Political Economy in Introductory Technical Architecture Education: Experiences and Pedagogical Methods

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Abstract

Within the context of architecture school, technical subjects are often presented as separate, objective spheres of knowledge, divorced from socio-political concerns, theoretical critique, and even aesthetics. Sustainability is perhaps the only notable exception, but even here, the emphasis is often on quantifying how building systems and new technologies can reduce energy input rather than exploring the regulatory frameworks and political conflicts that shape our professional approach to energy conservation. While there is a renewed interest in architectural theory surrounding the political economy of construction sites, material supply chains, and labor, more work needs to be done by educators to bridge the gap between specializations.

This paper introduces an alternative pedagogical method for teaching building technology that I developed for an undergraduate architecture elective called "Construction and Design." I have taught this course for five years at the School of the Art Institute of Chicago, and its hallmarks are its incorporation of political economic critique and focus on technical know-how that even beginning students can readily apply.

I argue that building technology educators can enhance student learning outcomes and engagement in their courses by incorporating architectural theory focused on the political economy of building through Socratic dialogues, reading discussions, and even politically provocative lectures. By helping students understand the broader stakes and contexts that surround and condition technical knowledge, they become more likely to engage with it. Although it is too early to tell, the hope is that in the long term, this approach will also encourage students to participate in the political and regulatory processes (such as code development and administration) that shape and frame how technical knowledge is applied and developed.

I further argue that the political economy of academia and the building profession favors specialized expertise and discretized courses. While this approach is beneficial for advanced studies in architecture, it often leads to jumbled curricula where technical knowledge is introduced late in the program and results in poor learning outcomes. Therefore, I emphasize the significance of introductory course content that provide a heuristic understanding of building technology, particularly structures, that students can easily apply to their design studio work at all levels. This approach fosters a holistic understanding of construction and design and lays a stronger foundation for further advanced studies.

Background and Analysis

Running Before Walking

I was initially offered a class Construction and Design at the School of the Art Institute of Chicago (SAIC) in 2019. The course is an undergraduate elective in a pre-professional degree program aimed at juniors with some studio education under their belt. The course had an unclear role in the curriculum and I was more or less given carte-blanche to reinvent the class and build a new syllabus. My only starting point was the initial course description that formally exists in the institution's catalogue, which focused on teaching construction documentation and advanced digital manufacturing practices. The description was very general but I assume the initial instructor who developed the course had an interest in BIM technologies and the promise (hitherto unrealized in the wider world of architecture outside of niche applications) of closing the gap between drawing and manufacturing.

As I began working on my syllabus I approached the topic from the standpoint of student need. Across studio courses it was clear that undergraduate students at my institution were struggling to understand basic principles of building technology. It was clear from little clues in their studio projects that so many of the construction considerations that occupy a central position in the thinking of a working architect were totally absent for these students. They were struggling to rationally organize spaces and programs with structure and systems in mind. They were also finding it difficult to draw windows in plan and section, one signal among many that they had little understanding of how basic assemblies are built or function.

I observed that outside of what they may pick up in studio courses in bits and pieces, the first thorough interaction these students would have with structures, building enclosures, or systems, would be in NAAB-required technical courses, taught at the graduate level by engineers focused primarily on how to perform calculations and analysis. While in some senses these courses might start with "basics" like performing a free-body diagram analysis of a simple span beam, many students would be entering into that course with very little understanding of where that beam might exist in one of their studio projects. There seemed to be no place in the curriculum for students to learn broader principles of building technology in a focused way. Even if their technical courses were successful in communicating fundamentals they were coming too late to have an influence on students 'core understanding of what design is. We were asking students to run who couldn't yet walk.

Over and over again, I saw examples of how this paradigm was failing students. A student might make a gesture toward environmental friendliness by touting the employment of a geothermal heat-exchange system or some other advanced technique aimed at achieving sustainability while having limited to no knowledge about insulation.[1] Things became worse when I saw the ways that students were thinking through materials. In some cases, students were exploring novel materials and construction methods, such as 3D-printed buildings, but it was clear their investigations were hampered by a limited understanding of the economic context surrounding these "innovations," or how they meaningfully differed from more conventional operations. There was very little understanding of the relationship between structure and enclosure, and materials were generally treated as two-dimensional wallpaper like finishes applied to a pre-developed volume. Even talented students in their third or fourth architecture studio struggled to draw roof or wall thicknesses in any way that made physical sense. When it comes to the application of basic material knowledge at this level I certainly don't expect students to be precise but the extreme lack of any accuracy at all was concerning.

I'm speaking here from personal experience because these patterns may be unique to my institution. Indeed SAIC, has a far less structured undergraduate curriculum owing to its institutional history. That said, based on my experience visiting other schools for pin-ups, reviewing graduate program applications at SAIC, and discussions with colleagues, it feels correct to say that at a minimum, a majority of undergraduate architecture studios are not centering an understanding of architecture's physicality, and that in some circumstances, this creates a knowledge gap that puts an undue burden on technical courses. Perhaps more importantly if students are taught implicitly or explicitly that the physicality and construction of architecture is of secondary importance, they are far less inclined to treat technical courses as anything more than a distraction from the "real work" of the design studio.

Root Causes

We can speculate on the root cause of how this came to be. As Eric Lum points out in his essay "Conceptual Matter," contemporary architecture finds its basis in the adoption (dated to the 1970s) of conceptual art practices where the "dematerialization" of the art work and a focus on process are bound together with institutional critique.[2] As Lum points out, this dematerialization is problematic when applied to architecture, as gravity and function are core aspects of architecture as a medium. He further notes that the (mis)application of these ideas in architecture fetishized process and "premiated [a building's] schematic diagram and photogenic appearance, suppressing the material particulars of it's construction."

To anyone teaching architecture the consequences of this shift in the values of the discipline are manifest in most student pin-ups. Program and site analysis diagrams are the driving force behind much of the work and well-crafted 3D-visualizations are the marker of talent. In other words, where the architecture student of the 1950s might make meaning via baukunst (the art of building), the architecture student of today tries to produce it through a quasi-scientific process of "design thinking," mediated by analytic diagrams explicating the development of a project.[3]

Thus, students are in effect judged on their ability to create an air of objectivity and inevitability around their process, and thereby, the resulting proposal. While design studio briefs often take up important social issues as a subject matter the evaluation of a student's success in meeting the brief is not dissimilar to a salesman's ability to "sell me this pen" in a job interview. In other words, the emphasis on process in architecture school may have roots in conceptual critique but it finds its ultimate form developing the soft-skills necessary to be a successful market actor.[4]

The removal of the act of construction as a defining character of the medium of architecture has further function in the contemporary economy. As Douglas Spencer notes, "The work of building is of no concern to architects because the real work of architecture, as a commodity, is to positively express the abstract structures and concepts of neoliberal capitalism while mystifying its actual conditions of production [my emphasis]."[5] Spencer cites Zaha Hadid Architects BMW Leipzig's Central Building as a paradigmatic example, where all semblance of joints and seams have been rigorously erased as if the building was an immaculate birth from digital model to realized form.

The portion of Spencer's critique most relevant to this discussion is the observation that the conception and application of the act of building (and the associated technical knowledge) is structured by ideological forces that are inseparable from political-economy. In other words, if, as a rooting principle of our labor, the physicality of architecture seems to have melted into thin air, than the cause for such evaporation is likely to be found in how neoliberal capitalism is conditioning our core values as people and as architectural workers. While this subject merits further exploration beyond the scope of this paper we can quickly note that in certain corners of the architectural academy there is a renewed or at least expanding interest in materialist analysis of architectural production and its relation to political economy that holds great promise for helping us put our feet on the ground instead of our heads.[6]

With this analysis in my mind I took developing a syllabus as an opportunity to take some small corrective action appropriate to a single course (as larger corrective action would have to have an origin elsewhere). I envisioned something that could serve as the missing link for students between their studio classes, theory seminars, and the technical courses they would be taking later in their studies. Central to the conception of this course was the (perhaps old-fashioned) belief that a holistic approach to design results in better architecture. In other words, I felt that if we could equip students with a heuristic knowledge of structure and building performance that they would be more capable of integrating these considerations into their studio work and produce more compelling (or at the very least more plausible) projects. I wanted to see students develop tools for crafting architectural meaning beyond formal massing strategies and program diagrams. I wanted students to be entering into their more advanced studios with a belief that even a basic application of technical knowledge surrounding structures, materials, and enclosures was not a limitation on their ability to do creative work, but actually an expansion of their toolkit for making meaning.

Back to Basics

Naturally my first attempt at realizing these lofty goals was, from my perspective, a disaster (instructors who have developed a new syllabus will likely know the feeling). I had decided that a focus on detailing and wall sections would be the most productive way to help students conceptualize the material facts of construction that enter into the design process. After all, a wall section is an extremely consequential drawing in contemporary architecture. Done well, it can fold in philosophical considerations toward the act of construction and aesthetic values, while speaking to the physicality of assemblies and building performance. We read Ed Ford and looked at Atelier Bow-Wow drawings. However, it turned out that students had a hard time understanding what they were even looking at as we were examining precedents. Much to my surprise, we had to spend an inordinate amount of time decoding how hatches functioned in wall sections and where negative space in details indicated a void or cavity. While the student course evaluations were basically positive, it was clear I had missed the mark in meeting my goals.

On the second running of the course I took a much larger step backward in order to move forward. Realizing that there was much in the way of basic knowledge that students were not being presented with in other courses, I decided to devote much of our time to lectures, followed by quizzes, followed by practical exercises designed to cement in some way the material we had covered in the lectures. The course was split in half with one portion focused on structures and another focused on building envelopes. Subsidiary lectures would be sprinkled throughout the course on high-level understandings of MEP systems. I will go into further detail about the methods employed in this course later but for now suffice it to say that this was not pedagogical rocket science. However this back-to-basics approach was a departure from the norm in the context of my institution, where lecturing in any formal sense was regarded as old-fashioned or even parochial when employed outside the bounds of large introductory survey courses.

I quickly found that the students responded well to the lectures as they were eager to fill in what they perceived as blank spots in their understanding of architecture. They felt that the class was in-line with their expectations of what they would be learning in architecture school, in distinction to what they had been focusing on in the core curriculum. It became clear from in-class discussions that a large part of the reason students responded well to the course was because they felt it was helping their job-readiness. While I felt pleased that the students had gained significant knowledge from the course, I was once again disturbed that success of the course hinged on salving student anxieties over their job prospects. I had a suspicion that the students felt as though they had checked off a box, rather than had their worldview expanded.

I came to the realization that this was because the course had in some ways reified a distinction between the technical and other aspects of architecture that was already latent in the structuring of architecture school and perhaps the profession writ-large. This led to some reflection and writing in other outlets, including the essays “Against Employability” and “Insulation and Ideology” (both written for Berkeley’s Room 1000 journal), where I observed that the separation of technical skilling from questions of politics and poetics was detrimental to students developing a holistic and humanist understanding of architecture. The (false) rendering of the technical as a sphere of pure objectivity applied post facto in the design process occludes the deeply political nature of supply chains, material production, and building regulation. In other words, the separation of the technical into a discrete ontological category is a tool for mystifying the actual conditions of architectural production.

This observation resulted in a few changes to my priorities in the third syllabus which have proven to be successful, and which I will expand on in the next section. First, the lectures and delivery of fundamental knowledge would continue, but with a greater focus on helping students analyze (following Lum) how the aesthetics and meaning of a work of architecture are always already related to its technical realization. We would seek to collapse the technical as a category as often as possible by pairing a technical analysis of a precedent with a discussion of its meaning (especially if we were looking at something very conventional).

Second, I expanded the role of socratic reading discussions in the class to better help students develop a philosophical and critical disposition towards the technical as a category of knowledge. We would read history and theory (with a special emphasis on construction history) to understand that the socio-political stakes and context attached to the production and application of technical knowledge. We would have meta-discussions in class about how they were being taught to approach things like structure in their work and discuss where those approaches might be coming from sociologically.

Third, I continued to assign practical exercises to help students operationalize the knowledge about structures and building enclosure they were developing through lectures. We would build models and draw up wall sections but emphasize growing student confidence in their ability to deploy technical knowledge immediately in their studio courses for better learning retention and an enticement to not treat the technical as a specialist realm or afterthought.

Pedagogical Methods

The fully developed version of this syllabus is broadly divided into two halves.[7] The first half of the course focuses on structure, and the second half on building enclosure. Each half consists of several lectures (one a week) accompanied by a multi-week practical design exercise. After each lecture the students are assigned a quiz relating to the lecture topic for homework and a reading (typically unrelated to the specific lecture) to be discussed next class in a Socratic fashion. There are no quizzes or readings assigned during the practical design exercise portions of the class, but students are given some supplementary lectures on the topic of mechanical, electrical, and plumbing systems as well as a broad overview of how architects work with builders and consultants in the design process. I will address each of these course components in turn.

Structures Lectures and Quizzes

I am a strong believer that the first exercise in a class sets the tone for the semester. In this case, the first exercise of this third syllabus iteration is a good demonstration of the core mission of “Construction and Design” as a class. The lecture begins with a short lecture on the basic structural forces and their associated architectural elements. A long rectangular piece of upholstery foam with a grid drawn on it is used to physically demonstrate compression (walls and columns), tension (cables), bending (beams and floors), and torsion (tubes, which are mentioned but not dwelled upon). A thin metal ruler is used to demonstrate the concept of structural depth by bending it on its edge and on its flat side.[8]

From there we transition to the main portion of the lecture which consists of discussing the fundamental difference between trabeated/point-grid structural systems and load-bearing wall type systems. The vast majority of architectural structures are one of these categories or a hybrid of both.[9] Students are shown how these systems manifest in plans and are for homework asked to go to OnArchitecture, a wonderful video database showcasing noted works of contemporary architecture, and simply describe what type of structural system is being employed and how that structural system is influencing the aesthetics and disposition of the project. Students present their findings in the next class and we have a discussion that hinges on the fundamental inseparability of aesthetics and architectural form-making from structure.

The distinction between trabeated structures and load-bearing wall structures is also simple enough that students are able to immediately employ it in their studio projects, increasing the retention of knowledge. I often hear from other professors with concurrently enrolled students that my class is referenced as students are going through their design processes. We continue to build from there, talking about various materials and their structural properties. Steel lends itself to a trabeated structure, masonry toward load-bearing walls, etc. Bearing wall structures lend themselves to heavy, monumental buildings and trabeated structures toward light and airy frames. We further explore exceptions-that-prove-the-rule to these truisms as a means of discovering how designers can make clever use of the architectural tools (ie. windows, wall, doors, columns, etc) at their disposal to various ends. At every turn it is highlighted that the experience and meaning of a building is inseparably related to its material manifestation. This seemingly obvious point is again not rocket science but, as described above, can also present as a novelty in the current paradigm of architecture education.

After this first lecture, we work our way up. The second lecture discusses “footings and foundations,” the third “walls and columns,” and the fourth, “slabs, floors, ceilings, and roofs.” Each of these lectures is generally organized by material and, crucially, assumes very little prior knowledge outside of what has already been introduced in class. Great care is taken to avoid thinking that what is obvious to an architect with even a few years of work experience is obvious to an undergraduate student. The lectures make use of prepared slides but also leave plenty of room for student questions to take us on tangents that often involve using YouTube and Google Images on the fly to show relevant example constructions.

It is worth returning to a discussion of the quizzes to highlight how they are structured. The first section of each quiz consists of simple multiple choice and short response questions that are simply designed to ensure a student was taking notes and paying attention. The second section of the quiz is a “practicum” consisting of some short exercise designed to gauge the students ability to apply the knowledge delivered in a lecture. For instance, students might be asked to draw a quick plan of a building consisting of both load bearing walls and columns. The third section is a self-study portion where students are directed to some outside resource and asked to respond to it. Often, this self-study portion involves directing students toward a curated selection of YouTube videos produced by contractors—effectively allowing them to do a "virtual construction site visit" so that they can see and ask questions about how the systems and materials we are studying come to be as a result of applied labor.

The Structural Project

After the lecture portion has concluded, the students are asked to build a model of "an interesting structure" without the consideration of site or program. Although these rules seem somewhat arbitrary and mercurial to the students at first they without fail produce something interesting. The exercise itself proves the point to them that meaningful architectural work can be produced independent of site and program analysis. Some rough guidelines are put in place to keep projects at a reasonable scale.

Students are instructed to start by sketching some ideas and reviewing them with me before proceeding. In this ideation phase I take great care to delineate "interesting" from "spectacular" as many students first instinct when they think of "interesting structure" is one that defies, rather than embraces gravity. I often refer to projects posted on the website Divisare, which are typically highly structurally legible and simultaneously possess a certain elegant restraint and inventiveness.

Throughout the assignment we discuss the ways in which models are analogous to full scale structures (as well as the way in which they are not). At each phase of the project, and especially during the final review of the models, I am keen to emphasize to the students that they are conducting sophisticated structural thinking without the need for equations simply by applying their physical intuition and the broad structures know-how covered in the lectures.

Building Enclosure

The second half of the course covers building enclosures. The first lecture of this portion,"Principles of Building Enclosure," covers some of the basics of building science that are so fundamental to contemporary energy codes and are universally applicable to almost any project an architect works on. The lecture is framed around a discussion of control layers, going into detail on how contemporary buildings typically address precipitation, air leakage, thermal energy, and water vapor. We look at photos and diagrams of various wall assemblies and analyze, as a class, how they are performing.[9]

Although this particular knowledge set is not as readily applicable in studio work it sets the groundwork for the following two lectures which are on "Windows and Doors" and "Roofs" respectively. The "Windows and Doors" lecture introduces basics such as the distinction between punched openings, window walls, and curtain walls and how solar orientation and other site specific climatic factors impact a buildings energy consumption. The "Roofs" lecture goes into detail about the ventilation of building assemblies, the importance of insulation and the thermal envelope, and how drainage works on various types of roofs (particularly low slope roofs).

The practical design exercise component of this half involves drawing wall sections. I find this to be the most difficult thing to teach and have varied the method each running of the course to mixed results. Most recently, I have had the students design an enclosure for the structure they modeled in the first part of the class. We spend two weeks workshopping detail drawings in class. I start by having the student draw assemblies that are present in the classroom in small groups at full scale. I then have them study precedent details (it is here important to recommend high quality resources for detail drawings) and copy them as a learning exercise. I then walk the students through a typical design school process of developing their ideas before they present a final wall section at 1"=1 '

The goal here is not for them to produce professional level details but to go through the process of synthesizing material considerations and building science in an assembly. This is also the first time that these students have been asked to work at such a fine scale—accordingly students are instructed that the point is not perfection but to have a space to struggle through detail drawing for the time. I want them to have enough knowledge after this assignment to appreciate how difficult it is to create an elegant assembly that performs wall and be able to read detail drawings they may come across in further studies so that they have more opportunities to absorb that knowledge before diving head long into it once they get a job.

Folding in Theory

As was mentioned, alongside the lectures and accompanying quizzes students are also asked to read works of architectural history and theory that focus on the political aspects of construction and discuss them in class. Unlike the lectures which are developed in advance, readings (after the first one) are typically assigned based on how each socratic seminar unfolds, so there is a loose thread of inquiry connecting each discussion. The first reading typically assigned is Sergio Ferro's essay "Concrete as Weapon", which describes the adoption of concrete as a material in France during the Industrial Revolution, not as a process of technological (re-)discovery but as a means of breaking the powerful carpenters labor unions of the time. This reading is quite important in setting the groundwork for future discussions because it tells a wildly different story from the conventional wisdom of architecture history on the subject. Rather than an inevitable march toward progress propelled by technological innovation, we are introduced to a story of architectural technology being leveraged to political ends. Instead of a teleological progression of aesthetic styles students start to understand how a given architecture style is influenced by a given material culture, the resources available to it, and the given political-economic context of the moment.

While the reading list changes from year to year there are some frequently recurring works which I have listed to give an idea of the subject matter being raised in these discussions:[10]

Janet Ore's paper published by the Aggregate Architectural History Collaborative entitled "Workers ' Bodies and Plywood Production: The Pathological Power of a Hybrid Material." This paper discusses the impacts of plywood production on the environment and workers health. This paper is used to prompt discussions about how the supply chains of materials are often rendered invisible under capitalism and how the "stuff of building" must come from somewhere.

William B Rose's 1997 paper published in the APT Bulletin: The Journal of Preservation Technology "Moisture Control in the Modern Building Envelope: History of the Vapor Barrier in the U.S., 1923-52". This fascinating paper traces the development of building science around vapor and recounts the various lobbying battles waged by building material manufacturers to influence standards, codes, and research funding. This paper prompts discussions about how the development of scientific standards certainly involves physics and quantitive analysis but is nevertheless subject to market forces.

Nader Vossoughian's 2014 paper in Gray Room entitled "Standardization Reconsidered: 'Normierung' in and after Ernst Neufert's 'Bauentwurfslehre '(1936)" This paper discusses how standardization as a concept in capitalism is not just a matter of scaling production but also something that transforms subjectivity. This typically leads to a discussion of how frameworks like building codes and guidebooks are not simply rules or suggestions but active means of shaping consciousness and understandings of the world.

A Conclusion by Way of Curriculum

In my eyes, architecture's capacity to integrate poetry, social inquiry, problem solving, the technical and the beautiful into the act of building all at once is the better parts of human nature made manifest. And, if student course evaluations are any indication (they aren't always), I have been mostly successful in helping students develop a more holistic approach to architecture themselves.[11] However, the need for such a course points to potential failings in how architectural education is structured at this moment in time.

I have argued in this paper that our understanding of the technical is at the very least conditioned by political economy and that this must become a subject of our teaching. It is true too, that universities exist in this context and are conditioned by it as well. I suspect that a further root cause of the problems with introductory technical education lie in the way that novelty and specialized research propels research funding and prestige, and thus careers in academia. Specialized expertise will inevitably result in specialized courses and while there is undoubtedly a hugely important role for this type of knowledge production and propagation it must not eclipse a focus on teaching the fundamentals and a recognition that what happens in the first years of a student's architectural education is profoundly influential on their worldview.

Interdisciplinary pedagogy has long been a buzzword among architectural educators but as we have looked outward we seem to have overlooked the fact that the strings which hold the various aspects of our own discipline together are becoming unraveled. Ironically I have suggested that an interdisciplinary examination of political-economy can help us understand this separation and help our students make sense of it.

Going forward my hope is that we see more studios, courses, and curricula that focus on developing new approaches and understandings of prosaic and conventional materials, standards, and processes. If architecture (and by extension architectural education) is to have any role in addressing the significant social and environmental challenges that exist in the world we must directly engage with the status quo of the construction industry, not in order to embrace it but to understand how we might change and shape it, particularly with regards to the rules and regulations that have the potential to influence the huge proportion of buildings that are built without an architect.

We must also believe that the significant portion of our students who are destined to become work-a-day architects are capable of becoming political actors in their work-a-day jobs and that the right to shape the world is not the exclusive purview of those on the cutting edge of socially or technologically focused practices. As educators we can help prepare the ground for that possibility by showing how every act of construction, from a backyard shed to the Burj Khalifa, is shaped by social constructions. Our success in this mission is directly proportional to how effectively we teach the know-how that architects will use on a daily basis and how effectively we intertwine that knowledge with an awareness of its political import. It's impossible to understand the way things could be without understanding the way it is.

Notes:

1 I would encourage all faculty interested in a sustainable future to ask their students across all levels if they know what a batt is. I would wager that you would be shocked by the results.

2 Lum, Eric. “Conceptual Matter: On Thinking and Making Conceptual Architecture.” Harvard Design Magazine #19. 2003. p 4-13.

3 Ackermann, Rebecca. "Design thinking was supposed to fix the world. Where did it go wrong?.” MIT Technology Review. 2024, August 4. https://www.technologyreview.com/2023/02/09/1067821/design-thinking-retrospective-what-went-wrong/.

4 Ackermann, Rebecca. "Design thinking was supposed to fix the world. Where did it go wrong?.” MIT Technology Review. 2024, August 4. https://www.technologyreview.com/2023/02/09/1067821/design-thinking-retrospective-what-went-wrong/.

5 Spencer, Douglas. “The Architecture Of Neoliberalism: How Contemporary Architecture Became An Instrument Of Control... And Compliance.” Bloomsbury Academic: New York, NY. 2016. p74.

6 Some of the thinkers I am alluding to in this sentence include Spencer himself but also Aaron Cayer, Daniel Barber, Peggy Deamer, and Michael Osman, among others. We may also mention Sergio Ferro, whose writings are not necessarily new but a recent translation effort has made them more accessible to English speakers. Ferro’s essay “Concrete as Weapon” is core to my critical understanding of construction in relation political economy.

7 Special thanks should go to [Identifying Information Removed] who co-taught this course with me in it’s fourth running. Our collaboration took the class from good to great.

8 I should give some credit here to my graduate school structures professor [Identifying information omitted for review] who made extensive use of similar props in his lectures.

9 Other systems such as membrane type structures are introduced at this time, but not dwelled upon.

10 I expect that in the future I will also be frequently assigning readings from the most recent issue of the Harvard Design Magazine entitled “Instruments of Service.” The editors of this volume should be commended for assembling a wonderful compilation of papers that directly discuss the political nature of architectural production.

11 Course evaluations for this class have been extremely positive every year. In the most recent Fall 2024 running of this course the course received a near perfect score from students. While these results should be of course taken with a grain of salt, the qualitative feedback also included in these reviews strongly indicated student success in meeting the learning goals I have outlined here.