

Street Vitality: A Socio-Spatial Analysis of S Jackson St

Xuwu Pan

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Danial B. Abramson

Jeffrey Hou

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Xuwu Pan

University of Washington

Abstract

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Xuwu Pan

Chair of the Supervisory Committee:
Daniel B. Abramson, Associate Professor
Urban Design and Planning

Vital streets are important to urban environments; they support the various activities that make up the “mixed life” of cities (Francis 2011). In order to understand its significance, this thesis discusses the role of the street as a public space and the concept of “street vitality”. It identifies some built-environmental characteristics that affect street vitality and provides methods to evaluate them, using South Jackson St in Seattle as a case study to demonstrate both real-world observation of street activity and environment, combined with GIS-enabled data analysis. Findings suggest several ways to improve street vitality, such as increasing building façade transparency, adding outdoor extensions and encouraging small and diverse developments. This study does not intend to change street conditions in the near future, but to provide ideas for analysis and design, and to provide inspirations for future development.

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Abbreviations

C-ID: Chinatown-International District, Seattle

St: Street

Chapter 1 Introduction

1.1 Background

As an Urban Planning student who is specialized in Urban Design, I have always been getting involved with the ideas of equity issues, public realm, public space, right of way...through different curriculums. We really care about how to satisfy the needs of different ethnic groups and resolve social issues through urban design interventions and administrative policies. These experiences make me more concerned with how physical environment can influence and change the social life.

The inspirations for my topic mainly come from a number of courses I have taken before in my programs for the Master of Urban Planning and Certificate in Urban Design. The Right of Way studio I took in spring quarter 2018 (Appendix B) was the first one related to the street, which required me to observe the walking environment and physical form of several streets. This studio evokes my increasing awareness of street space, furniture and landscaping that influence the safety and comfort of the street. In the winter quarter 2019, I took URBDP 522 Urban and Regional Geospatial Analysis and learned how to do spatial analysis by using GIS data. In the BE studio I took the same quarter (Appendix C), I got many chances to do deep research and observations on Jackson Corridor. For the early assignments, I spent most of my time on S Jackson St, which allowed me to observe the environment closely. Based on these experiences, I decided to combine my knowledge and choose S Jackson St as my study area in the thesis for deeper research. Moreover, in the BE studio, I always focused on the public spaces like parks and plaza but overlooked the main public space of the city – the street. This study was planning to fill that missing part.

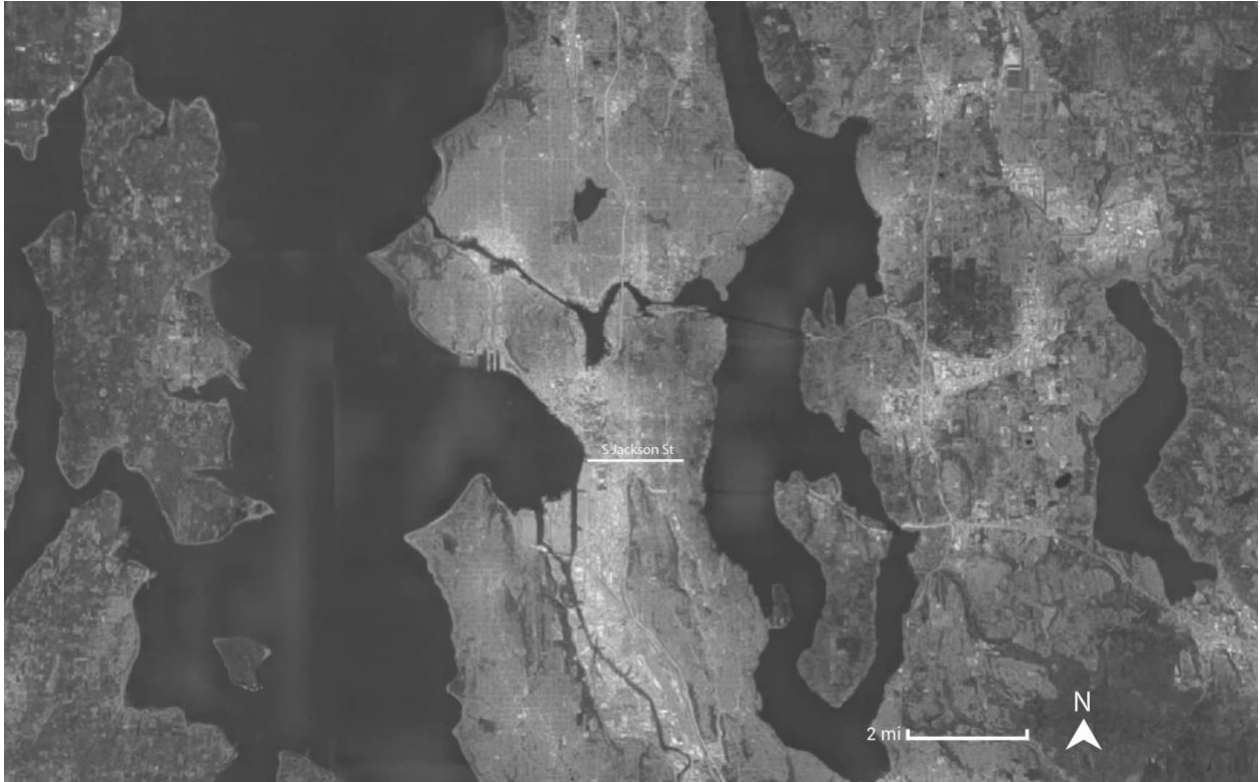


Figure 1-1. S Jackson St in Seattle



Figure 1-2. S Jackson St

1.2 Methodology

We spend more time on the streets than in any other public space. Streets provide spaces for us to walk, chat, drive and so on. They also play an important in connecting people with other spaces such as buildings and parks. A vibrant city may have numerous vital streets. However, some questions come to me: What kinds of streets can be considered as vital streets? What are the factors that contribute to the formation of a vital street? How these factors influence the vitality? How can we improve street vitality? In order to figure out these questions, I read lots of scholarships about street vitality and extracted a few physical factors to conduct quantitative analysis. However, this is not enough to fully understand the vitality. So, I chose some areas along the S Jackson St to do the behavior observations. By observing street life, I could see the relationship and interaction between social activities and physical environment and find the gap between them. Then, based on these physical and social analyses, I come up with few urban design suggestions for S Jackson St and acknowledge deficiencies and possible improvement for this study.

1.3 Purpose of this Study

The purposes of this thesis is to: 1) understand the concept of public space, the street as a public space; 2) understand the concept of street vitality and its importance to the social life; 3) learn the context of neighborhoods and street; 4) provide methodology to assess physical characters and street vitality; 5) make suggestions on street improvement.

Chapter 2 Literature Review

2.1 Public Space

Public space has multiple meanings based on the issues of ownership, management, usage and accessibility (Nemeth & Schmidt, 2007; Mehta, 2014). However, it might be confused to distinguish between the public and private place in terms of its ownership and management. Publicly owned space is not always accessible to the public, while privately owned and controlled land is often open to public use (Voyce, 2006). For this paper, the definition of public space focuses on accessibility rather than ownership and management. The key feature of the public sphere is universal access. According to Jalaladdini and Oktay (2012), accessibility has two types which are visual accessibility and physical accessibility. The former type “allows people to see it and be informed what is happening there”, while the latter one “allows people to enter that space and use its functions” (p. 667). Anyone should be able to enter the public space, and communication with it is ideally free from any constraints (Habermas, 1974).

According to Walzer (1986), public space is the space we share with strangers, people who are not our relatives, friends, or work associates. It is space for politics, religion, commerce, sport; space for peaceful coexistence and impersonal encounter. Carr (1992) described public space as “the common ground where people carry out the functional and ritual activities that bind a community, whether in the normal routines of daily life or in periodic festivities” (p. xi). Madanipour (2003) uses public space to refer to that part of the physical environment, which is associated with public meanings and functions. All of these definitions illustrate both physical and social dimensions of public space (Carmona, Tiesdell, Heath, & Oc, 2010), which is designed for public use and social interaction (Gehl, 2006), as an architectural form or material construction as well as part of a dynamic and fluid socio-spatial dialect (Orvell & Meikle, 2009).

Public space is an important means of framing a vision of social life in the city both for people who live there and for people who are free to leave the city (Zukin, 1995). According to Goodsell (2003), public space serves several values: 1) allowing residents to escape the stress and hubbub of city life; 2) promoting connectedness among citizens and groups; 3) helping to create a sense of community identity; 4) furnishing a site for political dialogue and protest. It is significant in providing the area for social activities, which makes it possible for people to see, and to hear others, to experience other people functioning in various situations (Gehl, 2006). It also provides opportunities for people to come together, to discuss and to recognize each other's presence (Arendt, 1958). With all these significances, Whyte (1980) described a successful space should address issues of accessibility, activity and use, comfort and image, and sociability. Carr (1992) also clarified that public space should be responsive, democratic and meaningful.

2.2 Street as the Main Public Space

Street, parks, plazas, squares, and shoreline beaches can all be seen as public space. In particular, this paper focuses on streets, which are “the main public space of a city” and “its most vital organs” (Jacobs, 1961, p. 107). Lynch (1960) also address that street is one of the urban elements that help to create a city image and along its other environmental elements are arranged and related. In the book *On Streets* (1978), Ellis describes the streets as exterior rooms in the city, which are generated by the buildings. Rapoport (1987) defines that “street is the more or less narrow, linear spaces lined by buildings found in settlements and used for circulation and, sometimes, other activities” (p. 81). Under these definitions, the street is mainly recognized as an element to determine the urban form from a morphological view. However, there are also many concerns have been put on its social values. Metha (2013) attaches great importance on sociability of public space that he also focuses on social behavior to understand its role. In his

book, he provide the definition of the sociable street, which is “a street that is open to the public , where people are present throughout the day and the week, engaged-individually or in groups – in a variety of active or passive social behaviors that are predominantly stationary and sustained in nature” (p.24). Fyfe (1998) says “streets are the terrain of social encounters and political protest, sites of domination and resistance, places of pleasure and anxiety” (p. 1). People “rely on them for such daily activities as travel, shopping, and interactions with friends. Much social life and learning occur along the streets” (Francis, 1987, p. 23). As part of public space, streets have the potential for enriching individual activities and collective conception of the urban surroundings. They function both as places and links, incorporating various social and operational activities into an integrated and unspecified mix (Ellis, in Anderson 1978). Rapport (1987) describes the street as a “setting in which a specified set of activities occur” (p. 80). Even activities are varied, he classifies them into three broad class. One category is non-pedestrian movement which consists mainly of wheeled vehicles. Another category is pedestrian activities under which the subcategories are dynamic pedestrian behaviors that include mainly walking and strolling, and static pedestrian activities that include sitting and standing, squatting, lying down, eating, playing, working, sleeping, and so on. Gehl (2006) classify outdoor activities into three categories: necessary/functional activities, optional activities, and social activities. Necessary activities include everyday movements that will occur no matter what the physical conditions look like. Optional activities will occur when physical conditions are favorable, and people have a desire to do them. Social activities, such as greetings and conversations, will occur when people meet in a particular space to socialize and these activities can usually evolve from other two types of activities.

2.3 Street Vitality

Lynch (1981, p. 118) defines the vitality as “the degree to which the form of the settlement supports the vital functions, the biological requirements, and capabilities of human being, how it protects the survival of the species”. A good environment should support the health and biological well-functioning of the individual and the survival of the species. He mentioned few performance dimensions for city form under the vitality: 1) Sustenance: the adequacy of the throughput of water, air, food, energy, and waste; 2) Safety- the absence of environmental poisons, diseases, or hazards; 3) Consonance- the degree of fit between the environment and the human requirements of internal temperature, body rhythm, sensory input, and body function. 4) for other living things, how well the environment provides for the health and genetic diversity of species which are economically useful to man; 5) the present and future stability of total ecological community (Lynch, 1981).

Jane Jacobs (1961) attaches great importance on a rich diversity of the physical environment, which could restore, maintain or promote the vitality of a big city. She is interested in the principles of planning and practices in rebuilding that can promote social and economic vitality in cities. Four primary conditions have been introduced in her book that can induce city vitality, which are mixed primary buildings, small blocks, aged buildings, and concentration. Even these principles are meant for generating useful great city diversity, they are also somewhat applicable to the street-level since the street is a significant component of city spatial form.

Montgomery (1998, p. 97) thinks the vitality is “what distinguishes successful urban area from the others”. He states that the vitality can be referred to the numbers of people in and around the street (pedestrian flows) across different times of the day and night, the uptake of facilities, the number of cultural events and celebrations over the year, the presence of an active

street life, and generally the extent to which a place feels alive or lively. He also defines vitality as “a theory or miscellany of beliefs which contend that living process are not to be explained in terms solely of material composition but . . . living things are animated by a vital principle such as an elan vital or life force” (Montgomery, 1995, p.105).

Jalaladdini and Oktay (2012) note the importance of vitality in urban realm, which provides a safer, more viable, and more attractive space enabling people to have more opportunities for social activities as well as for cultural exchanges. They regard vitality as an important measure of urban space health, and “a product of both the visual quality of the environment and the variety of the supported activities” (Jalaladdini and Oktay, 2012, p. 667). A good public space should satisfy both physical and social needs of people as well as adjust to their activities. Similar to this definition, vitality can also be defined as “the ability of space that can cater and support a variety of activities and people that have different needs and behaviors” (Zaidin et. al, 2016, p. 13).

2.4 Assessment Method

Lots of research have been conducted to identify the factors that influence street vitality, which is vital to create a safer and more desirable urban environment. Jacobs (1961) addresses four conditions that are necessary for urban vitality, which are mixed-use, small blocks, old buildings, and concentration. She also brings up two complementary conditions that are accessibility and border vacuums. However, the theories are based on her personal observations that have not been quantitatively tested out.

Sung et al. (2013) use Jacobs’ theory to measure street life in Seoul. They believe that there is an association between physical environment and walking activity and derive physical-environment measures at street level to investigate the relationship between them. Pedestrian

flow, which is the number of pedestrians who passed in front of researchers, is used to represent vitality. The measures for physical environment are sidewalk width, numbers of street lanes, existence of street furniture, sidewalk type dummy, nearby crosswalk dummy, and street slope dummy. Measures for mixed-use are residential and non-residential balancing index, and entropy index of neighborhood uses, non-daily facilities and office. Measures for block are intersection density of streets (number of intersections/net area) and the rate of four-way intersections (number of four-way intersections/total number of intersections) the mean floor area of the buildings, the distances to the three nearest individual-use buildings from the street survey location (business, daily living, non-daily living), and the mean distance to the nearest intersection. Measures for old building are mean age of the buildings and the standard deviation of the ages of the buildings. Measures for concentration are gross floor areas of all the buildings or of the individual-use buildings divided by net, total density of buildings for daily, nondaily and office use are used for concentration measurement. Measures for accessibility are the number of railroad stations, the number of bus stops, and the park area against the net area of the small-area census, the distance from the survey locations to the nearest facility use. Measures for border vacuum measurement are the nearest distance from a survey location to each border facility (major arterial roads, rivers or streams, on-ground railway sites, and expressways). It turns out the physical environment has a significant association with walking activity, while some of Jacobs' observations on physical diversity may conflict with Seoul's urban vitality.

Xu et al. (2018) select nine different year-built streets in old, main, and new urban areas, in Nanjing, China, using different factors to assess their vitality. The factors they choose are street form, including building density (the total floor area of all buildings along the street, divided by the land area of parcels on which they are built), street continuity (total length of the

building walls along the street divided by the total length of the street), and height-width (average height of buildings along the street divided by the width of the street); street business type, including store density (the number of store buildings along every 100-m length of street); function density (number of functions of buildings for every 100-m length of street); and permeation rate (percentage of the total length of the building's transparent wall along the street); and street accessibility, including location, the number of entrances/exits, transportation (the number of metro stations and bus stops near streets within 500 m), and walkability which is assessed by field observation. The authors use the number of factors to compare walkability, which are meticulous planning and design, small-scale, street space, rich building elevation, advertisement markers, public windows, greenery, lighting, pavement, seats and chairs, telephone booths, newsstands, dustbins, public toilets, bicycle parking, street corner squares, and open spaces of retreat. The more factors the street has, the more walkable it is. They calculate the values of the subfactors and rank their impact comprehensively and quantified the vitality as "the density of people engaging in unnecessary activities in streets" (Xu et al., 2018, p. 13). The result shows that 1) relatively high building density, interface continuity, and a suitable street height-to-width ratio promote street vitality; 2) a relatively high degree of function mixture can raise the land utilization rate; 3) highly-efficient and convenient accessibility is an important condition for the formation of street vitality.

Mehta (2007, p. 67) define a lively neighborhood commercial street as "a street with the presence of a number of people engaged in a variety of predominantly stationary, lingering, and sustained activities, particularly those activities that are social in nature". In order to create a Liveliness Index, he calculates 1) the number of people engaged in some stationary and sustained activity at the block, 2) the number of people in groups of two or more engaged in some social

activity, and 3) their duration of stay. Moreover, eleven characters of the street are chosen to measure its physical features and adjacent buildings (Figure 2-1). These characters are largely objective but still provide perspectives to assess physical environment. The result shows that commercial and public seating, presence of community places, personalization of the storefront, and width of sidewalk have positive impact on liveliness of a neighborhood commercial street. They make the street lively might because they help support stationary, lingering, and social activities on the street. However, many other characteristics that appeared to correlate with liveliness were not significant.

Street Characteristic	
1	Variety of goods and services on the block
2	Number of independent businesses on the block-segment
3	Degree of permeability of street-front on the block-segment
4	Degree of personalization of storefront on the block-segment
5	Number of community places on the block-segment
6	Percentage articulation of street front on the block-segment
7	Number of public (non-commercial) seating on the block-segment
8	Number of commercial seating on the block-segment
9	Average sidewalk width on the block-segment
10	Percentage shade and shelter from trees and canopies on the block-segment
11	Number of other street furniture and physical artifacts on the block-segment

Figure 2-1. Selected characteristics of the street environment. Reprinted from “Lively Streets: Exploring the Relationship between Built Environment and Social Behavior”, by Mehta, V., & Brower, 2006, ProQuest Dissertations and Theses.

In addition to physical environment, walking behavior is also closely related to human perceptions. Human behaviors depend on their integrated effects (Park et al., 2013). Park et al. (2009) survey 713 residents of study area and use 19 questionnaires for subjective and perceptual variables, as the dependent variable is measured in the Likert scale. Vitality is one of four variables (pleasantness, vitality, unsafety, and complexity). As a supplementary research to Park et al. (2009), Park et al. (2013) add more questions into four perception factors and invest the relationship between design elements and these perception factors. The result shows that

vitality was most positively related to the condition of plants, buildings, and benches, condition of sidewalks. The experiences of street furniture, such as kiosks, street vendors, and good restaurants, are also significant (Figure 2-2). Five design factors have been derived for factor analysis, which are sidewalk difficulty, well-ordered street furniture, crosswalk difficulty, various destinations, poor building design, and management. Street furniture, buildings, and crosswalk are statistically significant to the vitality factor.

Positively correlated design elements		Negatively correlated design elements	
Buildings are interesting and beautiful	0.2866***	I have to take transit or drive to meet friends or go to the cinema	-0.1953***
Kiosks and street vendors are convenient	0.2163***	Streetscape is monotonous due to large or long fences	-0.1380***
Sidewalks are flat in general	0.1714***	When it rains or snows, sidewalks are slippery	-0.1057***
Good restaurants are within walking distance	0.1646***	At night it is dark because the street is poorly lit	-0.0910**
My feet feel comfortable when I walk	0.1483***		
...		...	

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Figure 2-2. The correlation analysis between vitality and design elements. Adapted from “Design elements to improve pleasantness, vitality, safety, and complexity of the pedestrian environment: Evidence from a Korean neighborhood walkability case study”, by Park, S., Kim, J., Choi, Y., & Seo, H., 2013, *International Journal of Urban Sciences*, 17(1), p. 142-160.

Chapter 3. The Framework for Analysis and Design

Chapter 3 provides a framework to understand the street and the criteria for evaluation. It includes five sections: street classification, design features, the criteria, measurement and observation method. Street classification and design features are supposed to illustrate the function and composition of the street. The criteria are the goals of being a vital street. Measurement and observation method provide methodologies to assess the street vitality. This framework is intended to be applied in a broad and unspecified context that helps to understand the street in general.

3.1 Street Classification

According to Merriam-Webster dictionary (“street,” n.d.), street is “a thoroughfare especially in a city, town, or village that is wider than an alley or lane and that usually includes sidewalks”. They are usually classified by functions and capacities. Different countries, states, or cities have their own standard criteria to determine the types of street. For the purpose of this study, I’ll look at the classification of Seattle.

Seattle classifies city streets into primary functional classifications based on the American Association of State Highway and Transportation Officials (AASHTO) standards. There are two major elements that are considered for different levels of classification, which are mobility and direct access. The classifications include Interstate Freeways; Regional, Principal, Minor and Collector Arterial streets; Commercial and Residential Access Streets; and Alleys. From freeway to residential access street, the traffic movement is limited while the access to adjacent functional buildings is increasing. Figure 3-1 shows the name of street type and its associated classification and land use pattern in Seattle.

Name of Street Type	Street Classification	Adjacent Land Use
Regional Connector	Principal Arterial	Industrial, Commercial, Residential
Commercial Connector	Minor Arterial	Commercial, Residential
Local Connector	Collector Arterial	Residential, Institutional (community service)
Main Street	Arterial—all	Neighborhood commercial with a pedestrian designation
Mixed Use Street	Arterial—all	Neighborhood commercial
Industrial Access Street	Arterial—all, non-arterials in commercial areas	Industrial, Maritime
Green Street	Non-arterial in Downtown Seattle	Residential
Neighborhood Green Street	Non-arterial outside of Downtown Seattle	Residential

Figure 3-1. Street Type Definition. Retrieved from Seattle Right-of-Way Improvements Manual (n.d.). http://www.seattle.gov/rowmanual/manual/4_2.asp#421

3.2 Design Features

The streets have design standards required by the city to design each element of the street that each street type might slightly differ in details. Generally, the elements include roadway section, curb bulb, bus bulbs, on-street parking, bicycle routes, medians, crossing islands, sidewalk width, street furniture, street trees and landscaping, driveways, pedestrian scaled lighting, decorative elements and awnings or other weather protection (Seattle Right-of-Way Improvements Manual, n.d.).

3.3 The Criteria

Based on the literature reviews, six criteria are identified to measure the vitality of street.

In order to increase street vitality, the design should try to achieve these criteria.

1) Diversity

A vital street should offer a range of different opportunities to carry out a variety of activities, such as walking, talking and sitting, which can attract more people to appear on the street.

2) Safety

A vital street should have low crime rate or little abrupt violence. Adequate lighting and walking space are necessary.

3) Accessibility

A vital street should allow people to see it and be informed what is happening there, and also allows people to enter it and use its functions. Accessibility is essential to invite people to use the street (Jalaladdini and Oktay, 2011).

4) Equity

A vital street should allow people from different sections of society equally use it, such as elders, disabled and children. It is supposed to satisfy all kinds of needs from different users.

5) Sociability

A vital street should provide opportunities for people to communicate and exchange. Activities like talking, seeing, hearing and eating should be highly recommended and welcomed.

6) Comfortability

A vital street should provide a comfortable environment. Adequate infrastructures are needed, such as seating, greeneries, decorations and signages. It could increase users' the happiness and satisfaction.

3.4 Measurement

urban vitality distinguishes successful urban areas from the others. It refers to a safer, more desirable, and more attractive space which has the capacity for offering more choices for social activities as well as being a place for cultural exchanges. To understand the vitality of a street, one must first understand the factors that affect it, and these factors usually achieve their effects by influencing people's behavior. However, identifying all the factors is a complex task since the context of politics, culture and economic are varied in different locations. What we can grab first is its adjacent environment, especially its physical characters. Among these factors, the importance of buildings characters cannot be overlooked since the buildings physically help to define the street. Based on literature reviews and observations, six variables are identified to measure the physical environment. They are:

- 1) **Building Density:** Building density is highly related to street vitality. Typically, low street density will not facilitate high street vitality.
- 2) **Street Continuity:** Street continuity is denoted with the average building-to-line ratio. Street interfaces with good continuity can help form a desirable vitality atmosphere and a higher continuity, making the street look more orderly.
- 3) **Height-Width Ratio:** Height-width ratio can provide the spatial feelings for people. Enclosing streets with buildings help to define urban places, creating a greater sense of intimacy. This sense of intimacy has a traffic-calming effect as drivers become more aware of their surroundings.

- 4) **Building Age:** In *the Death and Life of Great American Cities* (1961), Jane Jacobs points to the importance of older buildings in part because they offer more affordable rents for small and start-up businesses. “Old ideas can sometimes use new buildings. New ideas must use old buildings,” (Jacobs, 1961, p. 188), she said. For this study, data on building age is drawn from property assessor’s records, which includes a year built for the structures on each parcel. The measure of building age for each block represents the median age of all primary buildings in that block.
- 5) **Mixed-Age Buildings:** A mixture of buildings with different functions could meet various needs, which is able to serve people of different age at different times of day. Multiple types of buildings perform well in increasing the community vitality by keeping the street busy and thriving.
- 6) **Granularity:** Granularity refers to the size of buildings and the size of the parcels upon which they are located (Preservation Green Lab, 2014). Areas of high granularity have large numbers of small buildings on small lots, while areas of low granularity have fewer, bigger buildings occupying large lots, sometimes in the form of superblocks. Small-scale buildings and parcels allow more diverse ownership, support small business development, and facilitate mixed uses. When neighborhoods and cities are made up of many smaller buildings, they may be more resilient and adaptable to change.
- 7) **Transportation:** Public transportation could bring numbers of people onto the streets every day. It could be assessed by the number of the bus stops per block and the number of bus lines per block.
- 8) **Land use:** Different types of buildings could serve people with different purposes, and their functions can influence pedestrian behaviors.

3.5 Observation Method

In addition to understand the physical environment, it is also important to learn the social behaviors on the street. The streets provide spaces for social activities, but we need to figure out how people use these spaces. To observe the street life, one precedent we can refer to is the Street Life Project conducted by William H. Whyte. He took the camera and notebook, recorded the human behaviors in public spaces. He believes that the quality of life of individual and society depends on the social life in public spaces, and we can learn a lot from their behaviors and then apply this knowledge into creating a community that is suitable for living. In book *Inquiry by Design: Tools for Environment-Behavior Research* (1984, p. 124), Zeisel says “to increase our control over the behavioral side effects of design decisions, we can describe behavior in terms of actor, act, significant other, relationships, context, and setting”. In other words, we need to know “*Who does what with whom? In what relationship, sociocultural context, and physical setting?*” (Zeisel, 1984, p.136). To do so, we can 1) randomly choose the observation sites and days with a specific time period; 2) record the number of individuals or groups; 3) record user’s activities; 4) record physical settings.

I design my own observation method for this study based on Zeisel’s (1984) book. I first choose both weekdays and weekends to do the observations. For the pilot study, four observation sites have been chosen. I will count the number of pedestrians in 10 minutes and record the pedestrian behaviors. Observations will start from the west to east. When I finish the last one, I will walk or take a bus to the next site because I can’t observation all the sites at the same time by myself.

These sites are selected based on my previous observations and analysis in the studio. They are close to the public transportation and provide easy access to all directions and have

mixed types of buildings that could attract different user groups. For behavior observations, I will draw base maps for sites to indicate their physical setting in advance and then record user's activities on these maps when I'm on the street.

Chapter 4. Case Study: S Jackson St

The research uses the vibrant S Jackson St as an urban place to study the vitality of the street, which can help us understand the role of the street as a public space and its importance on social life. This chapter includes introduction of neighborhood context, analysis of physical environment on both block and neighborhood level, observation of social life, issues and opportunities, and urban design suggestions for S Jackson St.



Figure 4-1. Neighborhood Context Map

4.1 Neighborhood Context

S Jackson St in Seattle crosses three different districts, Pioneer Square, Chinatown - International District and Central District. In each district, the street has quite different physical characters along the street.

Pioneer Square

Pioneer Square locates in the southwest corner of Downtown Seattle, which is known as Seattle's oldest neighborhood. It used to be the heart of the city that the founders of Seattle settled here in 1852 ("Pioneer Square, Seattle," n.d.). However, the Great Fire of 1889 almost ruined the neighborhood, which led to the constructions of the new buildings that were built of brick and stone rather than wood as they were before 1889. Even today, Pioneer Square still possesses this architectural style called Richardsonian Romanesque. After 1910, the city center moved north, and the growth of Pioneer Square slowed down, making it possible to preserve the historic fabric (Ochsner, 2017). Another strike was the earthquake in 1949, destroying and damaging lots of old building. In the 1960s, due to the urban renewal, some buildings were replaced with parking garages to serve Downtown Seattle, while many other buildings were also at the risk of being destroyed because of the proposal of building a ring road. Preservationists such as Victor Steinbrueck worked together to help people understood "the historic significance and commercial potential of the district" ("Pioneer Square Preservation District," n.d.). Their efforts made it possible for Pioneer Square to be designated as a Seattle's first historic district in 1970. The preservation ordinance and guidelines play important roles in maintaining neighborhood's historic characters. For example, the new buildings are required to have brick exterior facades, concrete tinted a subdued or earthen color, sandstone or similar stone facing material commonly used in the District (Seattle Municipal Code, 2019). Other restrictions can

also be found in building height and zoning, which protect the look of the historical buildings. As Ochsner (2017) says, the form of the district remains largely the same even the mix of uses and population of the district change.



Figure 4-2. Street Context Map in Pioneer Square

Chinatown-International District

Chinatown-International District is adjacent to Pioneer Square. It is “the cultural hub of the Asian American community” where Chinese, Japanese, Filipinos, African Americans, and Vietnams are living together (“International Special Review District,” n.d.). In the 1850s Chinese first settled along King Street to build Chinatown. Near the end of the 19th century, the Japanese began to come and developed a Nihonmahchi near the Main Street. Filipinos also arrived there to work and to start their own small businesses, so did African American. Due to the construction of Kingdome and Interstate 5 freeway, many hotels and business had been closed that made it harder for people making lives. Therefore, some activists united together to fight for more rights.

Central District

Central District is a mostly residential district with diverse races and ethnics. The area has a mixed housing style, including pioneer houses, the classic box, Victorian style, company cottage, bungalow, and low-rise apartment, which are largely built in the latter half of the nineteenth century (Henry, 2001). It was first a Jewish dominated neighborhood in the early 1990s and then largely occupied by Japanese-Americans around the 1930s who spread their community from International District to the Central Area. During WWII, because of the restrictive exclusion of Japanese, African Americans were able to take their space to reside. Housing discrimination and segregation made black population constrained within the area. With the arrival of new migrants and the birth of future generations, Central District gradually became largely an African-American neighborhood and the center of civil rights movement in Seattle by the 1970s (“Central District, Seattle”, n.d.). Nowadays, the neighborhood becomes the target of new housing projects. The real estate is increasingly expensive than ever before, forcing African American to leave the community while white people are moving in. The black population continues to decline, from around 80% in the 1970s to around 20% or less today (Grey and Garret, 2018). The community has been significantly influenced by gentrification that is striving to preserve its cultural identity.



Figure 4-4. Street Context Map in Central District

4.2 Physical Character Measurement

S Jackson St in Seattle crosses three different districts, Pioneer Square, Chinatown-International District and Central District. In each district, the street has quite different building characters along the street.

The study used a quantitative approach to analyze urban character with qualitative methods of observations, which refers to the measurement in Chapter 3. Selecting criteria for analysis is the most important part of determining the applicability of this approach to urban analysis. While GIS data available provided building size rather than entrance location or type of business, these factors would have been more fitting to analyze urban vitality. Height-to-width ratio, street continuity, density, older and mixed-age buildings play a supporting role in street vitality in some cases but do not seem to be the most relevant factors to study.

The neighborhood character indicators I studied do contribute to the feeling of being on the street - how historic it feels, how enclosed one is, how interesting it is to look around. These indicators can be measured with GIS data and may be a fast way to analyze these traits. The

analysis is completed by combing King County Assessor data with GIS data of parcels and buildings and analyzing it by building and block to determine overall street character indicators per unit. Moreover, I look for patterns at neighborhood level and analyze these patterns in relation to my observations.

4.2.1 Conceptual Model

In analyzing street characters, scale was a primary factor to consider. For this study, the scale focused on the block level, while some data need to be abstracted from the parcel level. Two blocks of opposite sides of S Jackson St were combined as one unit. There were 26 units selected. Data were used to calculate the value of each measurement, and the results were visualized into maps.

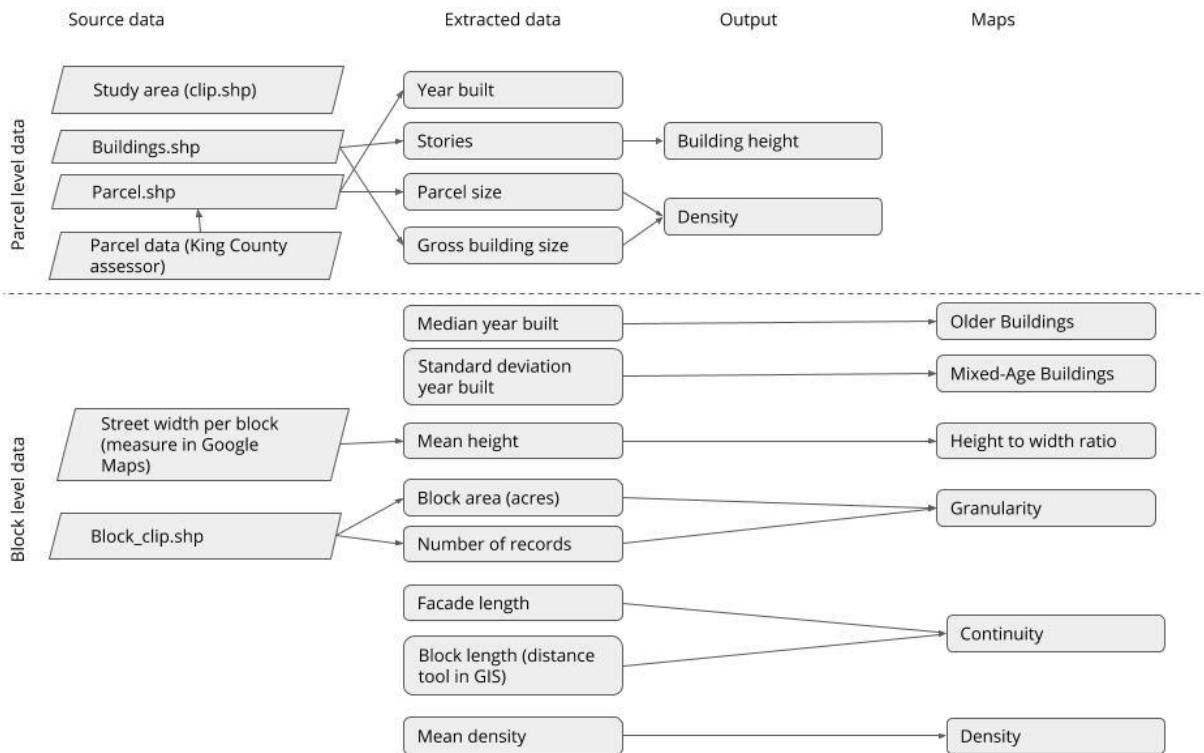


Figure 4-5. Conceptual Model

4.2.2 Findings

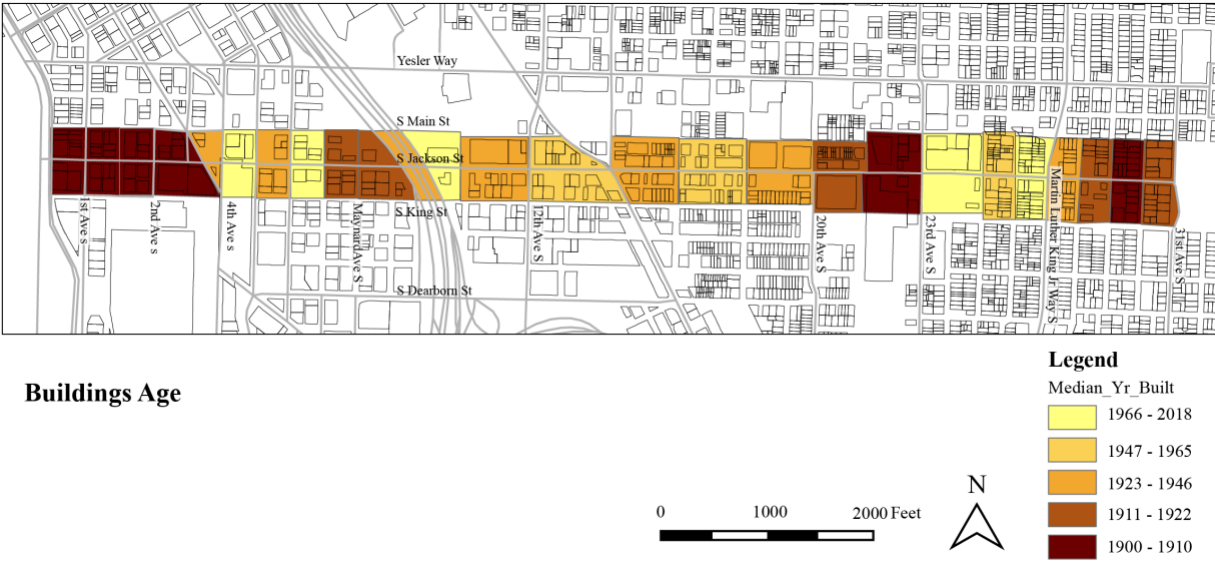


Figure 4-6. Building Age

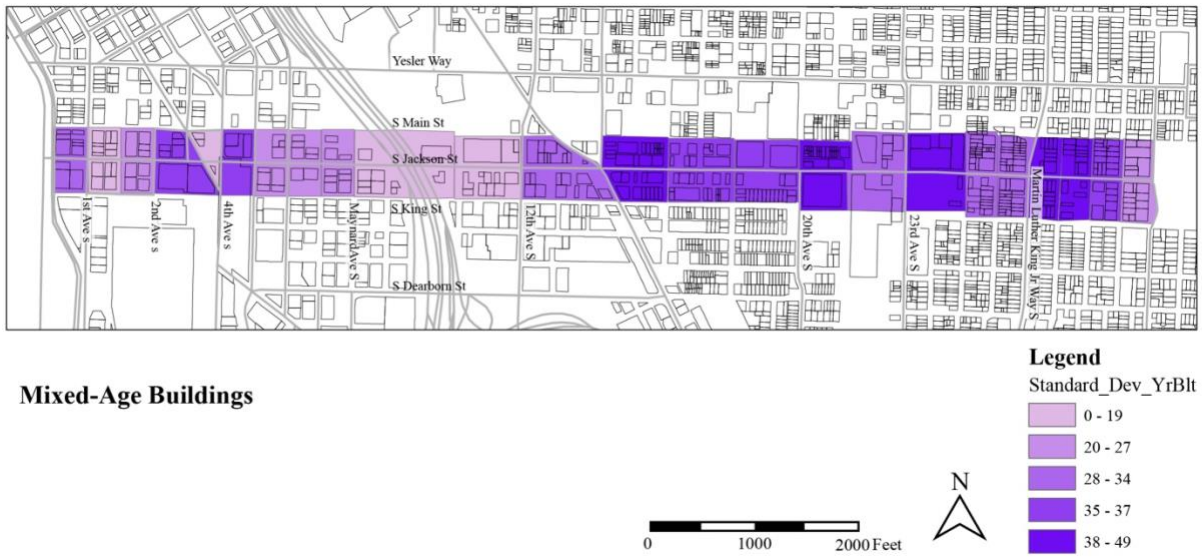


Figure 4-7. Mixed-Age Buildings



Height-Width Ratio

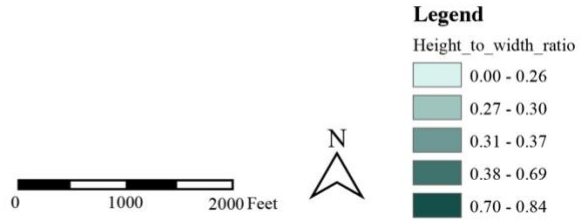


Figure 4-8. Height-Width Ratio



Building Density

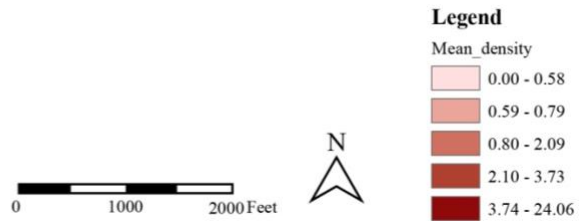


Figure 4-9. Building Density



Granularity

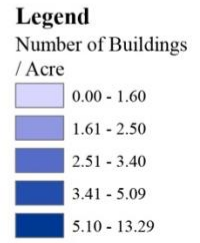


Figure 4-10. Granularity



Street Continuity

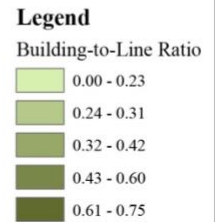


Figure 4-11. Street Continuity

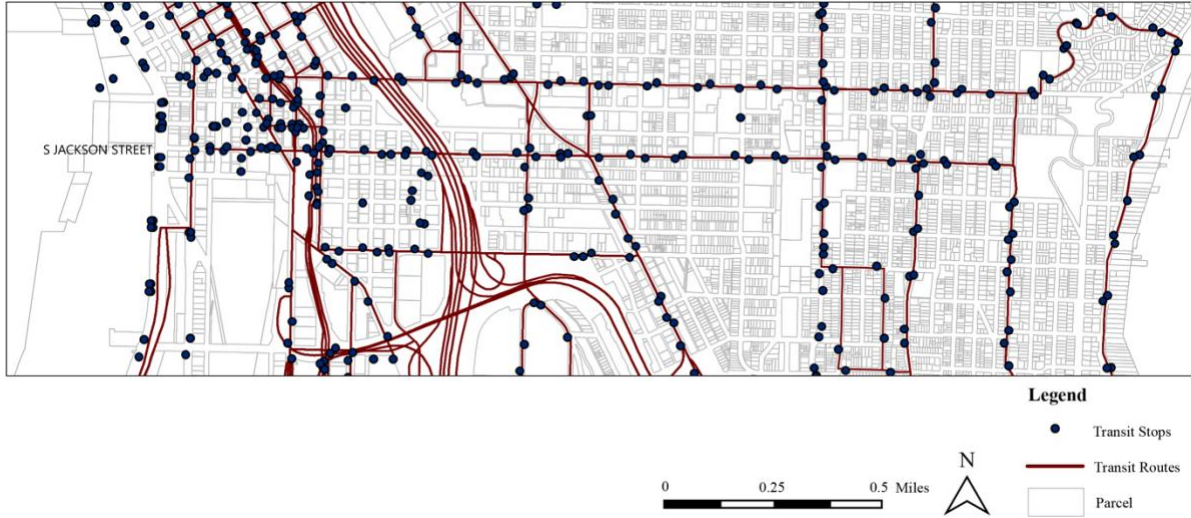


Figure 4-12. Transportation

Table 1. Number of Transit Stops and Bus lines per Block in Each Neighborhood

Neighborhoods	Pioneer Square	C-ID	Central District
Number of Transit Stops/Block	1	2	1.3
Number of Bus Lines/Block	7.6	10.7	0.6



Figure 4-13. Land Use Map

Pioneer Square



Figure 4-14. Views of Pioneer Square

The building age in Pioneer Square is older than the other two neighborhoods. Because it is a historic district, the buildings have relatively low building age standard deviation. Most granularity in the older parts of Pioneer Square where buildings are consistent with each other but relatively small. The neighborhood has relatively high street continuity, which indicates high density of building facades. It has high street frontage continuity. The neighborhood has high height-width ratio, which is consistent with the human experience on the street. It is here that S Jackson St can provide an intimate experience.

Chinatown-International District

The International District starts from 4th Ave and ends at Rainier Ave. The Chinatown International District (C-ID) has two parts along S Jackson St (Chinatown), to the West of I-5 and to the East (Little Saigon). These two parts have relatively different characters that are listed separately here. In addition, underneath I-5 has a completely different urban character lacking in every aspect.

a) Chinatown (West of I-5 Freeway)

There are older buildings before 1925 in general with the exception of the International District Link Station and the building across the street which are younger. It has a relatively low mix of building ages by block and a relatively low granularity due to warehouse-style buildings and strip malls indicative of their time period. For street density, of the buildings that are present, they fill up most of the lot. This is partly because of the older age of the buildings. The neighborhood has relatively high continuity largely because the buildings that are present have consistent street frontage, due to their vintage. For the whole length of the C-ID, S Jackson St is 96 feet wide, versus 66 feet in Pioneer Square and 70 feet in the Central District. This wide right-of-way detracts from the experience of being on the street.



Figure 4-15. Views of C-ID (West of I-5 Freeway)

b) Little Saigon (East of I-5 Freeway)

The neighborhood has relatively newer buildings from after 1925. It has relatively low mix of building ages by block, and Relatively low granularity due to larger building footprints parking lots, and empty lots. For street density, of the buildings that are present, they fill up most of the lot. This is partly because of the older age of the buildings. Like west of I-5, the neighborhood also a wide right of way.



Figure 4-16. Views of C-ID (East of I-5 Freeway)

c) Under I-5 Freeway

The freeway cutting through the neighborhood is the place with consistently lowest vitality indicators. There are no buildings to contribute to street life. However, the neighborhood has made the best of the situation by painting the columns and having parking fees fund neighborhood programs. This wide right-of-way which also detracts from the experience of being on the street.

There are different characters in the different parts of the C-ID. In Chinatown, there are many factors correlated with vitality such as older and taller buildings with a relatively continuous facade. However, the width of the street and presence of empty lots detracts from its potential. The high transit access to the area adds to the vitality by delivering people to the

neighborhood. Underneath I-5 is a gap in the neighborhood that creates a void in vitality around that the neighborhood must overcompensate for. Little Saigon does not have many factors that correlate with vitality.

Central District



Figure 4-17. Views of Central District

Reaching from Rainier Ave to 35th Ave E, the Central District along S Jackson St. takes has several different sub-neighborhoods. Squire Park neighborhood from Rainier Ave to 23rd Ave has been substantially redeveloped or is currently being redeveloped. This has led to an increase in street density, continuity, and height-width ratio, and newer buildings even though the GIS data does not fully reflect that change yet. The 23rd & S Jackson St area is a commercial heart of the neighborhood but is dominated by parking lots and discontinuous street frontage,

which does not typically indicate it as such. The final part is residential which has high granularity and mix of building ages, but not typical commercial street vitality. Even though these sub-neighborhoods are strikingly different from each other, these differences do not show up strongly in the data, so we have analyzed the neighborhood as a whole.

The building age in the Central District varies from 1903 to 2018 and has a good mixture. High granularity comes from the many smaller buildings in both commercial and residential areas. This is part of what makes the neighborhood attractive. The street density is low, indicating that the buildings in general do not fill up their entire lots. Relatively low street continuity is due to parking lots, small buildings, and single-family houses. This will continue to change as new development occurs which is bringing more street continuity. The height-width ratio is relatively low in the Central District, making it less enclosing and less intimate. This is also changing with new mid-rise construction. Compared with the other two neighborhoods, Central District has the lowest accessibility in transportation.

4.3 Social Life Observation

We can never ignore the power of observation if we want to know the vitality of the street. By observing social life on the streets, we can see its interactions with physical environment and get to know how it functions. In this study, through preliminary observations, I first chose four intersections based on types of businesses, transportation conditions, building characters, diversity of users. Then I selected their surrounding blocks as my study area to count the pedestrian flow and observe the street life. I used the number of people who were present in the study area to represent street vitality. And only the street spaces in front of buildings had been used to observe social activities. Hence, the street vitality could be analyzed in both

quantitative and qualitative way which aim to supplement the quantitative analysis of physical characteristics.

4.3.1 Study Area

Data and observations in this study are collected from blocks around S Jackson St & 2nd Ave S, S Jackson St & Maynard Ave S, S Jackson St & 12th Ave S, S Jackson St & 16th Ave S, S Jackson St & 23rd Ave S, and S Jackson St & 29th Ave S. These locations are almost geographically evenly distributed.

All sites are close to the bus station, link station or streetcar, proving that people have access to reach the street through public transportation. However, modes of transportation are not evenly distributed that the east of I-5 has better access to public transportation than west i-5. In order to reduce the impact of traffic, the study areas were not set on the link station which could bring a large number of people on the street. Near S Jackson St & 2nd Ave S, there is a mix of old and new, commercial and office buildings, which are compactly built. The two study areas within the Chinatown-International District are prominent in cultural characters that road signs are written in Asian characters, and the buildings are mainly for commercial use and are owned by various ethnic groups. The S Jackson St & 23rd Ave S in Central District locates in the commercial center of the neighborhood. Now part of the space in the south is being redeveloped as a new apartment, from which we can foresee its growing importance to the neighborhood. And the other two locations can be considered as sub-centers.

Pioneer Square is a diverse, dynamic and vibrant neighborhood providing various types of restaurants, offices, art galleries and retails. The buildings ensemble the Victorian and Edwardian Era architecture, which are mainly built of solid masonry stone mixed with brick. The neighborhood has easy access to public transportation connecting Seattle in all directions, and to

public open space such as Occidental and Union Station Square to enrich the social life. The study area, located at the intersection of the S Jackson St and 2nd Ave S consists of a historic landmark, a restaurant, an office building and a coffee shop. It only one block away from the nearest streetcar station and bus station, and two blocks from the light rail station in the east.

Chinatown-International District has lots of food and retails where people spend time on eating and shopping. Buildings along S Jackson St are mainly low-rise buildings with large windows on the first floor. The neighborhood also has easy access to the transit hub and has two parks and one community garden to support social activities. The study area located at the intersection of S Jackson St & Maynard Ave S which is in the east of district consists of numbers of commercial stores, one post office, one grocery store, and a hotel. Walking south, people can directly get to Danny Woo Community Garden and can also get to Hing Hay Park which has more restaurants around it when walking south. It is only two blocks away from the light rail station in the west and I-5 in the east. The study area located at the intersection of S Jackson St & 12th Ave S is also within the Chinatown-International District, but it is at the east of the I-5. Unlike the last one, it has lots of parking lots or vacant spaces, including several small restaurants, three parking lots, and one grocery store. There are four bus stops within one block in all directions, and two more larger grocery stores in the east of the area.

Central District has many new developments that the neighborhood is greatly influenced by gentrification. Buildings along the S Jackson St are a mix of old and new, low and tall properties. The neighborhood has much fewer transit options than the other two neighborhoods. Only two bus lines largely connect the north and the south, while only one bus line is used to horizontally connect the neighborhoods. The study area located at the intersection of S Jackson St & 23rd Ave S consists of a bank and a Starbucks coffee shop, while other blocks are under

new constructions. It is located at the intersection of different bus routes with four bus stops nearby. And there are also a large ground parking lot and a drug store near the area. Moreover, S Jackson St & 16th Ave S have a church, cafes, office buildings and apartments nearby, while S Jackson St & 29th Ave S is surrounded by a restaurant and residential buildings. These two locations both have access to the parks within walking distance.

4.3.2 Observation Method

According to the literatures, the vitality is influenced by the spatial form. Small blocks and old buildings are necessary for urban vitality. High building density and continuity, as well as a mixed use of buildings can promote street vitality. Convenient access to public transportation is also important to the formation of street vitality... These “conclusions” need to be testified for S Jackson St to see the relationship between its spatial and social characters. In the previous study, spatial characters have already been analyzed with GIS data so that further observations are needed to assess the vitality.

For each study area, I stand at the spot where I could see all the storefronts. Then I count the number of people who were walking through the intersection for 10 minutes as well as do the observations to record users’ activities other than walking and the locations they stayed. At the pilot study, four locations were observed, but it was impossible for me to observe them all at the same time. So, I started my observations from the west of the street at each location and then walk eastward to the next location. Both weekday and weekend have been observed. More observations were carried out at all locations for vitality assessment (Figure 4-17).



Figure 4-18. Location Map of Observation Sites

4.3.3 Counting and Behavior Observation

According to Montgomery’s definition, I use the number of people in and around the street to represent street vitality (Montgomery, 1998). The purpose of the count is not to do complex mathematical analysis, but to help us know how many people are using the street in general. During the observation, only one day was rainy and cloudy, while other days are sunny. The outcome might be influenced by the weather but observing in different weather conditions is helpful for comprehensive understanding.

Table 2. Counting for Pilot Study

Location	Neighborhoods	Weekday			Weekend
		5/16/2019, afternoon (Cloudy, Rainy)	6/6/2019, morning	6/6/2019, afternoon	5/18/2019 afternoon
S Jackson St & 2nd Ave S	Pioneer Square	83	121	154	96
S Jackson St & Maynard Ave S	Chinatown	64	101	108	126
S Jackson St & 12th Ave S	Little Saigon	95	80	76	83
S Jackson St & 23rd Ave S	Central District	26	30	32	37

Table 3. Counting for Additional Observation

Location	Neighborhoods	Weekday	Weekend
		6/13/2019, evening	6/8/2019, afternoon
S Jackson St & 2nd Ave S	Pioneer Square	104	113
S Jackson St & Maynard Ave S	Chinatown	94	84
S Jackson St & 12th Ave S	Little Saigon	84	73
S Jackson St & 16th Ave S	Central District	5	7
S Jackson St & 23rd Ave S	Central District	29	19
S Jackson St & 29th Ave S	Central District	6	9

When the weather was good, there were more people walking in the Pioneer Square during the weekday at daytime. Office workers were occupying the coffee shops, especially the one near the intersection of S Jackson St & 2nd Ave S. The shop provided outdoor seating that were frequently used for conversations over 5 minutes. The historic national park was also attractive to tourists who entered the building or took pictures near the intersection.

The C-ID overall had less pedestrian flow than Pioneer Square. Within the C-ID, Chinatown had more pedestrian flow than Little Saigon. In Chinatown, the commercial stores except for restaurants and grocery stores were rarely visited by people. The outdoor food market near the intersection of S Jackson St & Maynard Ave S was frequently used but people usually stayed there for less than 5 minutes. Sometimes a few groups of old Asian ladies stood near the markets, had conversations for over 5 minutes, and then left toward the south. In Little Saigon, there are many new developments and parking lots, for example, the Pacific Rim Center at the East of I-5. These large blocks were not frequently visited by people. At the intersection of S Jackson St & 12th Ave S, there were always a group of homeless people hanging around the herb shop and restaurants. The place they stayed had dirty floors and old building facades. Sometimes, an old lady sold vegetables near the shop entrance, making the sidewalk more crowded. There is also a public high school in the south. Around closing time, a lot of students came out of school and moved northward to take buses or walk home, which brought a large pedestrian flow to the study area.

Compared with the other two neighborhoods, Central District has the least pedestrian flow. In the neighborhood, S Jackson St & 23rd Ave S had the largest number of pedestrians, while the other two observation sites had fewer than 10 people crossing through the street in 10 minutes. The large parking lots of auto-zone area was a popular gathering space that I could

always saw small groups of people staying there. Along the street, there are many new apartments mixed with low-rise buildings. Around dinner time, restaurants were fully occupied, but I could hardly see people on the street. Moreover, in the evening, fewer people were present on the street even the homeless no longer stayed near the closed shops.

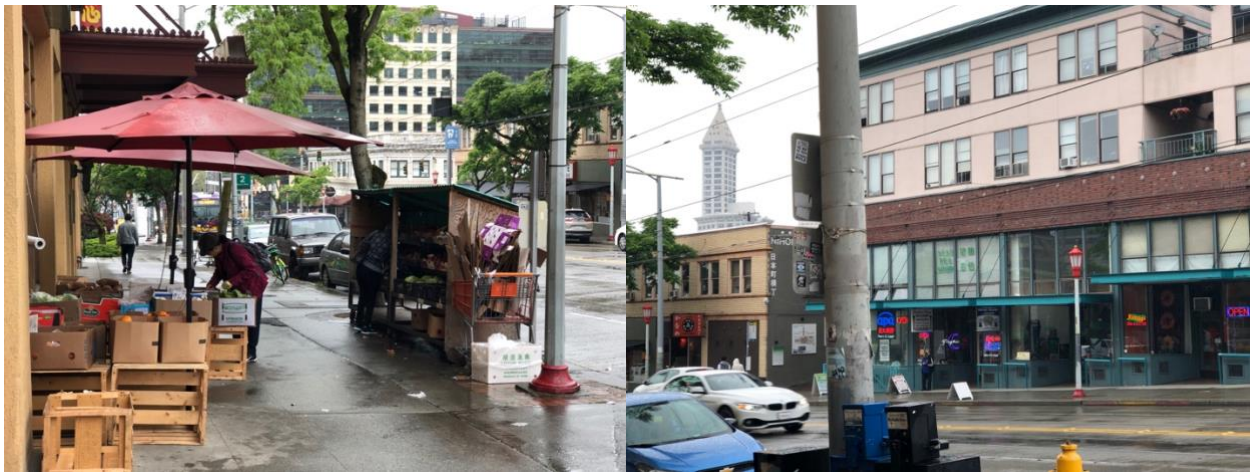
4.3.4 Findings

Through the counting and observation, we can conclude that Pioneer Square has the highest vibrancy, followed by C-ID and Central District. Combined with the spatial analysis, it proves that human behaviors on S Jackson St are largely consistent with the “conclusions” from the literatures, indicating the street vitality is closely associated with spatial characters. On the street, the clear and large windows on the first floor attract people to do window shopping. The wide sidewalks provide spaces for people to stay. The non-transparent building façades and wide alleys offer spaces for people to lean against. Commercial buildings could attract people to conduct different activities. For example, the historic landmark in Pioneer Square could always attract tourists, numbers of restaurants and retails in C-ID are good places for everyone to relax and enjoy. However, buildings only for residential use make less contribution to attract people on the street. And closed stores and empty lots are also harmful to the vitality. In addition to physical environment, transportation accessibility also plays a significant role.

In conclusion, neighborhood with relatively high building density and street continuity, as well as the existing of office buildings and restaurants tends to have higher street vitality. Convenient access to transportation and commercial stores is also important for the formation of street vitality. Public seating and wide sidewalk have a positive impact on vitality of the neighborhood commercial street.



a. S Jackson St & 2nd Ave S



b. S Jackson St & Maynard Ave S



c. S Jackson St & 12th Ave S



d. S Jackson St & 23th Ave S

Figure 4-19. Views of Observation Sites during the Weekday



a. S Jackson St & 2nd Ave S



b. S Jackson St & Maynard Ave S



c. S Jackson St & 12th Ave S



d. S Jackson St & 23th Ave S

Figure 4-20. Views of Observation Sites during the Weekend

4.4 Issues and opportunities

4.4.1 Issues

Through physical analysis, we can see differences in physical characters for each neighborhood and conduct preliminary assumptions about their street vitality. However, this method cannot replace real world observation because in some cases the evidence is completely contradictory. The data analysis needs to be combined with observation to detect their gaps. And the outcomes show there are indeed patterns that largely supported observations of the neighborhoods and also added insights that we may not have otherwise noticed.

Pioneer Square has the oldest buildings in the study area and the least deviation of ages. These buildings are consistent with one another with the high building to parcel density, street continuity, and height-to-street-width ratio. Thus, they have the most typical conditions for active street life. I observed only an average amount of street life here though, which could be attributed to the lack of building entrances and facades along S Jackson St, typical of the built form.

In Chinatown, there are many factors correlated with vitality such as older and taller buildings with a relatively continuous facade. However, the width of the street and the presence of empty lots detracts from its potential. The high transit access to the area adds to the vitality by delivering people to the neighborhood. This matches up with our observation of significant street life but still not a very pleasant urban character.

In Central District, the relatively low street vitality I observed may be explained by the low street continuity, density and height-to-width ratio throughout the neighborhood. The new constructions in the neighborhood could also distract people to the street. Besides, the sidewalk is only about 8 feet wide, nearly half the width of the sidewalks in other neighborhoods. The narrow walking space could also reduce vitality.

4.4.2 Opportunities

Each neighborhood has its own favorable elements to support a vital life on the streets. Flexible elements could be extracted and added to the existing physical conditions.

In Pioneer Square, there are many alleys between the blocks, having potentials to be developed into more pleasant spaces for people to gather or pass through. Lots of storefronts are facing west and east, vertical to S Jackson St, resulting in more solid walls to face the street. Thus, outdoor seating and planting could be installed near these walls without blocking the views

from the window, which could also increase the sense of security for those who use them. The C-ID has the widest sidewalks that more landscaping could be applied to improve the visual quality. The storefront could also have more decorations to activate the façade since stores situated in the same block have little differences in physical characters. The stores in C-ID usually have advertisements attached on the screen surface, largely decreasing the transparency and blocking the view from both inside and outside. Central District has so many parking lots or vacant spaces near the street that can be used to make up for the lack of sidewalk space. Besides, existing commercial buildings within the neighborhood should have a more visible appearance to attract local residents.

4.5 Urban Design suggestions for S Jackson Street

This section provides specific suggestions on S Jackson St, making it a better public space to support various social activities. According to the issues and opportunities summarized above and design features and criteria mentioned in Chapter 3, suggestions focus on building façade, outdoor extensions, landscaping, and informal public space. Some policy implications will also be discussed.

Suggestions

- Increasing building façade transparency

The first floor of most buildings has large windows, which may affect the walking speed of pedestrians as they spend some time looking inside. This is especially important to commercial buildings because they want to attract more potential customers who pass the street. However, stores in C-ID usually have large advertisement posters or text attached to the windows. It can block the view, and people who don't understand these characters may not take

time to look at it. Making these façades more transparent could attract more users to the area and thus activate the street.



Figure 4-21. Storefront in Chinatown

- Adding outdoor extension

Buildings along S Jackson St largely lack changes on the vertical façade, directly separating the interior space with the outer space. To break this pattern, some small plantings could be put into the storefront, especially near the entrance, so people can easily know where it is. Another extension is the outdoor seating, which could increase the interactions and intimacies between people and buildings.



Figure 4-22. Storefront planting for local eatery, Oakland. Retrieved from <https://ethanbodnar.persona.co/Cafe-Project>



Figure 4-23. The Ben Pentreath shop front; photo courtesy of Ben Pentreath. Retrieved from <https://www remodelista.com/posts/furniture-new-library-chair-at-ben-pentreath-ltd-in-bloomsbury/>

- Increasing landscaping

The greeneries could definitely help to increase street liveness by creating a safer, inviting and attractive environment. However, the landscape in some area is not fully implementing this function. More greeneries need to be added to encourage pedestrian activities. The area which already has the deciduous trees could add more evergreen plants to increase vitality.



Figure 4-24. Storefronts in Pioneer Square and Little Saigon

- Making use of informal open spaces

There are lots of parking lots and vacant space along the street, which could also be used to implement the function of the street as a public space. Low railing with art painting could be added between the parking lot and sidewalks to serve as decorations. And the wall and ground could have more graffiti that are created by local artists.



Figure 4-25. Parking lots in C-ID

Policy Implications

The uniform architectural style may create a feeling of boredom. Some little changes on signages or windows could be applied to make buildings more special on their appearance. So, we need to loosen historic district requirements to allow for new facades along S Jackson St. To make up for the wide street width of S Jackson St, vitality enhancements could include utilizing the sidewalks and increasing street art. However, there are some areas that have a very low height to width ratio and also some empty lots. Moderate infill development could increase the height to mid-rise buildings to give more of a feeling of enclosure on the street. With lots of parking lots along the street, a good solution is to incorporate the parking into the building, like Pacific Rim Center (Figure 26), which takes advantage of its sloping site to include two levels of retail, with parking above that, and then housing above that. However, this building doesn't bring much vitality to the street because of its limited number of entrance and invisibility of

commercial stores from the outside. The situation could be better if the new development consists of smaller blocks. Moreover, the area with gentrification needs us to pay more attention to the importance of having mixed-age buildings in the neighborhood and consider preserving remaining buildings. To make up for the observed gap between observed street vitality and its potential, we also need to encourage street life with events and other culturally-relevant programming.



Figure 4-26. Pacific Rim Center

Chapter 5. Reflections

5.1 Limitations

This thesis uses GIS data to do spatial analysis. However, testing the method of GIS analysis for something as subjective as vitality reveals many shortcomings. As we can see from the literature review, there are many other factors, such as the number of public seating, the number of shelters, and the number of street furniture and physical artifacts, that can be used to analyze physical environment and vitality. However, the data I used is from King County Assessor Parcel Data and City of Seattle Open Data portal. These datasets cover limited categories that I only looked at a few building factors to see how much relevance they have for vitality: specifically, year built, number of stories, parcel size and gross building size. Moreover, the GIS data I relied on does not include the extensive construction currently underway on S Jackson St. Additionally, some building data was simply missing, such as the large building called the Pacific Rim Center (Figure 26), just East of I-5. The missing data skewed the measures of street character that street continuity is supposed to be larger if the building's data had been included. For a more complete study, all GIS data would need to be verified in the field and augmented if necessary.

Another limitation to this analysis is that even though S Jackson St runs through all three neighborhoods covered by this study, it does not necessarily represent the liveliest street in each neighborhood. Streets are classified according to different functions. As an arterial street, S Jackson St tends to deliver more traffic. The sidewalks are only designed to satisfy the basic walking needs and the parking lots can hardly be replaced due to high demand, which discourages pedestrian activities and influences vitality. And indicators of street vitality on S Jackson St may be different from those on other streets in each respective neighborhood.

However, the thesis is based on studio work that focused on the Jackson Corridor (see Appendix C). Through studio assignments, I observed and understood S Jackson St more deeply than any other street.

Part of analysis relied on personal observation, so I choose intersections that are almost geographically evenly distributed along the street as representatives to observe how spatial characters influence vitality. Besides, the observation outcome could be so changeable depending on different time period, weather, or other uncontrollable forces. And sometimes there were a lot of people passing through the street and I could get distracted, which may lead to an undercounting of people on the street.

5.2 Possible improvements

The data and indicators are not comprehensive enough to assess the physical environment. The pedestrian behavior could be influenced by so many factors, including not only physical ones but also emotional ones. The latter ones are even harder to assess. To improve it, interviews and questionnaires could be included to decide which factors should be considered for vitality analysis. If there is not enough data, more should be personally measured on the street. And in addition to randomly choosing some days to do the observations, the study needs to consider different conditions in different seasons, different time periods, different locations, and different weather conditions.

The design suggestions are specific to S Jackson St and may not be applicable to other streets. In practice, instead of looking at the whole street, we need to start with one section and come up with specific designs after a series of detailed investigations. The suggestions here can provide a direction, but additional adjustments can be made according to different circumstances.

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Appendices

Appendix A: GIS Data Layers

Data layer	Year of Data	Source	Attribute used	Description/Limitations
Commercial Building	2019	King County Assessor Parcel Data	<ul style="list-style-type: none"> ● Major/Minor use ● Predominant use ● Year Built ● Building Quality ● Building Description ● Number of stories ● Story height 	<p>The data layer is a CSV file, so it needs to be joined to the parcel layer to show the spatial locations.</p> <p>From the joined layer, we can use the “select by location” tool to get specific building information, including building age, number of stories, etc.</p> <p>The data layer shows the building information within each parcel, so in the case of parcels with multiple buildings, the data is missing.</p>
Residential Building	2019	King County Assessor Parcel Data	<ul style="list-style-type: none"> ● Major/Minor use ● Predominant use ● Year Built ● Building Quality ● Building Description ● Number of stories ● Story height 	<p>The data layer is a CSV file, so it needs to be joined to the parcel layer to show the spatial locations.</p>
parcel	2012	City of Seattle	<ul style="list-style-type: none"> ● PIN ● Major ● Minor 	<p>Shows the parcel boundaries. “Pin to pin” join with “commercial building” layer, or other attributes that will match the data.</p>
building	2015	City of	<ul style="list-style-type: none"> ● Area 	<p>Building footprint size can</p>

		Seattle	● Perimeter	<p>be obtained with attribute table calculations.</p> <p>Either spatially calculate distance between buildings or calculate parcel to building footprint ratio.</p> <p>The data layer shows the spatial location of buildings but doesn't include building information.</p>
arterial	2019	City of Seattle	● Street name	The layer is not showing the street width.

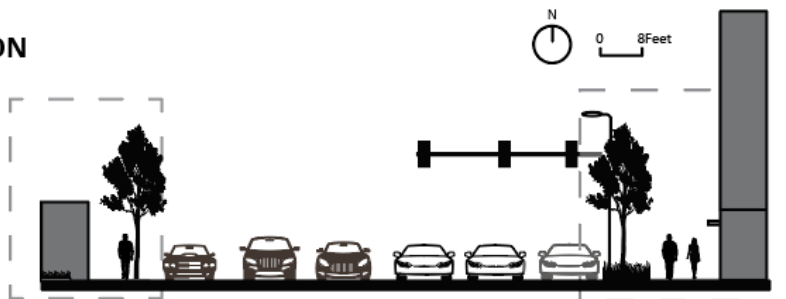
RETHINKING THE RIGHT OF WAY

DESIGN INTERVENTION IN MT. BAKER



RAINIER AVE S SECTION

The Rainier Ave S has narrow sidewalks, less diverse building facades, and no benches along the street even it has lots of pedestrian volume around the link station. The eave is also not wide enough to shelter people. And the open space near the bank is not effectively used.

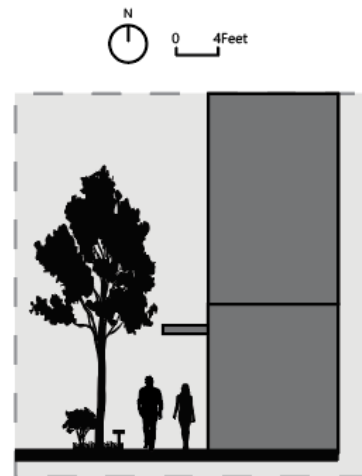


DESIGN INTERVENTION ALONG RAINIER AVE S



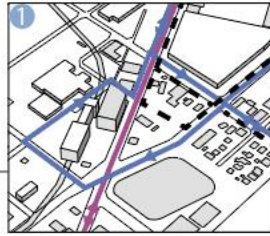
The design interventions focus on the possible open space and seatings. For space near the U.S Bank, the tree pool can be elevated with wider boundary and benches can be placed to seat more people. In order to make the area safer and private, some short shrubs can be planted to set apart with the sidewalk.

For the sidewalk near the commercial building, the eaves can be wider to keep the rain. And benches can be placed near the plants. Some shrubs can be planted as a fence around the seats.



MULTI-MODE TRANSIT CENTER DESIGN

POSSIBILITY



1 Relocation of the Transit Center
The original transit center will be replaced to the area behind link station that buses is going to change the circulation.

2 Redesign of Pedestrian-Friendly Plaza
The new plaza will create more opportunities for the neighborhood to gather, play and eat.

3 Construction of Mix-Used Building
More housing, offices and stores will be provided with the new redevelopment of the building.

PRECEDENTS



Foothill Transit Covina Transit Center and Park and Ride, Covina, CA

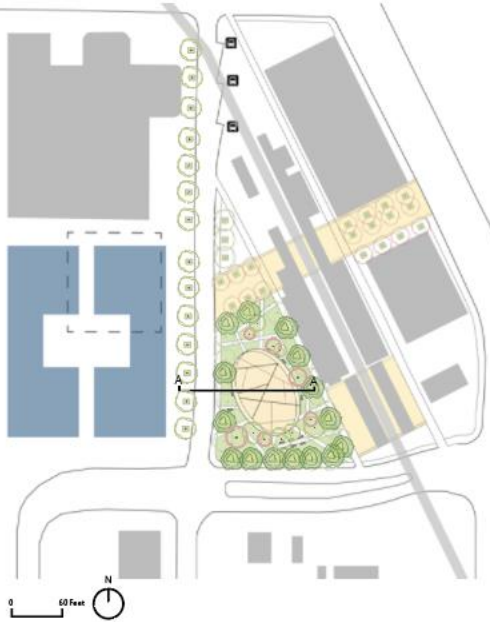


Munich Olympic Park
Munich, Germany



Beijing Olympic Park
Beijing, China

PLAZA PLAN

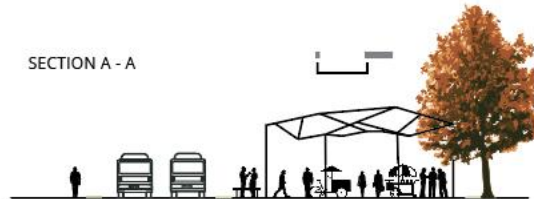


The road in the plaza is only for bus. It has two lanes that one is the driving lane and another is the bus lane. Both are 11 feet wide.

The bus stops are separate with each other. There will have three bus lines running through this area with bus station provided.

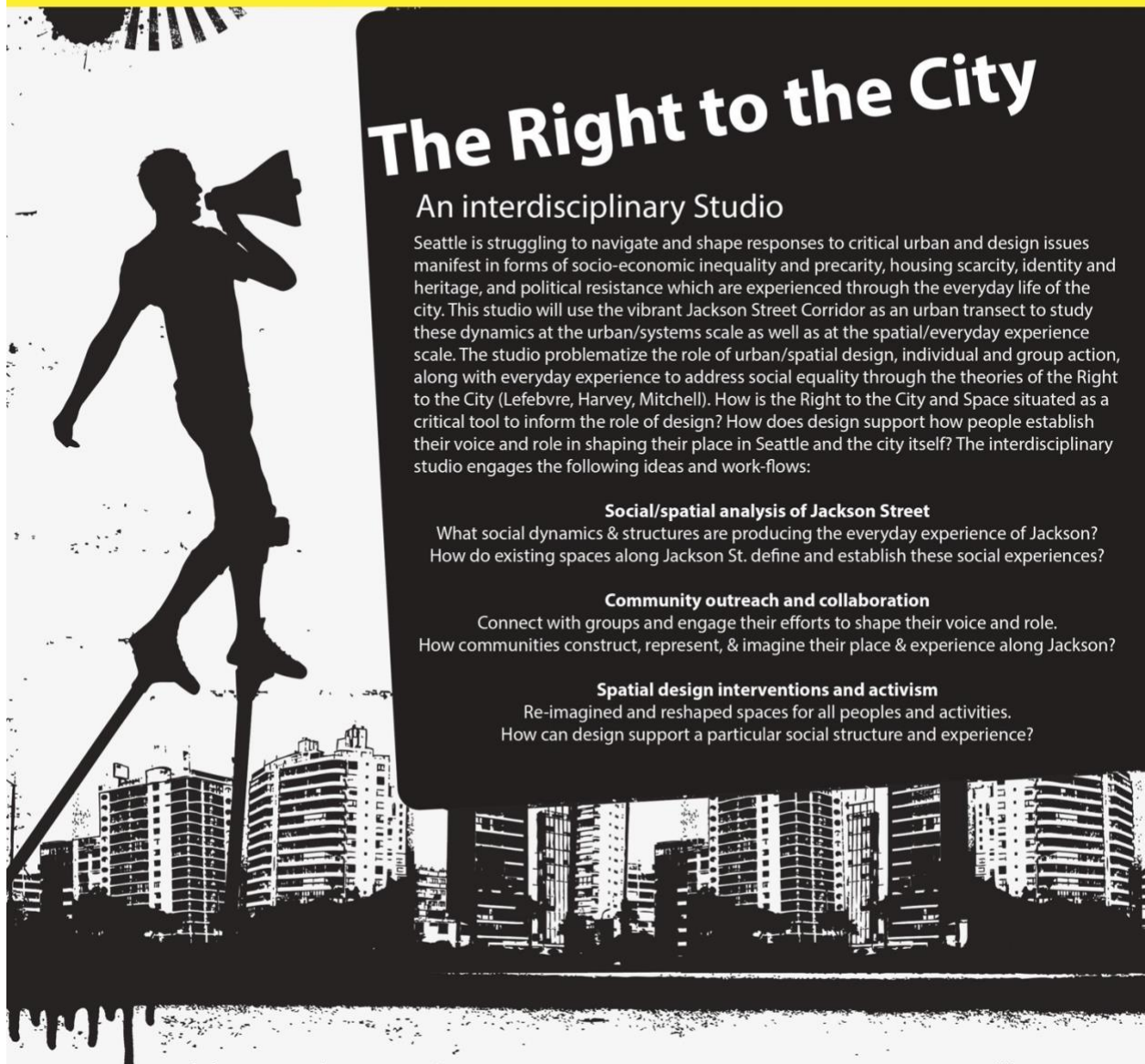


SECTION A - A



Winter Quarter 2019 BE Studio

Jackson Street - Social Justice Transect Studio



The Right to the City

An interdisciplinary Studio

Seattle is struggling to navigate and shape responses to critical urban and design issues manifest in forms of socio-economic inequality and precarity, housing scarcity, identity and heritage, and political resistance which are experienced through the everyday life of the city. This studio will use the vibrant Jackson Street Corridor as an urban transect to study these dynamics at the urban/systems scale as well as at the spatial/everyday experience scale. The studio problematize the role of urban/spatial design, individual and group action, along with everyday experience to address social equality through the theories of the Right to the City (Lefebvre, Harvey, Mitchell). How is the Right to the City and Space situated as a critical tool to inform the role of design? How does design support how people establish their voice and role in shaping their place in Seattle and the city itself? The interdisciplinary studio engages the following ideas and work-flows:

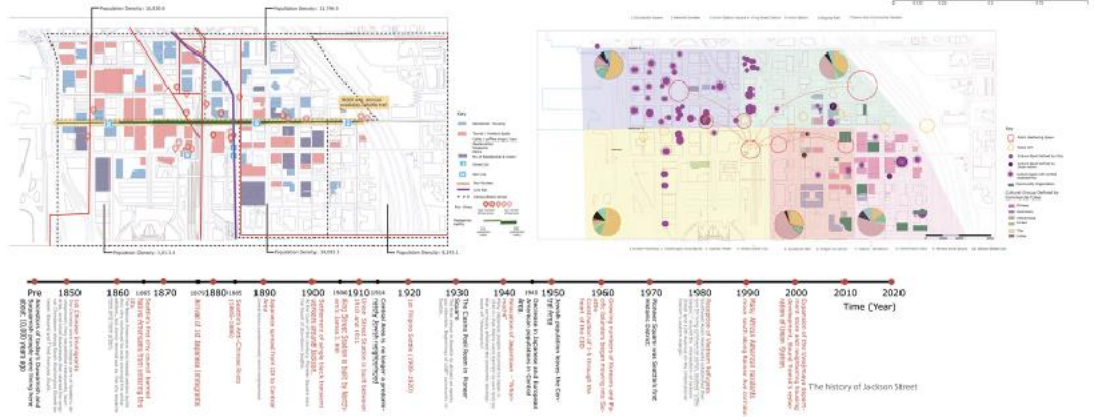
- Social/spatial analysis of Jackson Street**
What social dynamics & structures are producing the everyday experience of Jackson?
How do existing spaces along Jackson St. define and establish these social experiences?
- Community outreach and collaboration**
Connect with groups and engage their efforts to shape their voice and role.
How communities construct, represent, & imagine their place & experience along Jackson?
- Spatial design interventions and activism**
Re-imagined and reshaped spaces for all peoples and activities.
How can design support a particular social structure and experience?

PLAZA DESIGN (GROUP PROJECT)

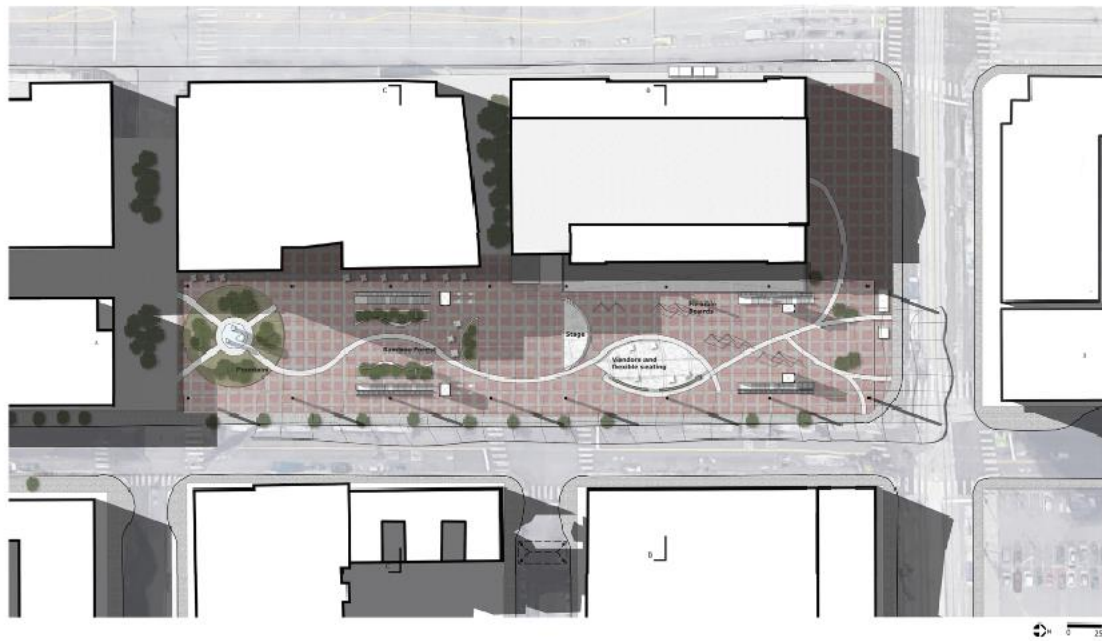
Collaborators: Jiao Mei, Michelle Kimberly Woo, Julie Yuan

Union Station Plaza Writing Your Own Story

International District is a melting pot of many ethnic enclaves such as Japantown, Little Saigon, Chinatown, and Africatown in which all of the very rich cultural histories contribute to the vibrancy of Seattle. Union Station Plaza will be a central gathering space representing one of Seattle's main community assets. This space strives to amplify International District's cultural visibility through the experience of art events, opportunities to express political voice, and the development of professional skills. This projects aims to build and unite International District as a whole collective community and bring new opportunity for the area, serving as a platform for all community organizations, residents, and visitors to grow and engage with each other through heartfelt and empowered interactions.



PLAN



PLAZA DESIGN (GROUP PROJECT)

Collaborators: Jiao Mei, Michelle Kimberly Woo, Julie Yuan



Context

ENTRANCES CIRCULATION GATHERING SPACES

Annual Calendar

Program

- Flexible outdoor/cultural pavilion
- River and water space
- Community gathering
- Art viewing and ART creation

IDENTITIES

- 5' x 5' Board Tables
- 12 Board Tables
- Public Benches

Weekend food and Culture market

Plan and Circulation

Art and Political Voice

Every other weekend, day and night visitors experience the food culture of the US with local businesses serving their best options to the public; low income and/or homeless citizens are able to work in these markets to develop job training skills.

Art viewing and creation with educational opportunities, workshops, lectures to reach art and art depicted by local ARTISTS engage the public and residents to define their own cultural presence in the community.

This block is a comprehensive design presentation. It includes a 'Context' section with diagrams for entrances, circulation, and gathering spaces. The 'Annual Calendar' section features a circular diagram showing seasonal activities. The 'Program' section lists key features like a flexible outdoor pavilion and community gathering spaces. 'IDENTITIES' are defined by board tables and benches. Two main activity areas are highlighted: a 'Weekend food and Culture market' and an 'Art and Political Voice' area. Each activity area is accompanied by a plan and circulation diagram and a perspective rendering. The market rendering shows people at tables under a canopy, while the art area rendering shows people gathered around art installations. Two perspective renderings at the bottom show the plaza's exterior facade from different angles, with a north arrow and scale bar below each.