig. 4).

Unlike Jake, Lola did not make note of any particular features at the site that drew her attention. Instead, she set about with a particular task:

> I wanted to focus on the key physical characteristics of the street, particularly what I considered as good design qualities. Therefore, I paid particular attention to wide sidewalks, narrow travel lane, abundant landscaping, and varying storefronts. I wanted to capture the fact that [this street] is currently an aesthetically pleasing street with great walkability and retail potential. Because I am personally most interested in pedestrian planning, I really wanted to show how wide the sidewalks were in comparison to the travel lane.

In practice, this meant making only a few changes to the current space.

Fig. 5. Lola's redesign using Sketchup.

Fig. 6. Ron's final design using SketchUp and Google Earth.

Fig. 5 highlights how Lola came to envision this space in order to communicate a more pedestrian-friendly street. As one notes, in Lola's design, the parking meters that dotted the sidewalk are removed and chairs and tables sit atop new pavers along the road to completely remove all vehicle traffic from the street.

Ron: Presidential Legacy

Ron's project was slightly different in that his instructor had requested that the entire class focus on creating a new building from scratch: a prospective Obama Presidential Library welcome center. In this design work, Ron wanted to focus on combining elements from past libraries and museums but to make the space also seem modern through the use of glass. Glass, he said, "makes things transparent so it makes things naturally brighter" and, as importantly "lets people see inside and outside." Those who are in the library can get a good view of the city skyline and those outside can "feel more connected to what's going on inside because they can see through."

It was particularly interesting seeing Ron's design come to completion given that he not only worked with the SketchUp software to design the building but he also used GoogleEarth to overlay that finished design onto the area of Chicago where he thought it would fit best. Because the two systems are owned and managed by Google, the integration was seamless, but Ron did stress that it was very difficult to get the two elements (the building and the surrounding environment) to line up just right. Fig. 6 shows the integrated design.

Analysis: Assembling the Designs

These final designs produced by students seem stable and cohesive. For example, Ron's Obama Library Welcome Center seems to fit perfectly within the cross-streets' boundaries. The people included in the various renderings know how to engage with the space and do so logically. This logic, however, conceals the many layers of iterative work that went into these renderings and promote the misconception that each emerges in toto, occluding how each is constructed and assembled. When diving further into the assemblages that make up these pieces, we see they are contested sites where different constituents merge, contradict, and negotiate to produce arguments about how a space should function
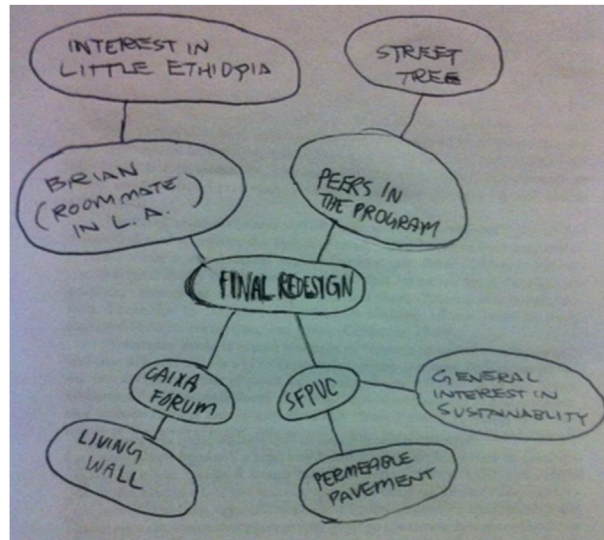
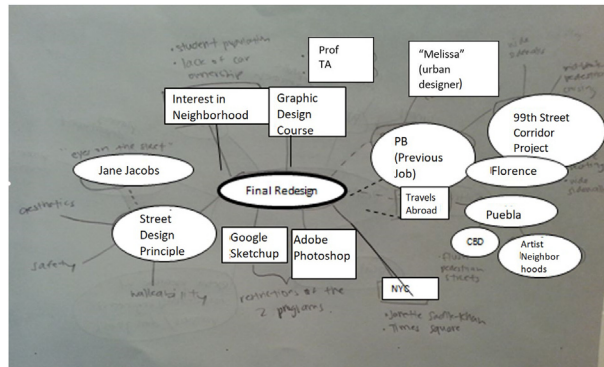Fig. 7. Jake's assemblages of the influences that guided his design.

Fig. 8. Lola's assemblages (text layered over illegible constituents).
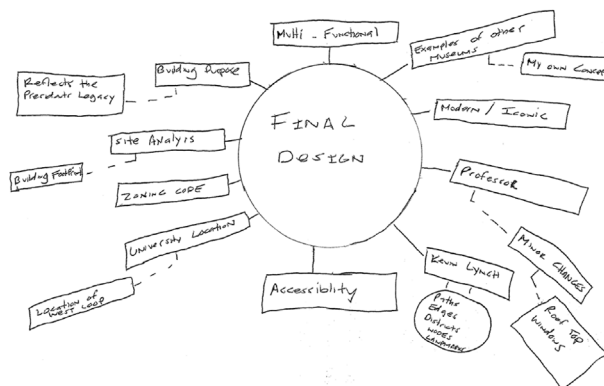

Fig. 9. Ron's assemblage map.

and how it should be used. In the maps that they produced of their assemblages, Jake (Fig. 7), Lola (Fig. 8), and Ron (Fig. 9) showcase the human and nonhuman constituents that they feel are most salient in the construction of their renderings. Though not entirely complete, we can gain a larger sense of these assemblages when we combine them with information from syllabi, interview transcripts, and reflections. In this section, I will discuss the commonalities

that these assemblages share and point out that the constituents mentioned here can be classified as constraints that are personal, spatial, technological, social, theoretical, or supervisory.

As existing scholarship has not yet explicitly brought in discussions of constraints as a way of mapping assemblages, I feel it necessary to spend time briefly noting how the two are intertwined. Lloyd Bitzer (1968) holds that constraints are "persons, events, objects, and relations which are parts of the [rhetorical] situation because they have the power to constrain decision and action" (p. 8). Although Bitzer's use of constraints has typically "been interpreted to mean limitations on the rhetor—prescriptions or proscriptions controlling what can be said, or how it can be said, in a given situation," in actuality, "Bitzer defines constraints more as aids to the rhetor than as handicaps. The rhetor 'harnesses' them so as to constrain the audience to take the desired action or point of view" (Grant-Davie, 1997, p. 272).

In that same vain, we can see a connection to how scholars have referred to writing assemblages as being comprised of and shaped by other texts (Johnson-Eilola & Selber, 2007). For example, Michaud (2017) notes how when writing white papers, students in his course borrow images, text, and ideas from their previous writing as well as writing that circulates within their sources (p. 96). In each of these cases, writers utilize these constraints in order to create a desired change or to facilitate a desired perspective. Connecting assemblages to the rhetorical conceptualizations of imitation, Edwards notes that imitation "celebrates a sort of community stockpile from which composers can continuously invent and reinvent" (p. 44). As a "method of composing wherein a composer builds a new text by gathering, repurposing, and redeploying a combination" of texts (Edwards p. 44), assemblages are inherently communal, comprised, in part, of relevant technologies (Kalmbach, 2017) and sanctioned ideas that circulate within a field or space (Porter, 1986; Preston, 2015). As such, composers harness these pieces in order to constrain an audience's point of view. In the case of this study: the point of view of the instructors of a spatial rendering course and any other secondary audiences that the participants might perceive. In essence, although they work on their projects individually, these participants as rhetors do not compose on their own. Rather, their messaging carries with it traces of multiple other rhetors, texts, and technologies that allow them to "speak" through their final designs.

Noting the concept of constraints above, we can see how participants harness a plethora of different technologies, texts, and ideas in order to accomplish their tasks, and these constraints, in turn, shape the final product. The constraints that I list below emerged after I coded the data, reflecting on what pieces participants noted as being important for the creation of their rendering—both within the context of our interviews and in the assemblage maps that they created. For instance, I noted if a participant stated in their interview or reflection that their design was inspired by international travel and looked for correlations within their specific map. Afterwards, I triangulated what all participants had reported verbally and in writing and looked for common themes. With that in mind, however, I also note in the following section that despite these complex webs of assemblages, we can see an obvious gap relating to the interpersonal-discursive work that planners must tend to and how to approach such opportunities for creating more fully rhetorical designs. That is, it may be beneficial for instructors to more explicitly introduce at least one more relevant constraint for students to harness in these designs.

Personal Desire and Experience Constraints

In every case, the assemblage maps contain a trace of some effort to impose a desired change upon the space. For all three participants, their experiences traveling abroad had a large impact on how they wanted to reimagine a space. For example, Jake mentions that his trip to the Caixa Forum in Madrid first acquainted him with the concept of a living wall. The feature, housed at the contemporary art museum, made a significant impact on Jake. He noted that at the time, "I thought it was so radical to adorn a man-made structure with living plant material. It was a merger of worlds, the natural world and the human world." And because sustainability is an important aspect of his work, **"the living wall was a design strategy that I was eager to bring back to my projects in the United States."** Similarly, Lola indicated that her travels to Florence, Italy, and Puebla, Mexico influenced her design in that they each featured "retail corridors that included important design elements such as outside seating, wide sidewalks, and flush curbs." Ron's design likewise borrows elements from his trip to The Museum of Art in Catalonia which featured great rooftop views of the Barcelona.

Spatial/Physical Constraints

Despite the desires that each of these designers brings with them, they still must work within the constraints of the space. Ron, for example, needed to build a library that fit within the current physical demands of a specific plot of

land. Moreover, the fabric of the city and the neighborhood also helped Ron to narrow down what he would design. Compared to the Clinton library in Arkansas, this is much bigger, but that's because this is a much larger urban center than Little Rock, AK:

> in Arkansas they are not going to build a monstrosity type urban building. . . . seeing that this one is in Chicago, Chicago is an urban city, you know a lot going on, you want something that fits . . . you don't want it to be too big, but you do want to say this is the first thing that you see when you enter the Obama library so we want something that is going to blow your socks off.

The fact that it is positioned at a busy intersection with a major highway nearby also limits the degree to which Ron can incorporate certain elements. "You have to account for people using this in the other sense too," he stated. "You need to have some area that can accommodate a large group of people within the space because if you don't, then you're going to have a long line of people just stretching around the block and that won't be good for traffic or safety." The materials each designer chose also had a large role in the final designs. I've already commented on Ron's propensity to use glass as a material because it creates a connection to the inside and the outside. The same can be said about Jake's focus on including permeable pavers in his design so that he can merge "the natural world and the human world." Attention to the physical constraints of the space are also present in Lola's assemblage map as she illustrates how the street's width, combined with the large number of students who walk through that area, make the space prime for being turned into a pedestrian walkway.

Technological Constraints

Oddly, the assemblage maps alone sometimes fail to capture the technological elements that are a part of the ecology, causing a few discrepancies and incongruences. For example, in their respective interviews, both Jake and Ron talked much about SketchUp's steep learning curve, which took them over 30 hours to master; yet neither makes any mention of this or any other technology as being an influence on their respective design. This is puzzling in Ron's case given that his project involves overlaying the SketchUp rendering with Google Earth street views of the city. Perhaps this is an oversight or perhaps they see the technology as being merely a vehicle for communicating their final redesign, which has been influenced by other actors.

Yet, we should not discount the work that the technology does to mold what each of these designers creates and how they create it. In fact, the Sketchup software, due to its specificity and array of features, makes the distinction between the analogue and digital forms of rendering very salient. For instance, when recounting his first weeks learning how to utilize Sketchup, Jake noted that

> I can see why old timers prefer drawing because when you draw, you just draw what you see. Or you draw what you imagine. Versus this. You have to enter in a coordinate for every point. And sometimes you like, think you are connecting two points, but you really missed it by a small degree and then when you go to fill that surface, the surface won't fill because it's not actually a surface because all four points aren't meeting and you're just like "What the fuck? How do I correct this? I don't even know where the mistake is!" You know what I mean? There were points where I was like "Oh my god, I hate SketchUp! I just would rather draw this!" . . . So you do the best you can but you have to make some small modifications to what you were initially thinking because otherwise you will spend all night on a tiny feature that doesn't matter as much as the large picture.

The design needs to be flexible because what a designer wants to create is mediated by what the technology allows. This flexibility showcases the ways that technology plays a role in the "translation" from the designer's mind to the actual rendering.

Lola makes a larger point about how technology has the potential to alter the way that one communicates the space on a larger, social level. Because part of the assignment that these designers produced had to communicate not just the redesign but the use of the design, each participant had to determine how best to incorporate people using the redesigned space in appropriate ways. For their rendering, Lola and Jake's instructor advised them to use Photoshop to create photo-realistic final images once they had finished rendering the design in Sketchup. Yet, as Lola found out,

> A lot of the stock photos [in Photoshop and those found through Google searches] are of white people and there's very little diversity—very little. So at first when I was putting in people, I noticed, "wait, they're all white" so I

had to go out of my way to find other ethnicities to include in the designs. . . . You kind of have to search "Person sitting down, Latino." And you would find someone. But if you just said "person sitting" it would be mostly white people. And like in SketchUp you kind of have the freedom to change facial or colors of skin so uhm so that is another option, but when you first pull in people, it's all very pale skin.

This limitation presented a problem for Lola given that the area that she was redesigning is very diverse, composed of Asian, white, and Latino populations. What is important here is the fact that these design technologies have the power to dictate how a space is represented and shape what the designer is communicating—beyond their intentions. Someone less critically engaged with technology than Lola might not have noticed that her space was completely devoid of the representations of diversity that are typical of this space. We can imagine that such a rendering would either not have spoken to the local residents as it did not represent them or might have even been seen as offensive given that the local residents were being white-washed, so to speak. The absence of proper representation could illustrate some of the friction frequently found between urban planners and those for whom they design: the people who will inhabit their physical space.

Social Constraints

While Jake, Lola, and Ron never spoke directly about the ways that their social influences were present in their designs, they all incorporate elements of peers, friends, roommates, acquaintances, colleagues, and other social connections as playing a part in the assemblage of their design. Lola's work with Melissa, her urban design colleague from her previous job, had given her the experiences that she needed to think through these designs. "At my old job, I worked on projects with Melissa, an urban designer, to improve major corridors. Some street design concepts I learned from the job and incorporated into my project were wide sidewalks and mid-block pedestrian crossings to encourage walkability." As is obvious from her design, these points stayed with Lola even years later as she reimagined a space for this class. Jake relied on his roommate Brian's counsel for choosing and looking "through" the site to determine its salient qualities and the potential that lies within it—the ways that it can support greenery or the possibilities afforded by the ground, for example.

Theoretical Constraints

Fittingly, Lola choose to bring Jane Jacobs into her assemblage map, given that Jacobs' seminal work focuses on the importance of pedestrian-friendly spaces such as sidewalks. Equally appropriate is Ron's incorporation of Kevin Lynch's principles in that he is working with a larger space that requires integration with a large urban area. Lynch's discussion of nodes, which draw people in to the city, is particularly apt given that Ron wants the Obama library to act as a node for the city. Although he does not name a specific theorist, as we have already seen, Jake is very much influenced by the research and theory that circulates around sustainability, so much so that he noted that he had purposefully taken enough sustainability courses to declare it his concentration.

Supervisory Constraints

Not surprisingly, the biggest influence in these renderings comes from supervisory constraints which helped to influence and mold the ways the students crafted their designs in very direct ways. It should be noted that there are two levels of design taking place in these projects. The first deals with the actual design of a space—applying design principles to remediate a city space. The second layer of design involves portraying the connection between people and the space itself. Early on, Jake had only listened to his instructor's warning that students not "muddy" their renderings by having too much activity or too many features present, as such busy activity would keep the ideas for the redesign from being communicated to others. Jake, at an early point, took this advice to heart and created a sparse rendering of his 7-Eleven parking lot, only to discover that he needed to adjust the way he thought about this advice:

My first go at it, I [chuckles] I probably had the most sparse renderings in the whole class because I was like "the point of this is to communicate the structure of the street so "less is more." I didn't put any cars in it. I didn't put any people in it. Because you know I was showing the built form of the street and then I show up to the critique

and everyone has like people playing Frisbee and totally populated with life, and I was like "well I guess I missed the point of this assignment" because I really thought that this was just "can you render this street as it exists?"

In other words, there was a fine balance that Jake needed to strike in this redesign project. While he had ably redesigned the space, he had not succeeded in designing the spatial scene. Without people engaging with a space there would be no way for an audience to understand how they—as potential users of the space—would engage with it or how it would engage with them. His instructor's feedback stressed that he populate the space with people to give an audience a better understanding of how the space would be used. In this way, the image that Jake created, incomplete without users, only became a rendering when he could show how individuals would interact with it.

Communicating this information visually is particularly important as we can see even more clearly from Lola's redesign. Without representations of residents using her redesign, exactly what the tables and chairs are doing in the middle of street would not be completely clear. Jake latched on to this important lesson about being able to re-present a vision of his space to the degree that he considered it to be the only thing that mattered in the class. "The actual redesign of the space," he mentioned, "doesn't matter as much as how you present it. The class isn't really about coming up with ideas as much as can you communicate them visually." However, that is not to say that generating actual ideas for redesigning spaces was unimportant, trivial, or an afterthought. To illustrate, early in her redesign process, in addition to making a pedestrian-friendly street, Lola wanted to remove the awnings that adorned the storefronts along the sidewalk. Lola felt that they all looked the same, which conflicted with the ethos of the space that she wanted to communicate; additionally, their small size meant that they did not necessarily provide enough shade or protection from the rain, thus making them a superfluous feature that could be removed easily.

As she found out, though, such an idea for a redesign conflicted with the actual work of planners. After beginning to remove the awnings through Photoshop, Lola spoke with her TA, who "told me to keep the awnings because they provided shade. In general as a planner, we don't want to remove elements, but rather to enhance them. Taking his advice, I abandoned this idea and kept the awnings." Although Lola disagreed with her TA's assessment of the utility of this feature, she kept the awnings, learning more about how a planner should think about design. So, while communicating a space visually is the focus of the course, learning to think like a planner-designer is also important.

Findings: The Spaces Between/ Gaps in the Assemblages

Certainly we can see how burgeoning designers rely on various elements when they set out to design. Much like Kathleen Blake Yancey and Stephen K. McElroy (2017) denote the web within which writers compose ("the Web designer, his markup languages, his editing program, his browser; the advertising executive, her products, her medium, her market"), we can see the assemblages that form for designing city spaces (the urban designer, her SketchUp software, her theoretical lens, her zoning code, her experiences). In this way, designers' assemblages proceed "from interrelated combinations of bodies, concepts, and ideas" (p. 7)

With that in mind, however, if assemblage theory "allows us to see and trace the assembled components and to map out how they work together, how they are related to generate a particular composition" (p. 7), then it also makes clear what might be missing from an assemblage as well. As we take a careful look at the designs crafted by these burgeoning design professionals, we can see that they lack attention to actual stakeholder considerations.

For example, redeveloping something as simple as a 7-Eleven parking lot would require a tremendous amount of input from several key public and private constituents. The 7-Eleven store would, obviously need to be consulted and their corporate owners would need to approve of any changes of that scale. The living wall that Jake included would also raise several questions about maintenance and upkeep from neighboring business and residents. When asked about a real-world redesign scenario, Jake noted that "local businesses may be concerned by the maintenance associated with the redesign elements, as well as potential pests that may try to make a home for themselves within the living infrastructure," which brings in a constituency of animals that his designs would need to account for.

Lola's design, in addition to requiring local business input, would certainly necessitate that city constituents such as the Mayor's office or public transit entities be involved in the design. Moreover, community residents would need to be consulted given that this change would create new traffic patterns for vehicles, bicycles, and pedestrians.

Yet none of these influences appear in the assemblages that go towards the construction of these renderings. I do not mean that they are solely absent from the maps that participants produced. As we have seen, even if a constituent is not present in the map, participants may still have referred to or alluded to them either in their reflections or interviews,

or they may have been mentioned in the syllabi. What I do mean is that at no point is the discourse that circulates within these private and public realms considered to act on the designs that are produced, with the exception of the zoning requirements in Ron's assemblage. Surely, design principles and theories are important pieces of a designer's assemblage as s/he undertakes the process of designing. That said, the lack of any community-centered constituencies signal that design and discourse are being compartmentalized and segregated, which could make having to learn how to integrate the two as professionals later on in their careers more challenging.

It may be tempting to argue that including discourses from real world sources is superfluous because these specific courses in which participants were enrolled focus principally on design. After all, such integration can happen once design students are out in the field. Yet, as we have seen, those in placemaking professions already struggle with how to negotiate between the various discourses that circulate in communities (Lees, 2004). This mirrors my own experience as well; when I have introduced myself as a teacher of technical communication to planners or asked about partnering up one of my technical writing courses with planning agencies, one of the first requests I receive is to provide them with tips to better communicate their information to a public that seems unable to understand the technical details of policy in transactional exchanges. To wit, the tools at designers' disposal seem little more than perfunctory methods of obtaining information. In one of our exchanges, Lola, who worked in a planning firm for a year and a half noted that:

> A lot of cities just go around to communities to get their opinions just to be able to say that they did and that doesn't mean that they will necessarily use that information. In my experience, there wasn't anything that was happening really after we did those surveys. The surveys that I mostly worked with were ridership surveys for our bus services. So from what I see whenever there is an open ended question, I would just enter it into an excel spreadsheet and it just sort of sits there. (see also Dryer, 2010)

Design charrettes, meetings wherein community members collaborate with planners to develop solutions for infrastructural issues that the community faces, are better at obtaining more complex information. However, as Moore and Elliott (2016) have recently pointed out, even here the concerns that community members might have often go unnoticed or get subsumed into larger points made by a majority of constituents. I raise these points to make the case that if planners are already finding it difficult to connect with constituents, learning design technology in arhetorical ways may only drive a wedge further separating them from community members.

While planners have started to learn to use design technologies, all of the planning student participants in my study enrolled in these design courses were being taught by architects. This makes sense given that planners themselves have only recently begun to return to design, but because architects are guided more by focusing on their creativity and meeting private client needs (Rowsell, 2013, pp. 97-100) rather than attending to communal equity, the focus of these classes seems to be more on learning how to use the technology rather than learning how to incorporate the public and private structures that planners must navigate through into technological renderings through. This priority of meeting client desires over working with community discourses can be a problem given just how much influence instructors have over the final design. As long as this work continues to be divorced from analyzing the discourses that circulate around a space, there will continue to be a separation between classroom and real-world work.

What is needed, much as Alexander and Rhodes (2014) argue regarding multimodal composition in writing instruction, is to contextualize design technologies and develop multiple strategies for adapting them to specific situations. In urban planning and in writing we can see how there has been a move toward the adoption of technologies that will help advance multimodal arguments. But rather than seeing these technologies as merely means to ends, we need to teach students to incorporate them as part of a larger assemblage—both as part of a design as well as within the context of the larger ecology in which their designs will circulate. For example, within urban design classrooms, students' assemblages reflect, among other elements, the affordances and constraints that make up their design pedagogy. Yet, by divorcing such classroom-based work from the assemblages that inform city space-making, we can see large gaps that make these designs incomplete. Technology, past experiences, and theoretical lenses can all play a role in redesigning a space, but without attention to the rhetorical dimension of design and design*ing*, students will be unable to meet the needs of a particular situation.

The benefit of these assemblage maps and the conversations that stem from them is that they reveal what is absent from design assemblages. More importantly, they reveal opportunities for CAC and DAC instructors and administrators to provide relevant instruction on rhetorical strategies for creating more robust designs. Within the context of urban design, specifically—or any similar field that incorporates spatial design technologies—opportunities exist for students to take more time getting to know what people in a community think about the space that students are attempting to

change, which would thus incorporate public concerns into assemblage maps and more fully prepare them for the debates that will arise when they are in the field. That is, if urban design renderings indeed showcase the "flow of competing discourse and imagery" (Pojani & Stead, 2015) then it is imperative that urban design students learn to make room for such complexity when they design. Students could read the local newspaper to see what types of comments have arisen regarding a space, or they could attend public meetings in order to listen to the concerns that people in the neighborhood have about a specific project. They could then engage in the difficult work of finding themes and patterns across constituents in order to make their designs more rhetorically robust, meeting the needs of a specific constituent and making design arguments for how they are prioritizing community voices. In doing so, paraprofessional urban designers can add another, more rhetorically appropriate layer to their designs—one that would be more attuned to the needs of those who will actually use the space.

Conclusion

That said, those of us who teach design technologies in a variety of fields and disciplines must, likewise, continue to ask ourselves whether we are creating opportunities to integrate design tools with real world discourses relevant for students. That is, when students learn design technologies, do our assignments lead students to not only feel like they have mastered a design technology but that they are also ready to delve into the messiness of designing with communities and multiple stakeholders where there may not be consensus. Bringing in assemblage theory can help to tease out these connections and to identify where students' designs do not contain traces of certain policies or constituents in any adequate manner. At the same time, students can make arguments to justify which voices they are prioritizing in their designs and provide a rationale for their choices. This leads to a rich discussion of accessibility, agency, and power. For instance, in my course on visual rhetoric, students have had to test out various principles of design to help remediate technical documents into a visual media. Rather than simply gain proficiency with Photoshop, students user test which principles are more appropriate for their particular context. After mapping out the different constituents that shape their assemblages, they write a report explaining what themes were evident in the feedback that they received, which voices and themes carried more weight for them, which they found difficult to accommodate, and why.

Laying out the assemblages that go into co-producing a design or a text can reveal important information both about what undergirds its composition, and also what elements are left out. If those elements are important enough to emphasize to our students and we think they will need to make sense of them in real-world contexts, we must make sure to find ways of incorporating them so that the final designs are robust and speak to the needs of stakeholders and larger community interests.

Acknowledgement

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