THE INFLUENCE OF ARCHITECTURAL DESIGN ON SAFETY IN THE IRREGULAR SETTLEMENTS OF SÃO PAULO

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Definitions

Autoconstruction

The process of workers building their own houses and expanding or upgrading them over time (Caldeira, 1996a).

Squatting

The process of occupying and building on the land of which the builder does not hold a legal status (Bhan, 2019). After five years of squatting, Brazilian law (Art. 183) assigns ownership of the land to the squatter (Constituent Assembly, 2022).

Favelas

The Portuguese word for slums. The municipality defines the term as: *"Precarious settlements that arise from spontaneous occupations carried out in a disorderly manner"* (Prefeitura de São Paulo, 2017).

Irregular settlements

Settlements that are less temporary than the favelas, but also lack a legal status: *"Settlements in which the occupation took place based on the initiative of a promoter or commercialization agent, without prior approval by the responsible public bodies or, when approved or in the process of approval, implanted in disagreement with the legislation or with the approved project"* (Prefeitura de São Paulo, 2017). Instead of timber, their building materials often consist of concrete and brickwork.

Enclavement

"Fortified enclaves are privatized, enclosed, and monitored spaces for residence, consumption, leisure, and work" (Caldeira, 1996b, p. 1). 'Enclavement' is the process of turning a public space into an enclave.

Peripheral urbanization

The process of city-making occurring in the peripheral areas of urban regions. It is related to a specific time and place and builders engage in politics to claim land (Caldeira, 2017).

Figure 1. Front page: fence courtyard Chácara do Conde, Grajaú.

Introduction

Walking through the streets of São Paulo, Brazil, one should constantly reevaluate the safety of the ongoing situation. During a two-week field trip to the city, we frequently ran into residents providing us with unsolicited advice on how to safely get around. Coming from a Dutch suburb where criminality is almost non-existent, this constant assessment of risks was a completely new situation for me. In my mind, my experiences in Brazil will forever be associated with safety, and it also makes me wonder how a safer future for the Brazilian megacity can be achieved.

In Grajaú, a peripheral neighborhood of São Paulo, the municipality has started transforming irregular settlements into social housing complexes as part of the *Programa dos Mananciais* (Portuguese for *Watersheds Program*) (ISA, 2008). Chácara do Conde is the first project to be completed, and therefore can be considered an example for the other transformations to be realized. In the design of Chácara do Conde, large fences have been put around the shared courtyard to create a feeling of protectiveness. This trend of enclavement is visible all over the city, with gates, security guards, and CCTV separating the lives of inhabitants in hope of a safer living environment (Coy, 2006). This trend also leads to further segregation though (Caldeira, 1996b), and one can wonder whether this is desirable, in a city that is already highly segregated.

Over the past century, various architectural theoreticians have touched upon the relationship between architecture and safety. Although there is no consensus on a single method to design a 'safe' neighborhood, various design concepts are offered that deviate from the concepts implemented in the Chácara do Conde project. In this thesis, the relationship between architecture and safety in the context of the Grajaú neighborhood is analyzed. Through this analysis, an alternative design for transformation projects in Grajaú is explored, that can hopefully offer safety to its inhabitants, as well as prevent further segregation of the city.

ENCLAVEMENT ALL OVER SÃO PAULO

Figure 2. Courtyard Chácara do Conde, Grajaú.

Figure 3. Conjunto Celso Garcia.

Figure 4. Parque Novo Santo Amaro V.

Figure 5. Gleba A Heliópolis.

Problem statement

São Paulo has to deal with a big shortage of affordable housing and a widespread feeling of urban unsafety, causing a growing percentage of public spaces to be enclaved, thereby adding to the segregation of its community.

Worldwide, one billion people lived in urban slums in 2020, as reported by the UN (United Nations) in their *Sustainable Development Goals Report* of 2022. Intensifying focus on providing adequate and affordable housing is the first step in achieving SDG number 11, *"Make cities and human settlements inclusive, safe, resilient and sustainable"* (UN, 2022, p. 18).

For decades, Brazil, the largest and most populous country in Latin America at 215 million inhabitants (CIA, 2022; UNFPA, 2022), has been known for having a large urban precarity, alongside having one of the highest income inequalities worldwide (Marques & Saraiva, 2017). In 2018, 16% of the urban population of Brazil lived in favelas (The World Bank, 2018), despite the right to adequate housing being included in the Brazilian constitution (Constituent Assembly, 2022). The creation of the favelas can be traced back to massive urban migration when Brazilian cities started to industrialize, with the urban population growing from 18 to 82 million between 1950 and 1980 (Fix & Arantes, 2021). A large part of the migrants did not manage to find a home in an official settlement or a job with a sufficing wage, therefore, they were forced to squat (Fix & Arantes, 2021), a process that is well-known in other cities in the global South as well.

São Paulo is with its 22.4 million inhabitants the largest city in Brazil and is considered its economic center (CIA, 2022; Marques & Saraiva, 2017). The city is also known for its housing problems though (Marques & Saraiva, 2017). This situation brings forth social, economic, and environmental challenges for both the inhabitants and the entire metropolis (Walker & Alarcón, 2018). To deal with this, the SEHAB (*Secretaria de Habitaçao* - Portuguese for *Housing Secretariat*) has been investing heavenly in improving the living conditions in irregular settlements, favelas, and watershed areas since

2005 (Serapião, 2016). There is still a long way to go though, with the number of households in favelas and irregular settlements being estimated at almost four hundred thousand each and the slum dwellers making up 11.6% of the population in 2017 (Prefeitura de São Paulo, 2017; Marques & Saraiva, 2017).

In Grajaú, one of the poorest and most populous neighborhoods of São Paulo (São Paulo Data-Driven Envirolab, n.d.; Pinheiro, 2021), the municipality had to remove the inhabitants of 5000 irregular lots in 2008 as part of the Cantinho do Céu project (Lara, 2019). The former settlements of the inhabitants were built within close vicinity of the waterfront of the Billings reservoir, one of the two large water bodies of São Paulo providing the city with drinking water (Lara, 2019). Due to a lack of sewerage and waste collection, the inhabitants were polluting the water of the reservoir (Lara, 2019). To relocate these inhabitants, as well as be able to provide space to the influx of residents, the neighborhood is in serious need of adequate housing that is affordable for the lowest-income groups. Though, development is lagging due to a lack of economic incentives – a trend that is visible all over São Paulo (Ribeira et al., 2016).

At the same time, Brazil has been dealing with crime and violence for decades. As a data analysis by Murray et al. (2013) shows, there were 1 million homicides in Brazil between 1980 and 2010. According to their research, these high numbers stem from *"rises in inequality, more young men in the population, greater availability of firearms, and increased drug use"* (p. 1).

Since the 1970s, gated housing communities have appeared in various Latin American cities, as noted by Coy (2006). Coy states that at first, gated condominiums were designed as exclusive housing projects that offer a more distinct contrast between private and public. These first projects were taken as examples for designs of future housing complexes (Coy, 2006). With crime and violence rising in the following decades, gated condominiums became more popular for the middle and upper class (Murray et al., 2013; Coy, 2006). The physical barriers became a symbol of wealth, thereby leading to further segregation of Brazilian communities (Caldeira, 1996b).

From 2017 to 2020, the number of homicides in Brazil has finally been dropping, by 29% (Worldbank, 2022). What remains though, are fear, psychological health problems, and injuries (Andrade et al., 2012; Gawryszewski & Rodrigues, 2006). These might well have an impact on Brazilian communities for decades to come. The Chácara do Conde project in Grajaú is an example of this, with the design setting a standard of enclavement for future transformation projects in the region.

SETTLEMENTS IN DIFFERENT PARTS OF SÃO PAULO

Figure 6. Irregular settlements near Cantinho do Ceú.

Figure 7. Irregular settlements along the Billings reservoir.

Figure 8. Dump site along the Billings reservoir.

Figure 9. Irregular settlements in Heliópolis.

Figure 10. Irregular settlements in Santo Amaro.

Figure 11. Favelas in Grajaú.

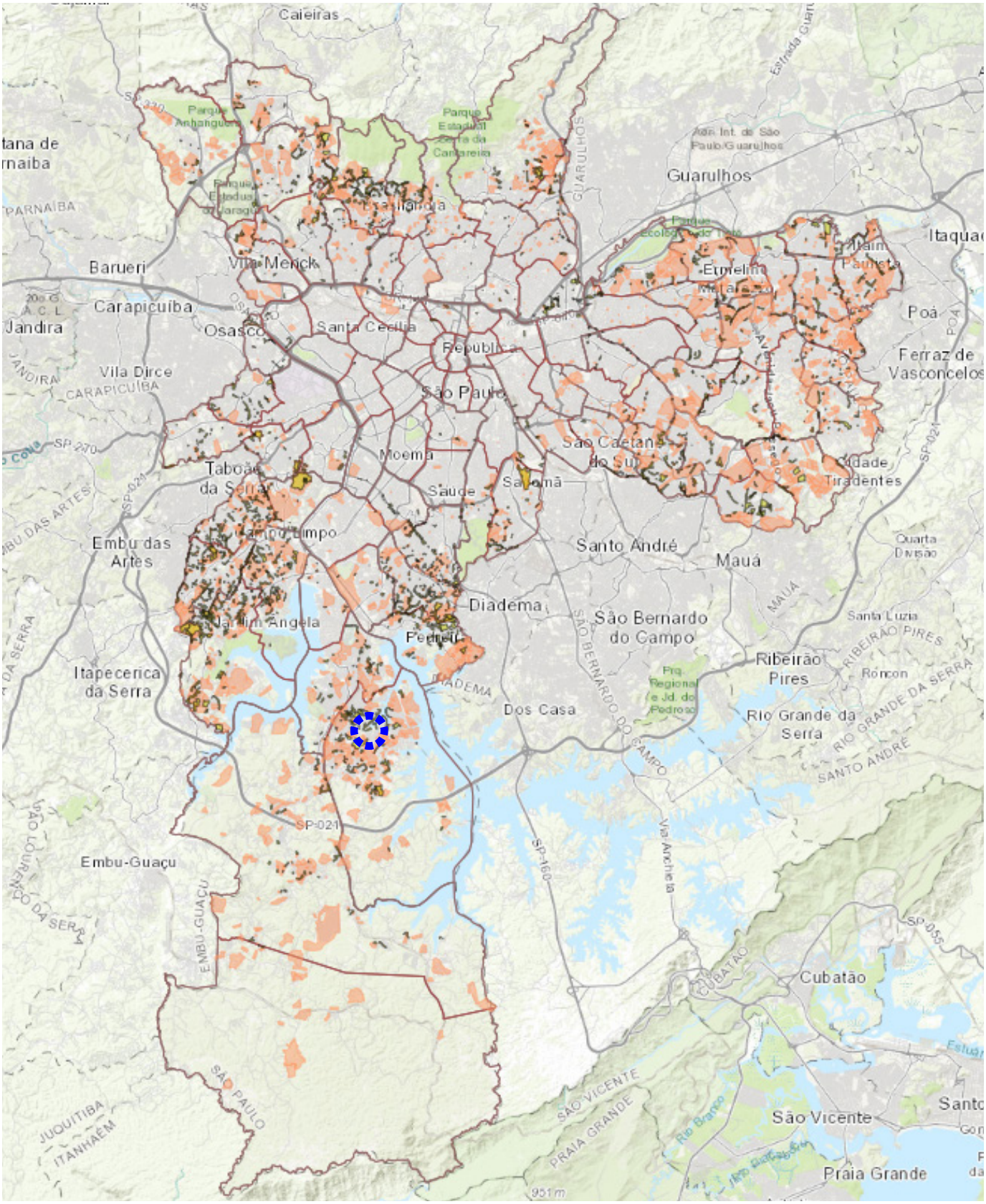


Figure 12. Map irregular settlements in São Paulo (Prefeitura de São Paulo, 2017).
Favelas marked in yellow, irregular settlements in orange, project site demarcated in blue.

Research question

In this thesis, the relationship between architectural design and safety is studied, to explore an alternative design for the transformation projects in Grajaú. An alternative design that can hopefully offer safety to future inhabitants, as well as prevent further segregation of the city. The following research question and sub-questions will be used:

How can architectural design positively influence safety in the irregular settlements of São Paulo?

i. What forms of safety are there and how do they influence the lives of the inhabitants of the irregular settlements of São Paulo?

ii. How can urban patterns and amenities positively influence safety in the irregular settlements of São Paulo?

iii. How can the street profile positively influence safety in the irregular settlements of São Paulo?

Theoretical framework

In the global north, a lot has been written on the relationship between architecture and safety. Jacobs her *The Death and Life of the Great American Cities* (1961), Jeffery his *Crime Prevention through Environmental Design* (1971), and Newman his *Defensible Space* (1972) all remain frequently quoted in research on the subject. Over the past decades, new research has mostly been on testing or elaborating these theories, like the works by Macdonald & Gifford (1989), Newman (1996), Tijerino (1998), Ham-Rowbottom et al. (1999), Brunson et al. (2001), Sennett (2019), and Cozens et al. (2019). Reynald & Elffers (2009) point out that Newman his defensible space theory still is largely ambiguous, especially when taking into account the amendments he made after applying the theory in three experiments in the United States (Newman, 1996). Furthermore, a critical review by Cozens et al. (2019) proves that architectural design based on Jeffery his theory is largely effective in reducing both crime and fear of crime in a community. The fact that CPTED (Crime Prevention through Environmental Design) guidebooks and classes are offered still, shows the lasting relevance of his work.

Urban areas in the global south, and more specifically São Paulo, present a context totally different from that of northern cities. Even terminology and fundamental societal processes should be reconsidered when trying to grasp this context, as argued by among others Caldeira (2017), Medrano and Recaman (2018), Lejano and Del Bianco (208), and Bhan (2019). Examples of this are the definitions listed on the first page of this report.

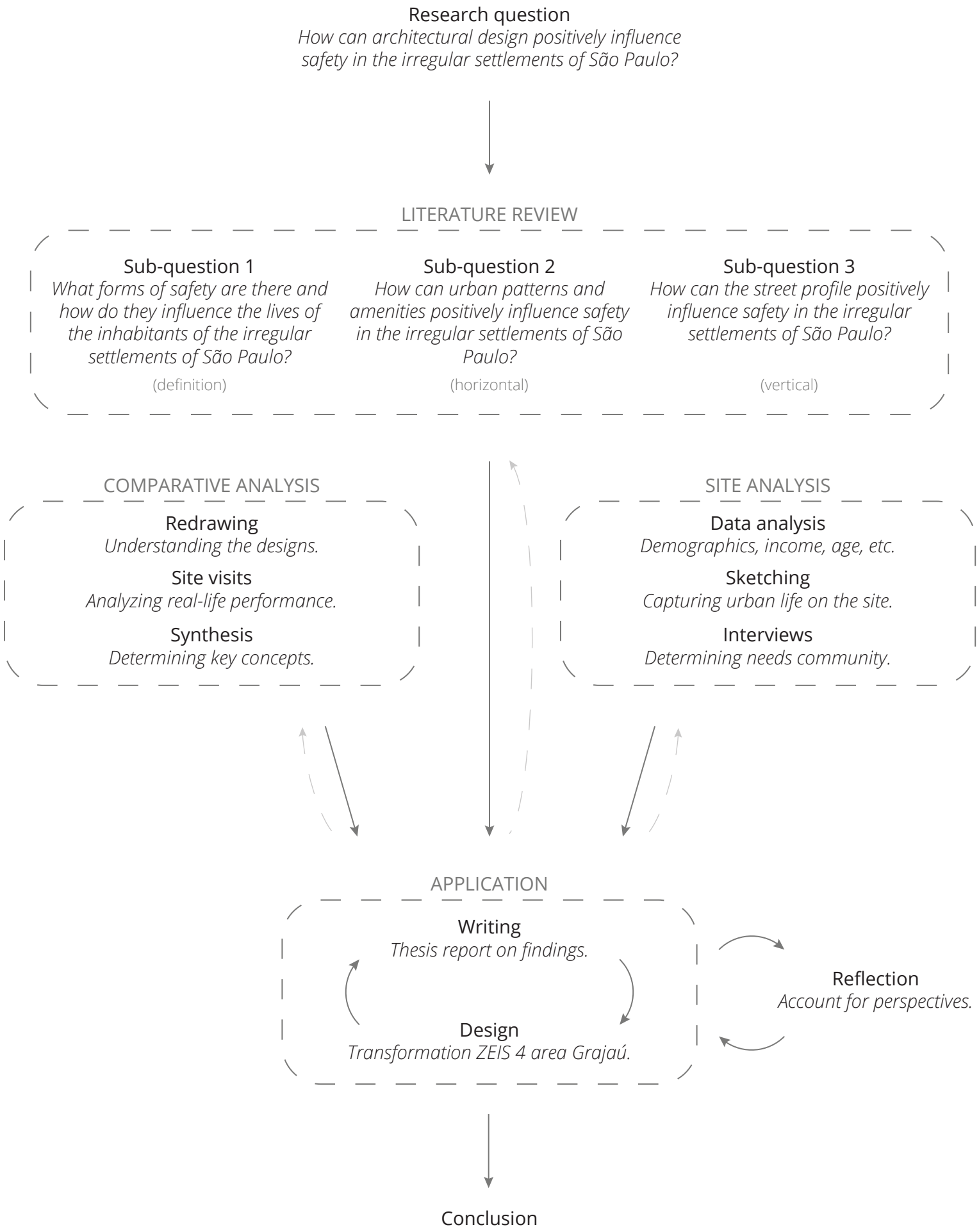
Methodology

The first part of the thesis will be analytical, for which literature is reviewed, a comparative study of other transformation projects is made, and the site is analyzed. During the second part, the takeaways from these analyses are applied and tested in the design of a transformation project in Grajaú to answer the research question. The design is made in a ZEIS 4 area, meaning unoccupied land designated to develop social housing with environmental restrictions. The site is marked by low socio-economic values and a high density compared to the rest of Grajaú (Prefeitura de São Paulo, n.d.).

For the literature review, books and articles on the relationship between architecture and safety from the 1960s until the present are dealt with. From these, an overview of design interventions is made, which can be tested in the design phase of the project.

A comparative analysis between five transformation projects in irregular settlements in São Paulo and Chácara do Conde will be made to determine how architecture influences safety, focusing on the three themes covered in the sub-questions.

During the field trip in October, these five cases and Chácara do Conde have been visited. At the sites, visual analyses have been made and interviews have been held. The visual analyses cover manifestations of public life, typical design features of the area, and safety measures taken by inhabitants. The interviews give an insight into how residents experience the projects. Though, with these interviews, biases and social limitations should be considered.


Research question
How can architectural design positively influence safety in the irregular settlements of São Paulo?
LITERATURE REVIEW
Sub-question 1
What forms of safety are there and how do they influence the lives of the inhabitants of the irregular settlements of São Paulo?
(definition)
Sub-question 2
How can urban patterns and amenities positively influence safety in the irregular settlements of São Paulo?
(horizontal)
Sub-question 3
How can the street profile positively influence safety in the irregular settlements of São Paulo?
(vertical)
COMPARATIVE ANALYSIS
Redrawing
Understanding the designs.
Site visits
Analyzing real-life performance.
Synthesis
Determining key concepts.
SITE ANALYSIS
Data analysis
Demographics, income, age, etc.
Sketching
Capturing urban life on the site.
Interviews
Determining needs community.
APPLICATION
Writing
Thesis report on findings.
Design
Transformation ZEIS 4 area Grajaú.
Reflection
Account for perspectives.
Conclusion

IMAGES OF THE PROJECT SITE

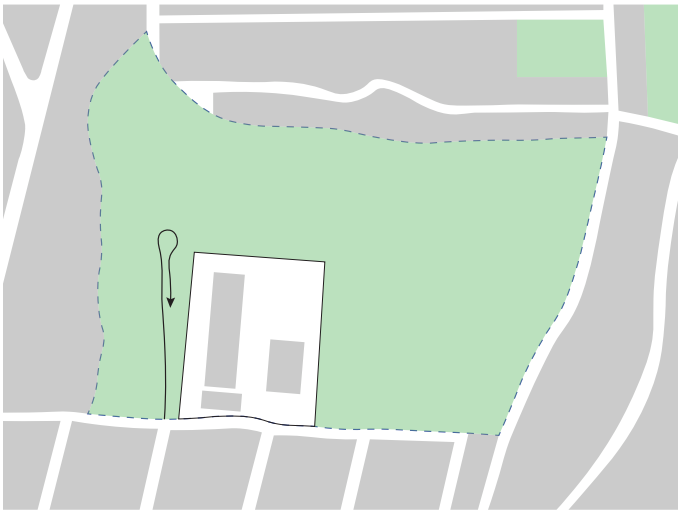


Figure 13. Map project site. Walking path demarcated with arrow.

Figure 14. Entrance site.

Figure 15. Settlements next to entrance.

Figure 16. Backside settlements next to site.

Figure 17. Western part site.

Figure 18. View over eastern part Grajaú.

Relevance

Though a lot of research has been done on the relationship between architectural design and safety in northern cities, not much literature was found on this relationship in southern cities, nor specifically for the irregular settlements of São Paulo. Whether this is due to the language barrier, availability of Brazilian literature in Dutch libraries, or accessibility of online Brazilian databases from the Netherlands, this thesis aims to contribute to the collective knowledge of this relationship.

Furthermore, the design made in the second phase of the project can hopefully inspire project developers operating in Grajaú to explore an alternative design for transformation projects. Ultimately, this involves a design that achieves similar safety levels as the Chácara do Conde project, without the public spaces being enclaved.

Perspectives

This thesis will be executed from a 'northern perspective', being the opposite of a 'southern perspective' – a perspective described by Sheppard, Leitner, and Maringanti (2013) as inherited by: *"those, everywhere, whose livelihoods have been made precarious by historical processes of colonialism and globalizing capitalism"* (p. 7). This offers both opportunities to think outside of the box compared to designers from the global south, and creates the danger of making assumptions based on northern societies and their values, especially when assessing the 'successfulness' of design interventions. Throughout this thesis, this should be taken into account when drawing conclusions or making decisions. Research papers by professionals from the global south, like the ones referred to in this research plan, alongside personal experiences from the two-week field trip to Brazil, should help to conceive an understanding of the societal and architectural processes in the global south.

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