COMBINED STRATEGIES: VISUAL ANALYSIS AND SIMULATION
Studying Appropriation of Space

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I INTRODUCTION

Socio-physical dynamics is a complex network that is constantly changing within emerging technologies. Thus, for architecture as a humanistic discipline to progress, it is important not to repeat conventional research methods, but to question them and conduct new ones. Since architecture is an extensive field that covers various problematics on different scales, followingly it considers a broad variety of methods. Consequently, an architect should be epistemological aware of various research systems in order to employ and benefit from them. Understanding how different methods predetermine the project approach and how data is analyzed and represented helps to carry out investigations in a productive way. Additionally, in order to gain intellectual independence and direct architectural discussion towards growth, it is necessary to study organized systems of ideas and not to stick only to one episteme.

This course introduced me to the new research methods that I was unfamiliar with and encouraged me to critically evaluate methods to which I have been affiliated by my previous school. It also helped me realize that none system of knowledge is better than the other, every approach influence the study of data differently within various topics and results in different findings. However, the selected method preconditions the angle throughout which the problem is approached and then solved within the design proposal, thus the system of inquiry has to be developed sophistically and well-grounded. It is important to raise methodological questions such as what instruments I am going to use and why in order to develop specific solutions for the design process in return.

Even though the course reflects on different systems of knowledge that are prevailing in architecture education, the thing that fascinated me the most was the critique towards architecture as a corroborative practice meaning it to be right in the solution of practical problems. In today's education, design process evolves in a linear canonic way - you are expected to identify the findings of site analysis as some kind of law or principle that you will try to embody in your design. This suggests that there is correct and incorrect architecture depending on whether it translates that formulated principle or not. I would agree to Jorge Mejia's statement that architecture should be understood as a cognitive practice – a produced knowledge of the built environment that allows test and explore limits of it.[1] Furthermore, architecture is a collective practice, thus it develops in terms of knowledge by the contribution of the individuals who participates in it. It is an active communication, not necessarily suggesting right or wrong solutions.

The research methods discussed in this essay are part of the graduation studio "Spolia" of the Urban Architecture MSc3. My individual interest focuses on the phenomenon of appropriation of the space - the way people inhabit and claim the space. Analysis of the appropriation process in various places results in "localization" of a certain context.[2] Studying this multidimensional concept could help to engage and intervene responsibly within the site-specific situations and inhabitants. Since the appropriation of the space usually emerges from the physical environment and cultural context, it was important to study all of those conditions. To reach this, the group work was being done until P1. Sofia Montalti, Michelle Ho and I examined the architectural language of façades around the site and the ways people inhabit them. The research questions were being raised as such: what are different processes of appropriation present around the site? How architectural language influence different modes of appropriation? The scale of the research was examining one street with a zoom-in of one house. Street of Rue des Bassins, adjacent to the given plot, was chosen to be analyzed because of its mixed typology buildings and due to its duality. The northern side which was considered as residential was more stable meaning that not much rebuild was going on, while the southern part was a combination of industrial buildings and residential and more rebuildings reoccur. The combination of two methods was chosen to examine this: visual analysis and simulation research. Realizations about architecture as a cognitive practice helped me not to push my research towards corroborative trajectory, but be open in terms of the conclusions I will receive. I looked at it as an exercise to acquire architectural knowledge which I should with others without putting pressure on it as being right or wrong.

II RESEARCH-METHODOLOGICAL DISCUSSION* (ca. 500 words)

Ray Lucas argues that multiple research methodologies could result in inconsistencies[3], while John W. Creswell states that certain types of problems call for mixed methods because employing only one is simply not extensive enough.[4] In the problematique of appropriation, a combined research strategy was chosen in order to avoid simplifying the social phenomena of the design and identify causal links between architecture and various processes of appropriation. The topic of architecture language was examined within the visual analysis, meaning that the research was context-led and could be considered as a quantitative approach. At the same time, appropriation was being studied throughout simulation which was a subjective qualitative approach. However, the dichotomous framework could be misleading, states Groat and Wang, because it predetermines the level of tactics and requires a particular methodology.[5] To avoid this, they suggest a three-part continuum (Fig. 1) of research paradigms, consisting of positivism, intersubjective and constructivism.[6] The critique towards selected methods could be described taking into consideration both methods separately the same as looking at it as uniform mixed-method.

Objective ← → Subjective

	Positivism/Postpositivism		**Intersubjective**	**Constructivism**	
Epistemology	Knower distinct from object of inquiry	Knowing through distance from object	Knowledge framed by understanding sociocultural engagement	Knowledge co-constructed with participants	Knowledge perpetually provisional
Ontology	Assumes objective reality	External reality revealed probabilistically	Diverse realities situated in sociocultural context	Multiple constructed realities	Infinite realities

Fig. 1. Continuum of research paradigms. Table courtesy of Linda Groat and David Wang.

To study architectural language, the formal visual analysis of the facades of the street was being chosen. The constantly changing street attached to the assigned plot was being studied as a case. Both sides of the street were photographed, measured and traced in order to study the compositional logic, proportion, façade elements, and their evolution. (Fig.2) Proportions were measured as such: building's height/width, roof's, middle floor's and plinth's height/width, height and width of the openings and its position within the façade's surface, horizontal and vertical rhythms of the face. It was important to study this topic in order to understand how the street works as an assemblage and how unity or fragmentation is being reached. Cataloging architectural elements, looking at their composition and proportions demonstrated the vocabulary of diversity the same as identified the "shape grammar" that formed a wholeness. Additionally, the topic was the starting point for understanding the socio-physical relationship within a zoom-in of one house. According to Groat and Wang three-part continuum research matrix, the visual analysis could be positioned under positivism, because the artifacts could be objectively described. However, this type of method made the research two-dimensional. Another disadvantage was that we only defined the components, but did not look at relationships between those elements and processes how they were being composed. I assume that it would have made the research more extensive, not just set the base for studying the concept for appropriation. Nevertheless, studying composition helped us indicate the hidden architectural rules to follow for our interventions.

Fig.2. Visual analysis – façade proportions. Diagram made by the author in collaboration with Sofia Montalti and Michelle Ho.

To study appropriation the simulation method was chosen because due to the lack of available data. Simulation, as described in a dictionary, is “imitation or enactment, as of something anticipated or in testing”.[7] This method could be considered as qualitative, because data sources were interviews (both interactive face-to-face and online data gathering) and observing in situ artifacts, photographing them. However, it was important to reduce data by extracting the information that is relevant to understand the way people live inside the house. This step was rather subjective because the decisions were made in terms of personal understanding of what can indicate the way people live behind the facade. Thus, in order to reconstruct how people appropriate their houses, interview data, photography and built form material were combined. This resulted in comparative drawings (before and after appropriation) of the façade, section and plans, and sectional model. (Fig. 3) The main critique of this method is accuracy because it gives wanted and predictive outcomes, however, the simulation os useful in order to predict possible behavior and possible appropriation. Notations to the results were added in order to make the outcomes more explanatory.

Combining both methods helped to identify causal links between the built environment and social practice. As Crano and Brewer stated, simulation is helpful when the theory is being developed.[8] In this case, it helped to examine how the physical environment triggers various ways of living. In my opinion, the simulation method is useful the most when combined with another method, because alone it gives wanted results and it is extensively subjective, while combined it uncovers unexpected patterns and conditions.

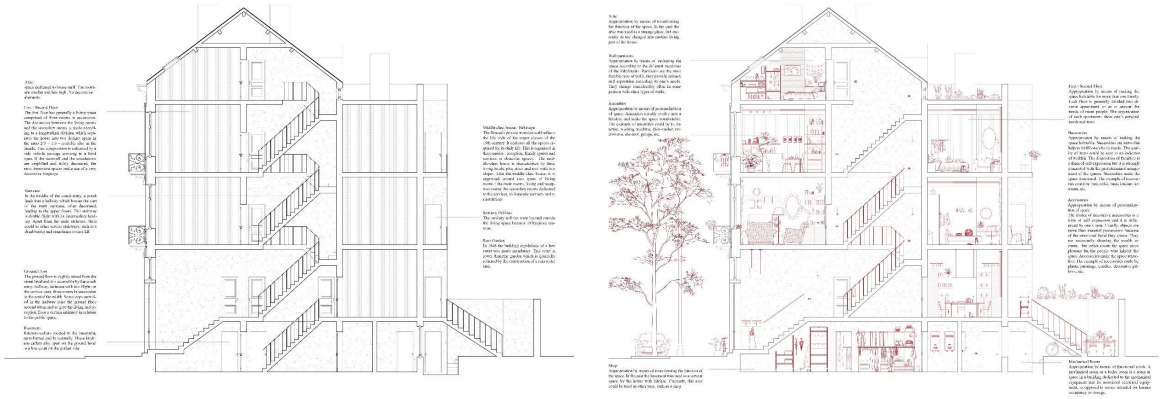

Fig. 3. Comparative drawings. Architectural language (left) and simulation of appropriation of space (right). Diagram made by the author in collaboration with Sofia Montalti and Michelle Ho.

III RESEARCH-METHODOLOGICAL REFLECTION

In order to reflect how visual analysis and simulation inform specific problematique, it is useful to indicate how various researchers employed those methods. Studying façade elements, its proportion and relations have been a relatively old concern in architecture. Laws of proportion that help to form various objects into a whole were discussed by Marcus Vitruvius Pollio, Leon Battista Alberti, Andrea Palladio, Le Corbusier among others. More recently, the method has been used as a tool in order to indicate how architects can reach the contextual fit when designing the new infills. Yun Hu et al used the mathematical quantitative method in order to evaluate how new interventions fit in the existing historic context.[9] The case study was done of the "Dancing House" building in Prague, Czech Republic. The building data was collected related to size, proportion and colour by taking pictures at the same time of the day with the same equipment. The data has been analyzed using mathematical synthetic indexes and formulas in order to give as much objective results as possible. Furthermore, the weights of all factors were calculated by using analytic hierarchy process.[10] Another researcher Fernando Lara used formal visual analysis of the facades to address the question of how Modernism in Brazil affected the architecture of middle-class houses in the 1950s. 460 houses were analyzed based on quantitative documentation of the façade elements. Additionally, multiple data sources such as archival information and interviews added another layer to research about the building techniques.[11] In this way, cultural influences were linked to a physical context.

Architectural project could be considered as a simulation itself. Wang and Groat state that architectural drawings, three-dimensional models, renders are representations, but if it is able to collect data from such representations, then the simulation is taking the place.[12] Since due to the cost limitations and potential to cause danger if failed, it is usually impossible to make full-scale mock-up models. Advances in technologies allowed to simulate many necessary factors through which researchers can indicate "patterns and projections of possible behavior".[13] Simulation technique is usually used in historical research. Anne Kelly Knowles et al combined tool such as GIS database and archival photographs in order to collect data for simulating the urban environment at Auschwitz and studying the experiences of the prisoners.[14] CAD was used for building up three-dimensional models which later resulted in dynamic maps. This is also an example of how mixed tactics (simulation and historical research) can benefit from each other. Other researchers Toby E. Morris et al used simulation technique – Finite element analysis (FEA) - to prove that ornamental tracery on the Herland's trusses of Westminster Hall in London actually are structural elements not only serving for aesthetic purposes.[15] Researches simulated "what if" scenarios with and without tracery in order to indicate bending moments and conclude the function of tracery. Combined strategies, in this case, revealed interesting insights about the formal and aesthetic issues in a historic setting.

IV POSITIONING

Research that is conducted using a combined strategy could be understood as a bricolage, as stated by Denzin and Lincoln.[16] As quoted by Matt Rogers, they suggest that "the combination of multiple methodological practices, and empirical materials, perspectives, and observers in a single study is best understood, as a strategy that adds rigor, breadth, complexity, richness, and depth to any inquiry".[17] This is much related to the studio position. The main topic of Spolia is tightly linked to the concept of bricolage which refers to the capability of working with material that is constructed with different substances.

The critique towards selected methods could be as such: one could say that simulating appropriation of a single typical Belgian house gives a general view on the complex socio-physical network that is intended to be studied. Due to the given time, it was impossible to simulate appropriation in other typologies. Additionally, since it was impossible to enter any house physically, it was important no to

lower the depth of the study. For this, many interviews were conducted that helped to understand the thoughts and patterns of the locals. However, due to the language barrier, the depth of the data could be missing.

Both of the mentioned researches of visual analysis are at the same time case studies because of the focus on a specific place. It is important to draw attention that the researched topic is influenced by the context, especially, when studying proportion is much related to aiming for a contextual fit, thus buildings are evaluated in terms of their relation to the existing urban setting. In comparison with Hu et al. research methodology of quantitative analysis, our research was not that extensive in terms of mathematical indexing and did not provide an accurate rational reference. Additionally, in our research, the colour was not examined because it was considered relatively less influential than other factors to the different modes of appropriation. However, both researchers conclude that new buildings draw inspiration from the neighbors which was also one of the conclusions of our research.

Combined strategy helped us to link architectural language with the processes of appropriation in order to understand the identity and traditions of the place. The conclusion was drawn that the level of appropriation is tightly connected with the architectural typology, ownership, and usership. If the user has a feeling that space belongs to someone other than oneself, this results in the alienation of the facade and the space around it. However, the research was limited to the visual complexity analysis, which helped to identify the changes in dwellings made by occupants, but no deeper level of studying economic, technical, technological or social conditions has been conducted.

The selected methods and the researched topic could be linked with the praxeology that was discussed during the course. In order to study users, it is not enough to position yourself to be the observer (etic), it is important to employ the emic approach. In this way, appropriation is considered not only in the final stage of the design but always goes parallel in every step of designing.
Furthermore, within the development of technology, for architect, it is not only important to use simulation as a representational technique but to understand its capabilities to serve as data for studying complex socio-physical networks.

[1] Jorge Mejia Hernandez, “Transactions; or Architecture as a System of Research Programs” (Delft University of Technology, 2018).
[2] Kaj Noschis et al., “Appropriation of Space: A Method and Two Case Studies,” *Ekistics* 45, no. 273 (1978): 451–66, http://www.jstor.org/stable/43623631.
[3] Ray Lucas, *Research Methods for Architecture* (London: Laurence King Publishing, 2016), p.11.
[4] John W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Thousand Oaks, California: SAGE Publications, Inc., 2009).
[5] Linda N Groat and David Wang, *Architectural Research Methods*, Second edi (Hoboken, New Jersey: Wiley, 2013), p.72.
[6] Groat and Wang, p.76.
[7] Dictionary.com Unabridged (Random House, Inc.), s.v. simulation. http://dictionary. reference.com/browse/simulation. Accessed December 09, 2019.
[8] Willam Crano and Marilynn Brewer, *Principles of Research in Social Psychology* (New York: McGraw-Hill, 1973).
[9] Yun Hu et al., “Using Quantitative Analysis to Assess the Appropriateness of Infill Buildings in Historic Settings” (Tianjin, China, 2017).
[10] Hu et al.
[11] Fernando Lara, “Popular Modernism: An Analysis of the Acceptance of Modern Architecture in 1950s Brazil.” (University of Michigan, 2001).
[12] Groat and Wang, *Architectural Research Methods*.
[13] Groat and Wang p.360.
[14] Anne Kelly Knowles, Tim Cole, and Albertp Giordano, *Geographies of the Holocaust* (Bloomington: Indiana University Press, 2014).
[15] E. Toby Morris, R. Gary Black, and Stephen O. Tobriner, “Report on the Application of Finite Element Analysis to Historic Structures: Westminster Hall, London,” *Journal of the Society of Architectural Historians* Vol. 54, no. No. 3 (1995): 336–47.
[16] Norman K. Denzin and Yvonna S. Lincoln, *The SAGE Handbook of Qualitative Research*, 5th editio (Los Angeles: SAGE, 2018).
[17] Matt Rogers, “Contextualizing Theories and Practices of Bricolage Research,” *The Qualitative Report* 17, no. 48 (2012): 1–17, p.4.

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