

# An Investigation of Cultural Infrastructure in Hangzhou, China to Improve the Quality of Life in Xiasha

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# An Investigation of Cultural Infrastructure in Hangzhou, China to Improve the Quality of Life in Xiasha

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Report Submitted to:

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# Abstract

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With the guidance of Hangzhou Dianzi University Professor Wang Guofeng, this project addresses the current disparity of cultural infrastructure in the Xiasha sub-district in Hangzhou, China by comparing it to the Xihu district and Worcester, Massachusetts. Utilizing results from interviews and a survey conducted with residents of Xihu and Xiasha, the team discovered that key cultural facilities are unavailable in Xiasha and at least 40 minutes away by public transportation. From these findings, the team created a list which recommends that the sub-district of Xiasha establish new cultural infrastructure sites, and also refurbish certain existing facilities. Implementing these recommendations has the potential to raise the happiness and quality of life for people living in Xiasha.

# Executive Summary

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Cultural infrastructure, more commonly referred to as cultural facilities, plays an integral role in the overall happiness of a community. Cultural infrastructure has a range of definitions, including interconnected social hierarchy (Thomas, 2015) and just leisure activity buildings in general (Under Construction, 2008). For the purposes of this project, a cultural facility is a place that fosters a sense of community while providing activities for leisure time, outlets for creative energy, and sources of knowledge. A city with vibrant cultural infrastructure makes affordable and engaging leisure activities available to all community members (Zheng, Y., 2018).

At Hangzhou Dianzi University (HDU), sociology professor Wang Guofeng observed that the sub-district of Xiasha in Hangzhou, China is lacking in cultural infrastructure. She recognized that from events in Chinese history, such as the Cultural Revolution, China experiences a void of cultural enrichment for its citizens. In email correspondence to the team, she stated: “Once the population’s standard of living rises sufficiently to satisfy basic requirements—reliable food and shelter—the focus shifts from survival to happiness” (G. Wang, personal communication, September 11, 2018). In the years since the Cultural Revolution, Xiasha has been able to provide these basic needs; however, its cultural infrastructure has yet to blossom.

In China, the government is responsible for implementing cultural infrastructure. The nature, diversity, and location of this infrastructure affects citizens’ quality of life. However, due to top-down city planning, China’s government has been slow to develop cultural infrastructure in Xiasha in its pursuit of establishing an economic and technological center. Known as the Hangzhou Economic and Technological Development Area (HEDA), Xiasha is a hub of industry and economic development. This designation as HEDA is the main reason for cultural infrastructure disparity in Xiasha. The focus on economic development and higher education tends to outweigh cultural infrastructure in Xiasha’s city planning decisions. Therefore, residents of Xiasha experience cultural enrichment in a different capacity than those in Xihu.

Located in the west of Hangzhou, the Xihu (West Lake) District covers an area of 312 square kilometers. In terms of cultural infrastructure, it has 23 state historic sites, 44 provincial historic sites; as well as Buddhist, Confucian, and Taoist religious protections due to the many temples surrounding West Lake (West Lake—World Nature Heritage, 2018). The group utilized

Xihu's cultural infrastructure as a model to compare with that of Xiasha's to aid in creating the deliverables. The goal of this project is to raise the quality of life in Xiasha by identifying the strengths and weaknesses of its cultural infrastructure and determine how to improve these facilities in the future. To this end, the group created the following three objectives:

1. Assess the public cultural and sports facilities in Worcester and Hangzhou.
2. Analyze the public usage and perception of these facilities in Worcester and Hangzhou.
3. Identify points of strength and areas of improvement in Xiasha's cultural infrastructure.

The team investigated Worcester, Massachusetts as a preliminary step to gain an understanding of public cultural facilities. Once in Hangzhou, the team conducted group interviews with HDU students and teachers, individual interviews with Hangzhou residents and distributed a survey in Xihu and Xiasha. Over the course of one week from October 23rd to November 2nd, the team conducted 12 interviews. Additionally, during a two-week period from November 8th to November 20th, the team collected 395 surveys, online and on paper. Completing these interviews and the survey would not have been possible without our Buddies, the HDU students who volunteered to help us translate languages and navigate Hangzhou. With their assistance, the team obtained the following results.

The overall population of Hangzhou is satisfied with the current cultural infrastructure; however, survey responses illustrate that Xiasha residents believe that the cultural facilities are both "too far away" and that there are "not enough" facilities. Xiasha residents indicated that many types of facilities are too far away (see Figure 0-1). Sports facilities are low on this graph due to the large concentration of universities in Xiasha, which offer this cultural infrastructure free of charge.

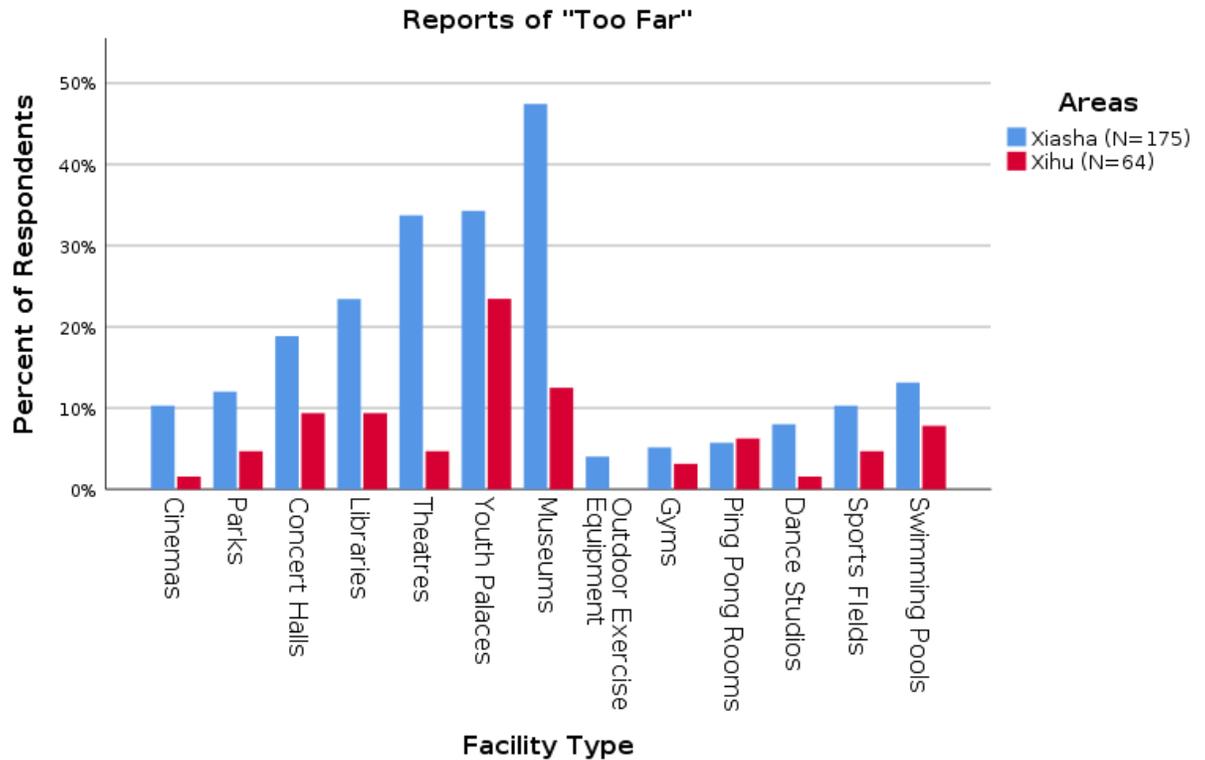


Figure 0-1: Graph of “Too Far” responses to the survey

Museums, youth palaces, theatres, and libraries are the highest bars on the graph due to there being none of these facilities in Xiasha (see Figure 0-1). A majority of these types of facilities are, at minimum, about 26 kilometers from Xiasha which requires residents to travel 40 to 60 minutes on public transportation to get to them. Casual interviews with Xiasha residents informed the team that the respondents want to cut back on travel time as much as possible, due to their limited free time during the week and weekends. These long travel times deter Xiasha residents from going to these facilities and therefore, require closer infrastructure.

Additionally, the surveyed Xiasha residents stated that there are not enough cultural facilities in their area (see Figure 0-2). However, certain types of facilities, like cinemas, are commonly found throughout both cities which is why they have low percentages on the graph.

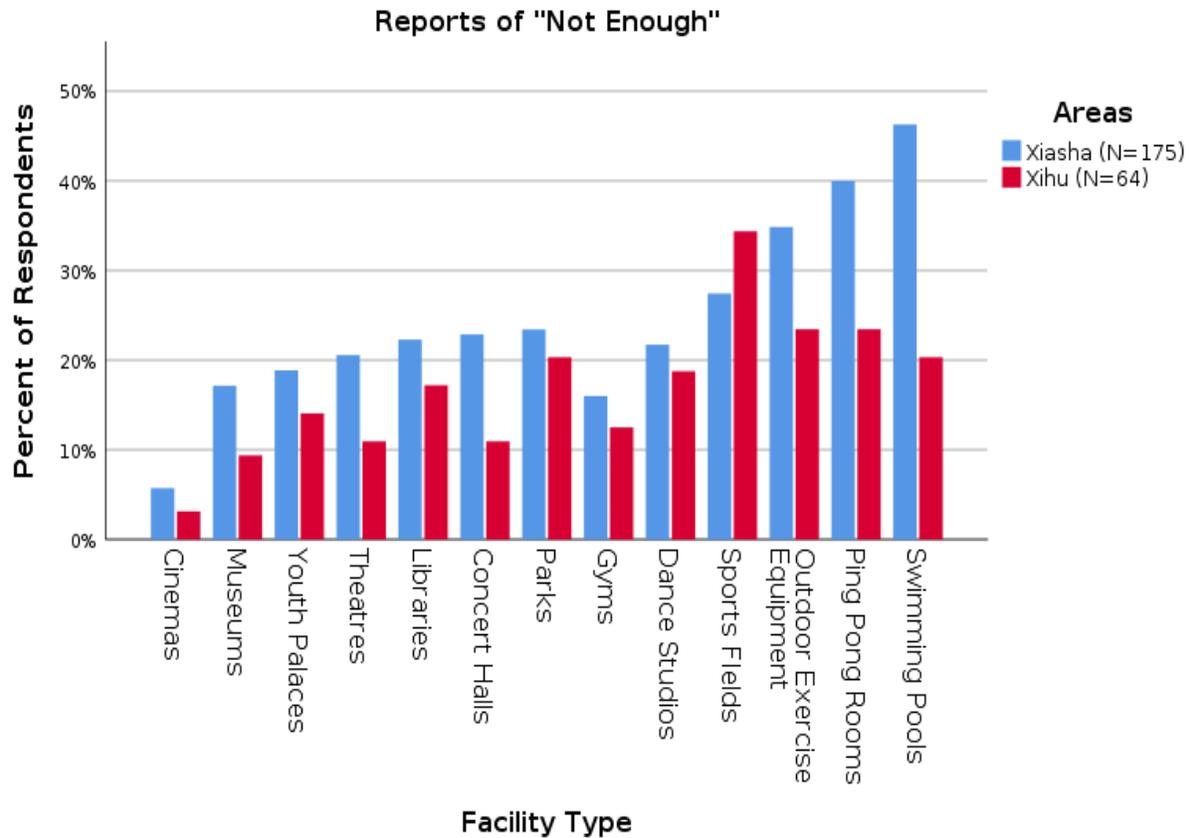


Figure 0-2: Graph of "Not Enough" responses to the survey

Although survey respondents indicated that the sports facilities are close to where they live, this does not mean that they are satisfied with the number of these facilities in Xiasha. Specifically, swimming pools, ping-pong rooms, and outdoor exercise equipment are sports facilities of which residents' desire more. One student from the HDU Student Group Interview (see Appendix H) stated that she does not go to the currently available public swimming pools because they are extremely overcrowded. This overcrowding of current facilities discourages residents from using what is currently available, despite its close proximity. Building more of these types of sports facilities in Xiasha will address this issue.

From the data analysis, the team found three main ways to improve Xiasha's cultural infrastructure, which are establishing more cultural facilities, reducing the cost of admission, and refurbishing certain sites. These issues served as the foundation on which the team created a list of recommendations that Professor Wang will present to Xiasha's government. The list of recommendations is as follows:

- Reduce prices or raise incentive to pay for gyms, swimming pools, and theatres through promotions or membership loyalty programs
- Publicize and refurbish parks in Xiasha to make the parks visually appealing and more well-known to residents
- Add more and improve current outdoor exercise equipment in Xiasha's parks to provide workout variety to residents and park attendees
- Build more libraries and youth palaces in closer proximity to Xiasha to reduce travel time and costs
- Establish more theatres in Xiasha to increase accessibility, as well as the amount and variety of shows
- Raise the number of ping-pong rooms and public swimming pools in Xiasha to create a wider variety of physical activity options

Our sponsor, Professor Wang, intends to deliver this list of recommendations to Hangzhou's government, our second stakeholder. We believe implementing these recommendations will raise the quality of life and overall happiness of Xiasha residents. Shortening travel time as well as increasing the number and quality of facilities allows residents to relax more, which will lead to an increase in happiness and the general quality of life in Xiasha. There is a link between exercise and leisure activities and an increase in mental and physical health, (Paluska & Schwenk, 2000) and by increasing opportunities for these activities, Xiasha residents can experience these health benefits and improve their lives.

This project is important because raising the quality of life in a city can create a more desirable place to live in and help grow the population. Providing activities for people to do in their spare time gives residents a sense of purpose and benefits them in the long term. Without things to do in their free time, people will feel unfulfilled, and this could result in less productivity or drive them to move out of the area for a more attractive option.

Building more cultural infrastructure sites benefits Xiasha for many years. Not only will the creation of these buildings create construction jobs and positions at the cultural infrastructure itself, but the residents of Xiasha can use and enjoy these facilities for decades after construction. For example, more youth palaces can provide children with diverse classes and help foster a well-rounded generation to contribute to the progress of society. With quality outdoor exercise equipment, people of all ages can exercise safely in a pleasant, outdoor environment fit for socializing. These recommendations are ways to improve Xiasha as well as the lives of its residents.

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# 1. Introduction

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Cultural infrastructure, more commonly referred to as cultural facilities, plays an integral role in the overall happiness of a community. Cultural infrastructure has a range of definitions, including interconnected social hierarchy (Thomas, 2015) and just leisure activity buildings in general (*Under Construction*, 2008). For the purposes of this project, a cultural facility is a place that fosters a sense of community while providing activities for leisure time, outlets for creative energy, and sources of knowledge. A city with vibrant cultural infrastructure makes affordable and engaging leisure activities available to all community members (Zheng, Y., 2018). Hangzhou, China, is a city with high-quality cultural facilities; however, the distribution of these facilities is not even. This disenfranchises the citizens of certain areas, who lack easy access to the facilities found throughout the rest of the city.

Professor Guofeng Wang of Hangzhou Dianzi University (HDU), our sponsor, intends to improve the cultural activities specifically in Xiasha, a sub-district of Jianggan. Since the Cultural Revolution, “the standard of living of Hangzhou residents has been greatly improved” (G. Wang, personal communication, September 2, 2018). However, this increased standard of living is mostly in terms of material goods, due to the economic growth of China over the last four decades. Cultural infrastructure in Hangzhou has not kept pace with the city’s economic growth during this period. Consequently, certain areas of Hangzhou need improved and expanded leisure activities and facilities. Xiasha, specifically, has seen insufficient growth in cultural infrastructure due to its focus on economic and technological development.

The goal of this project is to help improve the quality of life in the sub-district of Xiasha by developing its cultural infrastructure. To help achieve this goal, the team followed these steps. This study first looks at the current facilities in Worcester, Massachusetts, focusing on distribution and price. Then the group analyzed Xihu, known as the West Lake district, as a point of comparison in China as it is a well-developed cultural district in Hangzhou. To assess the present state of cultural infrastructure in Xiasha, the team conducted casual interviews to gain background information that helped restructure the survey for more accurate results. Then, the group conducted surveys in Xiasha and Xihu to evaluate the citizens' perceptions of the quality and availability of cultural facilities. The surveys also identified several specific issues affecting different types of facilities in each area. The group obtained 395 surveys both electronically through WeChat and in-person to obtain a representative sample population. In addition, the team used anecdotal evidence from casual interviews to support the survey data. Based on statistical analysis of the survey, results from the Worcester comparison, and patterns in interview responses, the team generated a thorough and feasible list of recommendations to strengthen the cultural infrastructure in Xiasha.

The team created this list for Xiasha's government, recommending that it establish more cultural infrastructure sites, refurbish certain facilities, and reduce prices for admission. The team hopes the government integrates our recommendations into its future city planning and development to provide its residents with diverse activities and opportunities to lead a more enriching and fulfilling life.

## 2. Background

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This chapter consists of relevant background information to offer context for this project's research. Section 2.1 outlines of China's recent history as it relates to the project. Section 2.2 defines the broad term of "quality of life" and analyzes it from a few, non-exhaustive angles. Section 2.3 presents information on the nature of urban planning in China and on the importance of cultural infrastructure in cities. The next section contains basic statistics on the populations of Worcester and Hangzhou. Section 2.5 consists of information on the layout and size of each city, paying special attention to the distribution of public cultural facilities throughout Hangzhou and Worcester, and the last section describes the project's stakeholders.

### 2.1 Relevant Chinese History

China has a rich history of almost 5,000 years, with the first Chinese dynasty dating back to 2100 BCE (Asia for Educators, 2009). However, this background looks at the recent event of Mao Zedong's Cultural Revolution and developments since then because this part of Chinese history directly relates to the project. Section 2.1.1 gives an overview of the Cultural Revolution. The Cultural Revolution is the key event in Chinese history that is critical for understanding the motivation of this project. Section 2.1.2 briefly discusses what China has done since the Cultural Revolution to undo the economic and societal damage done by Mao's rule.

## 2.1.1 Cultural Revolution

To address modern cultural infrastructure in Hangzhou, it is important to understand the history that is central to the creation of the project. The Cultural Revolution was a decade-long event launched by Mao Zedong in 1966 to eliminate counterrevolutionaries, or anyone accused of going against the communist party. Mao utilized impressionable youth, such as college graduates and teenagers, who quickly seized the opportunity to join Mao—partially due to facing an inevitable mass unemployment (Singh, 1968). These young activists became known as the Red Guard. Under Mao’s control, the Red Guard started by tormenting school authorities and teachers, then eventually Chinese society as a whole (Yongyi, 2011). Universities shut down due to the Cultural Revolution, which had a long-term consequence of a poorly educated generation (Kenley, 2012). With minimal just cause, the government and the Red Guard accused and beat people for reasons including not displaying adequate communist enthusiasm or showing signs of western sympathy. Many of Mao’s political opponents committed suicide rather than face persecution by the Red Guard. During this time Mao became a god-like figure, commonly referred to as the “Reddest-red Sun of Our Hearts” (Kenley, 2012), through numerous propaganda tools like statues, posters, and books. Figure 2.1-1 is an example of one of these propaganda posters.



Figure 2.1-1: Propaganda depicting an enthusiastic crowd cheering for Mao. (Zhejiang Workers, Farmers and Soldiers Art Academy Collective, 1968)

The Cultural Revolution came to an abrupt end in 1976 when Mao died of natural causes. In modern times, Chinese society refers to the Cultural Revolution as an “unmitigated disaster” (Kenley, 2012), where Mao’s government destroyed much of Chinese culture and history to censor citizen’s access to past regimes and dynasties. For example, the Red Guard stormed the Lingyin Temple in order to destroy the connection to Buddhism (Franzen, n.d.). Events like this resulted in China losing a large portion of its history, traditions, universities, and economic stability. In the 40 years since the Cultural Revolution, China has made progress in rebuilding sites from the economic and cultural damage done.

## 2.1.2 Post Cultural Revolution

After Mao's reign, Deng Xiaoping, Mao's successor, wanted to undo the damage done by the Cultural Revolution. He wanted to modernize China in four areas: agriculture, industry, science, and the military (Kenley, 2012). Most notably, Deng pushed for huge economic reform, opening up China's borders to the rest of the world. He created Special Economic Zones where foreign companies could build and hire with almost no government interference. This was incredibly successful; Shenzhen, the first of these zones, grew from a population of a few thousand to over fourteen million (Kenley, 2012). Despite this progress, economic development was not always smooth. After the incident at Tiananmen Square in 1989, international investors were uneasy to continue their business in China, thinking that Deng would reverse his stance on economic openness. However, Deng made it clear through public announcements that China would remain economically open and not return to being a nation with closed borders. China is an economic powerhouse in the world today, with its economy being second largest in the world, behind only the United States (Kenley, 2012). Due to the void of activity and lack of effort to create new cultural programs, China's cultural infrastructure has not experienced as significant of a growth as their economy over the past 40 years.

## 2.1.3 Conclusion

In general, it is essential to learn from history so that future generations learn from the mistakes of their ancestors. The current investigation, initiated by Professor Wang, intends to help Hangzhou renew what it lost to the Cultural Revolution through improving cultural

infrastructure. With the knowledge of this part of China's history, the team focused the scope and objectives of the project on the actions the country needs to take to regain its cultural footing. Having knowledge of the Cultural Revolution helps identify the historical, and continuing, need for infrastructure reform in China. This provides insight into the state of the quality of life of Chinese citizens in the present day.

## 2.2 Quality of Life

Being more involved in one's community both raises levels of happiness and is beneficial to one's mental health (Wei, Huang, Stodolska, & Yu, 2015). In a city, one's quality of life depends on many factors, including exercise, education, and hobbies. Having many options to satisfy the needs of the citizens within a city encourages people to participate in the activities available. Cultural infrastructure creates a sense of community by providing resources that enable people to gather in one place to participate in a hobby or activity that they all enjoy.

### 2.2.1 Leisure Activities

Leisure activities are an important part of daily life as they positively impact a person's health and well-being (Larson & Cloutier, 2016). The definition of leisure activities is hobbies and other types of activities that people enjoy in their free time. Studies done on the relationship between leisure activities and quality of life show that people who engage in social leisure activities are more satisfied with their lives (Lloyd & Auld, 2002). Improving cultural facilities in an area provides citizens with more opportunities to discover something they enjoy doing in their spare time, and thus increases their health and well-being.

During the Cultural Revolution, people could only participate in traditional Chinese activities. These included games, like poker, reading government-approved novels and cartoons, playing Chinese checkers, and collecting items (Wei et al., 2015). In China today, things like surfing the Internet and playing computer games are the most popular leisure activities (Wei et al., 2015), which is a testament to the technological advancement of China in the last 40 years. However, Chinese cultural infrastructure did not maintain the same pace as other areas of China's advancement. In a study done by Wei, Huang, Stodolska, and Yu (2015), 500 students took surveys in Hangzhou asking about current cultural infrastructure options. More than half of the students said they were either "not satisfied" or "not very satisfied" with the current offerings. An influx of western culture after the Cultural Revolution introduced new leisure activities to the Chinese, validating results that indicate people are dissatisfied with their traditional options. During the Cultural Revolution, Mao declared anything western as counterrevolutionary, due to the capitalistic tendencies of the western countries (Wei et al., 2015). In more recent years, the Chinese people have expressed a demand for more 'fashionable and trendy' western leisure activities, such as going to bars and mountain climbing (Wei et al., 2015). The National Survey predicts the demand will keep rising as China continues to recover from the Cultural Revolution (Wei et al., 2015). This increasing demand is a problem because of the lack of available facilities for leisure activities. Additionally, those facilities that exist are often not open at times that coincide with the schedules of students or employees (Wei et al., 2015). Improving and creating more leisure offerings addresses the current dissatisfaction with current leisure activities and will enhance cultural infrastructure in Chinese cities.

## 2.2.2 Education

An essential part of a healthy culture is quality education. Education passes down the culture of a society to younger generations and equips them to produce their own contributions to art, science, or history. In general, people with higher education levels have a better quality of life because their access to more jobs and the economic advantages of education give these people a greater sense of control over their lives (Ross & Van Willigan, 1997). Additionally, Museums and historical sites can enrich people's knowledge by providing more information and artifacts on specific topics.

China has a rich past, as highlighted by the many museums, pagodas, and other historical sites found throughout the country. These museums and historical sites supplement the lessons taught in the school systems by displaying artifacts and complementary knowledge on the relevant subjects. Children learn more easily inside these sites because the artifacts and the various exhibits inside the museum keep them engaged longer than a classroom setting could (Wu & Wall, 2017). During the Cultural Revolution, Mao condemned museums and historical sites for glorifying Historical China (Yongyi, 2011). The denouncement of Historical China stripped museums and certain sites of history, making the museums of today un compelling to most Chinese locals (Sheng & Lo, 2010). Improved marketing, among other adjustments, will entice locals to return to these museums and help the local population continue to learn from them (Sheng & Lo, 2010).

Youth palaces play a huge role in educating the youth in China. They are government funded buildings that offer various classes for children of all ages to take (Baidu Encyclopedia,

2018). Classes available at these facilities include sports, art, language, and developmental. Parents enroll their kids in these classes because it provides a source of extracurricular activities and is relatively inexpensive due to government funding (Grandparent at Xihu youth palace, Informal Interview, October 24, 2018). These reasons make youth palaces very popular in China, so popular that each district in various cities has at least one.

### 2.2.3 Parks and Sports Facilities

Physical activity provides many benefits to the human body. People who incorporate exercise into their daily lives experience fewer instances of mild health issues and mental health issues, like depression and anxiety (Paluska & Schwenk, 2000). The benefits of regular exercise include reduced stress, clearer minds, and a higher level of happiness (Paluska & Schwenk, 2000). Including more sports facilities and green spaces in a city raises the quality of life by giving the residents more opportunities to stay active and healthy.

Sports facilities create an outlet for people who want to include more exercise and physical activity into their lives. For the purpose of this paper, the definition of sports facilities is a place one can go to exercise and play, like a Youth Men's Christian Association (YMCA) or gym. Using these facilities raises the quality of life because exercise can improve a person's daily life (Guedes, Hatmann, Martini, Borges, & Bernardelli, 2012). Daily exercise releases various chemicals in the brain, such as endorphins which cause someone to feel positive and energized (WebMD, 2018). Exercising improves a person's physical health as well. Instances of heart disease, high blood pressure, and heart attacks decrease with daily exercise (Paluska &

Schwenk, 2000). By making sports facilities more accessible, more people will reap these benefits.

Parks raise the quality of life in an urban area because they provide “a space for recreation, reflection, and cognitive growth” (Larson & Cloutier, 2016). Additionally, in China, parks play a larger role in daily exercise than in the United States. Many people use parks on a daily basis to go for a walk, a jog, play sports and outdoor games, and do Tai Chi (Professor Du, personal correspondence, September 19th, 2018). In an urban setting, parks containing trees help the residents more than those with just exercise and recreational space. Trees filter carbon and other emissions out of the air, which helps combat pollution from cars and other sources (Nowak, Greenfield, Hoehn, & Lapoint, 2013). Chinese cities are also extremely crowded resulting in smaller apartments. The cramped conditions inside apartment buildings drive residents to spend free time elsewhere (Urist, 2013). Creating more parks or repairing the current offerings, provides more outdoor space for people to go in their spare time and promotes using these parks for physical activity and to relax.

More instances of places with space for physical activities encourages people to stay active. Establishing more aesthetically pleasing and easily accessible parks or sports facilities leads to a rise in physical activity among men and women in the surrounding area (Su et al., 2014). The benefits created by the rise in physical activity would help citizens reduce stress and be happier overall (Paluska & Schwenk, 2000). Bolstering the supply of available sports facilities and parks in a city promotes wellbeing and elevates the quality of life of the residents.

## 2.2.4 Conclusion

A high quality of life is essential for residents of a city to want to stay. Poor cultural infrastructure lowers the quality of life because people may feel they are missing essential cultural activities, resulting in a less desirable city. Residents want to be close to amenities and infrastructure that they need on a regular basis, which would improve their quality of life. The design of the city is crucial to ensure their even distribution throughout. Knowledge in urban planning is essential to guarantee that these facilities are accessible to a high concentration of people.

## 2.3 Cultural Infrastructure in Urban Planning

Some cities are better to live in than others, but why? There are countless factors that might make one city preferable to another, and many are beyond control, but city planning can steer the course of an urban area to a certain extent. Managing the complexity of a densely-populated area is difficult; however, and it is easy to overlook small-scale issues while also considering millions of citizens. One issue which takes place on a very local level is the state of cultural infrastructure. Each neighborhood in a city needs a diverse set of cultural facilities, but planners may overlook these local concerns while trying to cater to the city as a whole. Therefore, it is critical to find an effective strategy while guiding the growth of a city.

### 2.3.1 Urban Planning

Urban planning is a daunting task. There are countless intertwined factors which determine the livability, vibrancy, and global prominence of a city. City planners are responsible for balancing and advancing all these goals and more, despite the fact that the outcomes of their decisions are always difficult to predict accurately. However, even an imperfect attempt to guide a city's development is better than unchecked growth.

The organizational structures of most urban planning administrations tend to fall somewhere on a continuum from top-down to bottom-up (*Under Construction*, 2008). In a top-down approach, a central city (or even federal) government sets targets for the more local levels of government to strive for and dictates funding. A bottom-up approach, in contrast, gives local levels of government substantial freedom to choose their own projects. This enables local and grassroots groups to influence their local areas. China falls squarely on the former side of this spectrum, which aligns with its strong centralization of power. This echoes the influence of the Union of Soviet Socialist Republics in that single-party rule and five-year plans have had no small impact on China's development as a nation (Kong, 2007). However, there is evidence that bottom-up strategies yield better results, which reflect the desires of the city populace (*Under Construction*, 2008). This is the weakness of the highly-centralized Chinese model; spectacular skyscrapers with cutting-edge architecture may create an image of prosperity and advancement for outsiders, but they often have little value to city residents, who may remain underserved indefinitely (Kong, 2007). Cultural infrastructure is one example of this conflict, and successful implementations of it prove that a local focus is essential in large-scale urban planning.

### 2.3.2 Cultural Infrastructure

This project focuses on the characteristics of cultural infrastructure in cities. But before any research, analysis, or discussion can begin, it is helpful to decide on a single definition of “cultural infrastructure”. This is no trivial task, as multiple definitions exist within a relatively small body of literature. The term can refer to the intangible structure of a culture itself – the “infrastructure” which establishes an interconnected social hierarchy (Thomas, 2015). This definition is most common in the literature on management but holds little relevance to this research. The other available definitions, closer to our working definition, tend to refer to real-world locations associated with culture to some degree. However, most of the literature available does not provide a rigorous definition of the term and focuses on art facilities near-exclusively (Brooks & Kushner, 2001). While studios, galleries, and museums are within the scope of this project, this research also considers most public leisure destinations as cultural infrastructure. This includes entertainment facilities, such as movie theatres; outdoor spaces, such as parks and public gardens; and other spaces, including gyms and sports facilities. Although these examples may provide a general understanding, it is helpful to have a single, written definition. Thus, we use the CECC National Roundtable Dialogue (2007-2008) definition of cultural infrastructure:

[Cultural infrastructure is defined as] physical assets and spaces whether they are full time or part time, single purpose or multi-purpose, historic or contemporary that have cultural products and accommodate and satisfy the requirements of cultural activities and cultural industry (as cited in Under Construction, 2008, p. 17)

Consequently, there is a diverse array of facilities, ranging from libraries and playgrounds to basketball courts and concert halls, which are relevant to the project.

Cultural infrastructure plays an important role in elevating a city's quality of life. Once the population's standard of living rises sufficiently to satisfy basic requirements—reliable food and shelter—the focus shifts from survival to happiness (G. Wang, personal communication, September 11, 2018). This is the role of cultural infrastructure; it provides activities for leisure time, outlets for creative energy, and sources of knowledge. Grodach and Loukaitu-Sideris (2007) state that cultural centers, areas of concentrated artistic or creative cultural infrastructure within cities, are “a significant factor in how individuals choose where to live and work” (p. 349). The reasoning is simple: people place value in their culture, and places where it is accessible to them will naturally attract citizens. However, accessibility can be surprisingly difficult to implement. People usually frequent places which are only within about 15 minutes from their home by foot, and the upscale, “flagship” facilities are often prohibitively expensive, especially for habitual use (Kong, 2007; Zheng, 2018). The spatial distribution and makeup of cultural infrastructure therefore requires close attention, and is the focus of the project.

### 2.3.3 Conclusion

This study aims to determine the needs, met and unmet, of Hangzhou residents on a local basis. This is necessary because top-down urban planning is several degrees removed from the wishes of the citizens, and because the distribution of current cultural facilities will result in varying needs in different areas. By collecting input directly from the source and analyzing it based on location, the research addresses both of these “blind spots”. As a result, the project is

well-positioned to uncover new areas of potential improvement for the cultural infrastructure of Xiasha. Another important step towards serving the city effectively is to understand the demographics of the two cities involved in the investigation, Worcester and Hangzhou.

## 2.4 Demographics

A city's residents need for cultural infrastructure depends on the population's makeup, but not necessarily on its size. As explained by our sponsor, Professor G. Wang, "Any city has a cultural infrastructure, which is an important aspect of urban construction and has little to do with the size of the city..." (personal communication, September 11, 2018). As a result, our research team decided to initially compare Worcester, Massachusetts to Hangzhou, our city of primary concern, due both to its proximity and the team's familiarity with the city. Though Hangzhou's population of 9.18 million dwarfs Worcester's population of 185,677, their populations have the same basic needs for cultural infrastructure (United States Census Bureau, 2017; Zhejiang Provincial Department of Culture, 2017). Any variations between the cultural infrastructure of the two cities result from the types of people inhabiting the cities. Tables 2.4-1 and 2.4-2 tabulate the demographic data of Hangzhou and Worcester, respectively.

The most reliable method to compare the demographics of these two cities is through existing statistical data. Population numbers from the past reveal the astonishing growth rate of Hangzhou: based on a 5% population sampling survey, Hangzhou had 7.966 million long-term residents in 2008 (CPC Hangzhou Committee and Hangzhou Municipal Government, n.d.). With a current population of approximately 9 million, that means a growth of over one million residents in less than a decade (China Statistics Press, 2017). This means a population growth of

over one million residents in less than a decade. Tables 2.4-1 and 2.4-2 show that neither city has drastic differences in age distribution, but the data may mask more subtle differences. Table 2.4-3 shows the city's population density averages 554 people per square kilometer throughout the entire urban district, but this figure rises by an order of magnitude or more in several districts, especially Shangcheng and Xiacheng.

Table 2.4-1: Demographics in Hangzhou, China (2008) (CPC Hangzhou Committee and Hangzhou Municipal Government, n.d.)

Age in Hangzhou	People	Percent of Population
Persons 0-14 years	987,800	12.40%
Persons 15-65 years	6,109,900	76.70%
Persons 65 years and over	868,300	10.90%

Table 2.4-2: Worcester Census Data (2017) (United States Census Bureau, 2017)

Age and Sex	Percent of Population
Persons under 5 years	5.9%
Persons under 18 years	20.3%
Persons 65 years and over	12.7%
Female persons	50.8%
Male persons	49.2%

Table 2.4-3: Land Area and Population Density of Hangzhou (2016) (China Statistics Press, 2017)

Region	Land Area (sq. km)	Population (10,000 persons)	Population Density (persons/sq. km)
<b>Whole City</b>	<b>16596</b>	<b>918.80</b>	<b>554</b>
Shangcheng	18	35.32	19,622
Xiacheng	31	53.60	17,290
Gongshu	88	58.20	6,614
Jiangan	210	106.15	5,055
Binjiang (Hi-Tech)	73	33.56	4,597
Xihu	263	84.42	3,210
Urban District	4876	737.99	1,514
Xiaoshan	1,163	157.20	1,352
Yuhang	12,22	135.90	1,112
Fuyang	1,808	73.64	407
Tonglu	1,780	42.30	238
Jiande	2,364	44.70	189
Lin'an	3,124	58.85	188
Chun'an	4,452	34.96	79

## 2.5 City Layout

The layout of a city is a major factor in the success and popularity of cultural facilities. With poor urban planning, facilities are difficult to access, making it challenging to stay in business. Alternatively, facilities may be too close together, oversaturating the market, and producing decision paralysis among citizens. Analyzing the layout of Hangzhou and Worcester can show the location of cultural facilities and their distribution throughout both cities.

## 2.5.1 Hangzhou, China

Known as “Paradise on Earth”, “Cultural State”, “Home of Silk”, and “Tea Capital”, Hangzhou lies on the Southeast coast of China and is the capital of Zhejiang Province. Figures 2.5-1 and 2.5-2 are maps of China and Zhejiang Province, respectively, and Table 2.4-3 shows the total area of the city covers 16,596 square kilometers. Hangzhou is the province’s center of economy, education, politics, science, and culture. As noted by the State Council, Hangzhou is also a national center for tourism and history in China (CPC Hangzhou Committee and Hangzhou Municipal Government, n.d.).



Figure 2.5-1: Map of China (Hangzhou Maps, n.d.)



Figure 2.5-2: Map of Zhejiang Province (Hangzhou Maps, n.d.)

There is a very large area within Hangzhou's administrative boundaries, although not all of it is heavily urbanized or even the city proper. Figure 2.5-3 shows the delineation of the area into eight northeastern districts and five southwestern counties. The districts (Shangcheng, Xiacheng, Gongshu, Xihu, Jianggan, Jinjiang, Xiaoshan, and Yuhang) partition the urban center and outskirts of Hangzhou city, while the counties (Fuyang, Lin'an, Jiande, Tonglu, and Chun'an), each a smaller city in their own right, occupy the remaining land. All are under the governance of Hangzhou City (General Situation, n.d.).

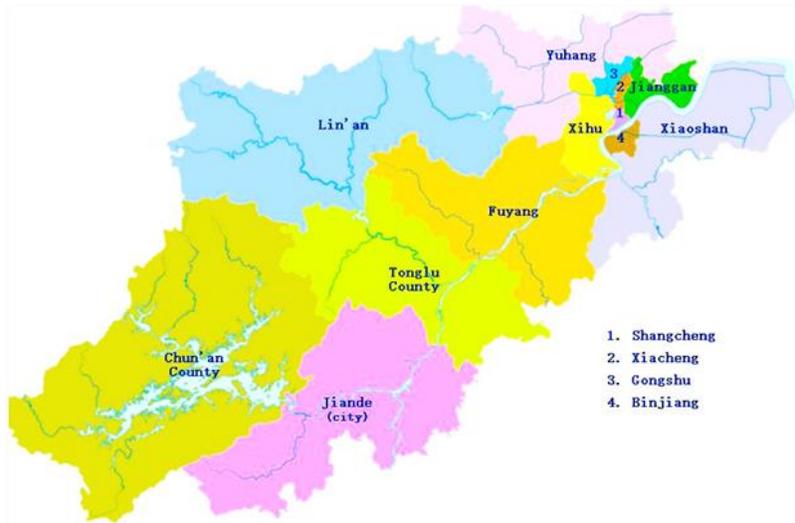


Figure 2.5-3: Map of Hangzhou districts (Hangzhou Maps, n.d.)

Figure 2.5-4 plots the quantity of specific cultural facilities in Hangzhou regions. While some have increased recently, such as cinemas and museums, others experienced little-to-no development in 16 years or more. From 2000 to 2016, the number of libraries only grew from 10 to 15, and the number of theaters rose even less, from 9 to 11. Additionally, even the facilities which have improved in the last decade have grown unevenly. Their numbers remain constant, see a period of rapid growth, then stall once again.

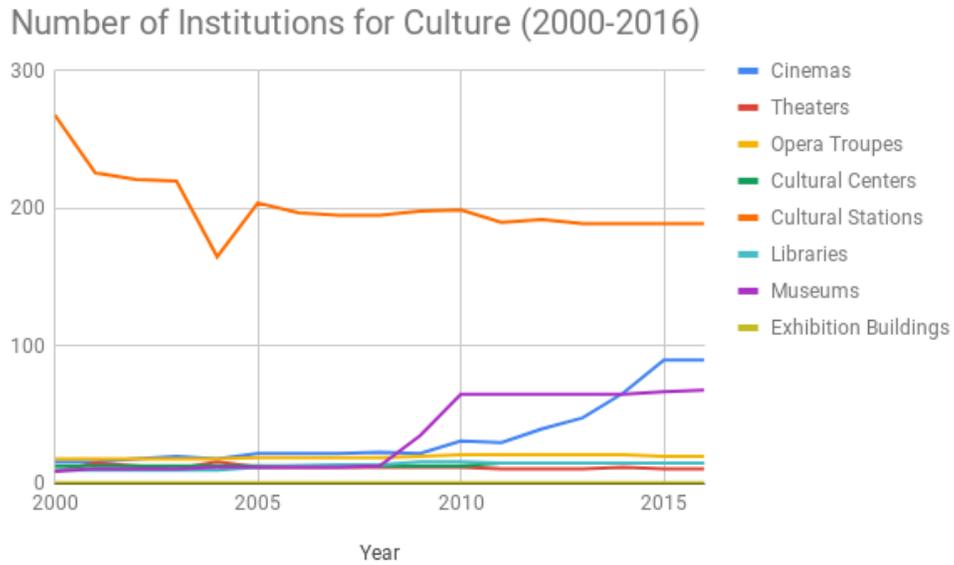


Figure 2.5-4: Number of cultural facilities in Hangzhou (2000-2016) (Zheng, Y.,2018)

Table 2.5-1 separates the number of cultural institutions by district. The urban district surpasses the outlying and rural districts in its offerings of cultural infrastructure for citizens. These figures show that Hangzhou citizens who live outside of the city center have few options for cultural enrichment.

Table 2.5-1 Number of Institutions of Culture by Region (End of 2016) (Zheng, Y.,2018)

District	Theatres	Opera Troupes	Cultural Centres	Cultural Stations	Libraries	Museums	Exhibition Buildings
<b>Total</b>	<b>11</b>	<b>20</b>	<b>15</b>	<b>189</b>	<b>15</b>	<b>68</b>	<b>1</b>
<b>Urban Districts</b>	11	18	11	118	11	60	-
<b>Xiaoshan</b>	-	1	1	27	1	9	-
<b>Yuhang</b>	2	1	1	19	1	5	-
<b>Fuyang</b>	-	1	1	24	1	3	-
<b>Tonglu</b>	-	1	1	14	1	2	-
<b>Chuan'an</b>	-	-	1	23	1	1	-
<b>Jiande</b>	-	1	1	16	1	4	-
<b>Lin'an</b>	-	-	1	18	1	1	-

#### 2.5.1.1 Xihu District

Located in the west of Hangzhou, the Xihu (West Lake) District covers an area of 312 square kilometers. Within its population of 1 million, there are 600,000 permanent residents and 400,000 migrants. Xihu also holds the Provincial Party Committee and provincial government, which rules over 10 sub-districts, 131 communities, and 61 administrative villages (Xihu District Introduction, 2016). In terms of cultural infrastructure, it has 23 state historic sites, 44 provincial historic sites; as well as Buddhist, Confucian, and Taoist religious protections because of the many temples surrounding West Lake (West Lake—World Nature Heritage, 2018). The group utilized the Xihu district’s cultural infrastructure as a model to compare with that of Xiasha’s to aid in creating the list of recommendations. Professor Wang and the group chose this district as the point of comparison in China to the Xiasha sub-district because it is culturally highly

developed and serves as a strong model for an area with adequate cultural infrastructure to support its people.

#### 2.5.1.2 Xiasha Sub-district

Located in the southeast of the Jianggan district, Xiasha sits by the Qiantang River on its eastern and southern sides and on the southern flank of China's Yangtze River Delta. It has a 13.5-kilometer beach line and is 19 kilometers from West Lake (Hangzhou Economic and Technological Development Zone–Xiasha, 2009). Known as the Hangzhou Economic and Technological Development Area (HEDA), Xiasha is a hub of industry and economic development. Additionally, it is a center of higher education with 14 universities. Figure 2.5-5 shows a map of Xiasha in blue and the university campuses in red. This focus on economic development and technology is due to top-down city planning. As a result, the government neglected to develop the cultural infrastructure at the same pace. Therefore, the citizens in Xiasha experience less cultural enrichment at the same level of convenience than those in Xihu. To this end, Professor Wang and the group directed the project focus on Xiasha to bring more cultural activities to this area.

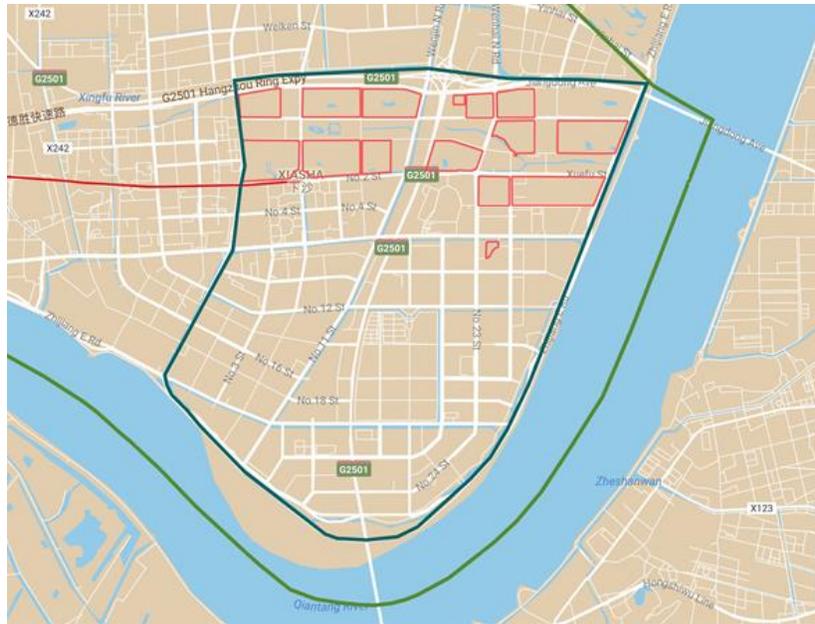


Figure 2.5-5 Map of Xiasha sub-district (outlined in blue), with college campuses outlined in red

## 2.5.2 Worcester, Massachusetts

Known as the “Heart of Massachusetts” and the second largest city in New England, Worcester lies in the center of Massachusetts (Worcester history, 2018). It became an official city in 1848, and currently covers an area of 38 square miles (City-Data, n.d.; The City of Worcester, n.d.). “Worcester is a hub of world-class colleges and medical facilities, and a place containing rich and diverse cultural assets...” (Worcester Cultural Coalition, 2017). Figures 2.5-5 and 2.5-6 show Massachusetts and neighboring states. Analysis of the current offerings of cultural infrastructure in the city can serve as a baseline, or possibly a counterexample, with which to compare Xiasha.



Figure 2.5-6: Map of the United States. Massachusetts in red. (File Map of USA, n.d.)



Figure 2.5-7: Map of Massachusetts and neighboring states. Worcester outlined in red. (Google, n.d.)

To obtain information in Worcester that served as a reference during the investigation in China, the group pinpointed the geographical locations of cultural and sports facilities. Figure

2.5-7 shows the layout of the facilities in Worcester. The group identified Worcester's centralization of its facilities as they lie in a linear fashion going from north to south. Several places branch out to the east and west, which increases their accessibility to the residents living near the city limits. This layout represents Worcester's cohesion as one city body under one central government.

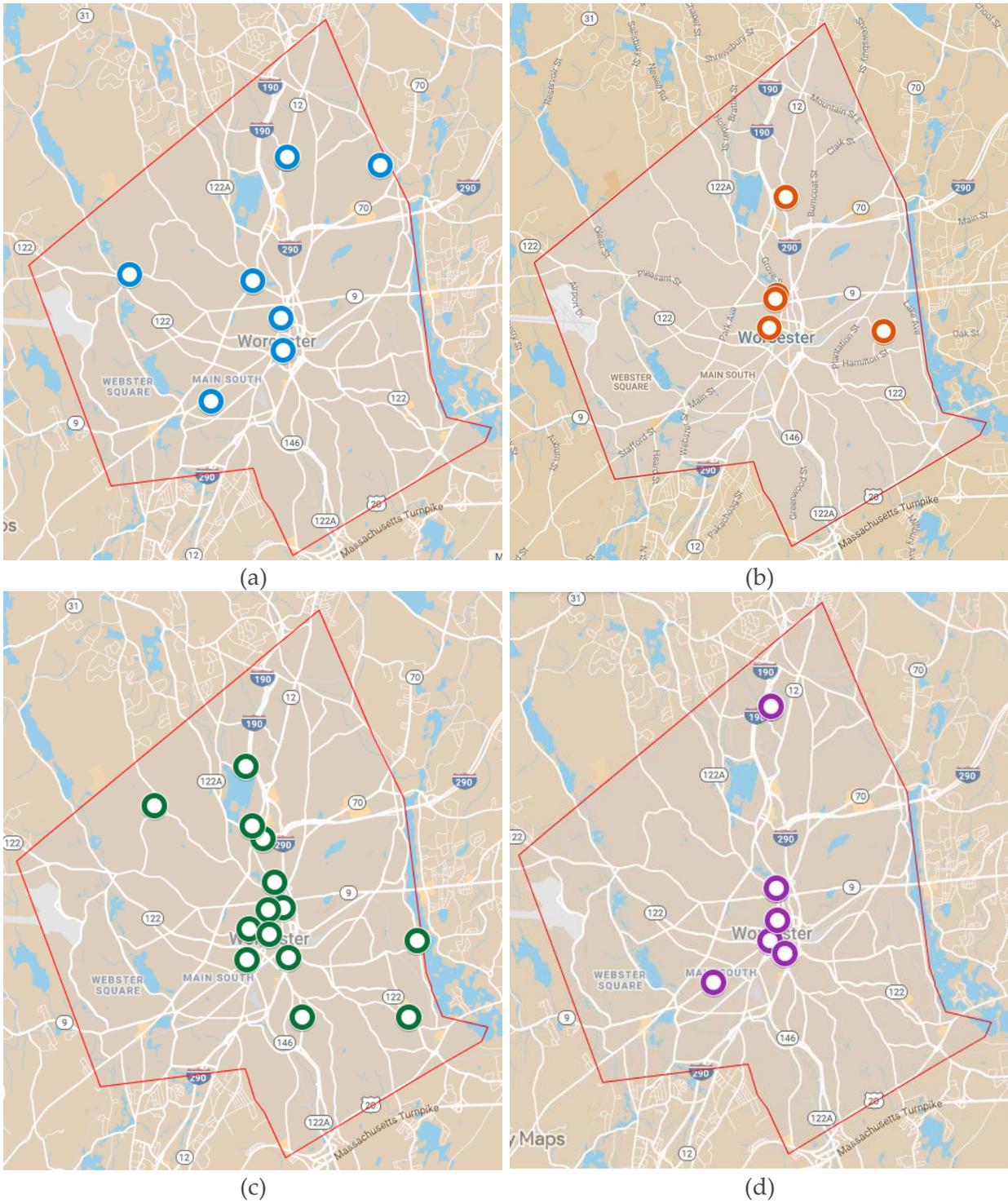


Figure 2.5-8: Public cultural facilities in Worcester: (a) libraries, (b) museums, (c) sports facilities, and (d) theaters (Google, n.d.)

### 2.5.2.1 Libraries

Figure 2.5-8a shows that the public libraries are spread throughout most of the city. These six libraries provide sufficient coverage for most of the city, except for the southeast quarter. In addition, there are two nearby libraries in the center of the city. This may reduce the load on both libraries, which see more traffic than those nearer to the city limits, but may represent an imperfect distribution of libraries throughout Worcester.

### 2.5.2.2 Museums

Figure 2.5-8b displays the locations of Worcester's five museums. One example of these, the Worcester Art Museum, showcases a variety of works from around the world; another, the Salisbury Mansion, tells the story of the Salisbury family and its impact on Worcester. Three of the five are in the city center, and the remaining two leave the south and west sides of Worcester without any nearby museums. However, since cross-town travel is feasible for occasional outings, this may be an acceptable distribution of museums.

### 2.5.2.3 Sports Facilities

To better understand recreational facilities in Worcester, the team analyzed membership and admission fees. Tables 2.5-2 through 2.5-7 below highlight a few of the sports facilities in Worcester and list their prices for use or membership. Figure 2.5-8c shows that there are a large number of sports facilities in Worcester, but few are in the residential area surrounding the city center. Most would entail a daily commute for regular use. It is worth noting, however, that Chinese people are already accustomed to doing various exercises in public parks for free

(Professor Du, personal correspondence, September 19th, 2018). As a result, people may not be interested in paid fitness programs in China. Therefore, Western-style sports facilities, such as Meridian Pilates and Worcester Fitness, may not be as popular in China.

Table 2.5-2 Sports Facilities in Worcester (Google, n.d.)

Facility	Type
Body Mind Balance	Training Studio
Buffone Arena	Ice Rink
Central Community Branch YMCA	YMCA
Dennis F. Shine Jr. Swim Pool	Pool
Enlightened Interventions, LLC	Wellness Center
Fidelity Bank Worcester Ice Center	Ice Rink
Greendale Family Branch YMCA	YMCA
Kinetex Athletic Training and Fitness Center	Gym
Meridian Pilates	Pilates
Snap Fitness	Gym
Worcester Fitness	Gym
Worcester JCC	Community Center
Worcester Yoga Center	Yoga
X Core Fitness	Gym

Table 2.5-3 Buffone Arena pricing (Worcester – Buffone Skating Arena, n.d.)

Service	Fee
Ice Rental	\$240 (50min/hr)
Public Skating	\$6.00
Public Hockey	\$10.00
Skate Rental	\$6.00

Table 2.5-4: Worcester YMCA membership fees (YMCA of Central Massachusetts, n.d.)

Age	Monthly Fee	
	Central Community Branch YMCA	Greendale YMCA
<b>One-time joining fee</b>	<b>\$25.00</b>	<b>\$50.00</b>
Young Adult (18-28 years) [no enrollment fee at Greendale]	\$32.00	\$45.50
Adult (29+ years)	\$33.00	\$64.00
Household/Family (two adults w/ children under 18 or dependents residing at the same address)	\$66.00	\$110.00
Senior Adult (65+ years) [no enrollment fee]	\$26.00	\$55.00
Senior Couple (two adults, one 65+, residing at the same address) [no enrollment fee]	\$52.00	\$88.00

Table 2.5-5 Meridian Pilates pricing (per person) (Meridian Pilates, n.d.)

Private	Duet	Trio
1 Session: \$75.00	1 Session: \$55.00	1 Session: \$45.00
5 Sessions: \$350.00	5 Sessions: \$250.00	5 Sessions: \$200.00

Table 2.5-6 Worcester Fitness pricing (Worcester Fitness, n.d.)

Service	Monthly Fee
Fitness Membership	\$89.00
HD Membership	\$139.00
Young Adult Membership (24 or younger)	\$45.00
Personal Training	\$169.00

Table 2.5-7 Worcester Jewish Community Center membership fees (Worcester JCC, n.d.)

Age	Monthly Fee
Family (Two adults & dependent children under 26 years)	\$109.00
Single Parent Family (1 adult never married/divorced/widowed & dependents under 26 years)	\$85.00
Couple (2 adults (27-64 years) living in same address)	\$100.00
Individual (27-64 years)	\$70.00
Young Adult (23-26 years)	\$46.00
Teenage (13-17 years) [no enrollment fee]	\$25.00
College (18-22 years) [no enrollment fee]	\$35.00
Senior Adult Individual (65+ years)	\$57.00
Senior Adult Couple (Two adults, one 65+, residing at the same address)	\$90.00

#### 2.5.2.4 Arts and Entertainment

Figure 2.5-8d shows the number of arts and entertainment facilities in Worcester.

Different cultures place greater emphasis on certain cultural facilities because of their cultural values. Comparing the number of arts facilities to that of sports facilities shows that Worcester places more value on athletics and physical activity. The team took Hangzhou’s cultural values into consideration when researching the current offerings for cultural facilities. Ignoring the cultural values of a city can prove problematic for new facilities since they may fall into disuse depending on the cultural emphasis of the location.

#### 2.5.3 Conclusion

An efficient city layout is necessary to ensure access to cultural facilities for everyone. Analyzing both cities provides the team with a broad sense of common pitfalls and possible improvements in the distribution of cultural facilities. Achieving a good city layout positively

affects the lives of many people. These people who rely on the cultural infrastructure are stakeholders in this project.

## 2.6 Stakeholders

Any individuals, groups, or entities involved with cultural infrastructure are stakeholders in the project. The state of Xiasha's cultural infrastructure may affect countless people in indirect, subtle ways, but itemizing and analyzing these groups completely is impossible. However, if this study reduces this list to only the parties with a very direct role in the project, the task becomes not only possible but advantageous to the team. Understanding the different perspectives, assets, and concerns of each set of stakeholders allows for a more complete and accurate analysis. The following sections introduce each key stakeholder and the role each plays in the project.

### 2.6.1 People Living and Working in Xiasha

People who are in a position to use cultural infrastructure in Xiasha are the primary stakeholders of the project. They include students, those working in Xiasha, and anyone else who resides in the area. Their happiness and general wellbeing correlate with the availability of quality leisure activities (Wei et al., 2015), which in turn is almost entirely determined by the state of cultural infrastructure throughout the city. Because the ultimate goal of the project is to raise the quality of life in Xiasha, the team is concerned primarily with this group.

The people of Xiasha know better than anyone else what their district needs in order to improve. The team gathered data on the cultural infrastructure of Xihu and Xiasha by surveying

the populace, since the population which uses the cultural infrastructure has the best perspective from which to evaluate it. This feedback was a key asset for the team, and will directly determine the investigation's findings.

## 2.6.2 Hangzhou Government

The *de facto* implementation of additional cultural facilities, or even the planning of specific facilities, is out of scope for this project. As a result, the Hangzhou government has few assets to offer the team besides statistics. These are still valuable for comparing Xiasha against other districts, but information and guidance on zoning laws or other regulations would only be useful for future, follow-up projects. As a result, the team has no plans to actively communicate with the city government. However, the government still has an interest in the success of the research as data on the state of cultural infrastructure may assist future city planning efforts. Specifically, improving the available facilities will make the HEDA a more livable and productive urban space. Provided that higher-level administration sees the value in developing cultural infrastructure on a local level, the products of this research would be a valuable asset to urban planners in Hangzhou.

## 2.6.3 Conclusion

Each stakeholder group brings different interests, perspectives, and assets to the project. While some groups may be more central to the investigation than others, it is always important to keep the big picture in mind and consider how the project's conclusions impact all groups

involved. By remaining cognizant of every stakeholder, especially while making decisions that affect the direction the project takes, it is possible to deliver the best results for all involved.

### 3. Methodology

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In order to improve Hangzhou’s cultural infrastructure, this project analyzes its current facilities and citizen needs. The team investigated Worcester, Massachusetts as a preliminary step to gain an understanding of public cultural facilities. Once in Hangzhou, the team conducted interviews and a survey to determine what is most needed in Xiasha. Figure 3-1 shows the connection between the two main methods. The goal of this project is to raise the quality of life in Xiasha by identifying the strengths and weaknesses of its cultural infrastructure and determine how to improve this infrastructure in the future. To this end, the team established the following three objectives:

1. Assess the public cultural and sports facilities in Worcester and Hangzhou.
2. Analyze the public usage and perception of these facilities in Worcester and Hangzhou.
3. Identify points of strength and areas of improvement in Xiasha’s cultural infrastructure.

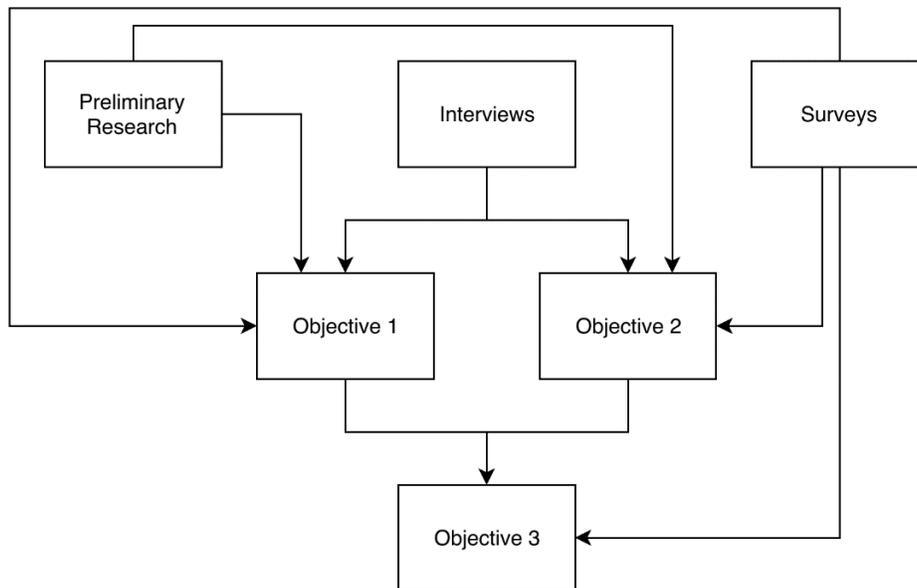


Figure 3-1: Methodology flowchart

## 3.1 Preliminary Research—Worcester, MA

To understand the idea of cultural infrastructure and its overall presence in a city, the team researched the geographic distribution and fees required to utilize Worcester’s facilities. This investigation in the United States consisted solely of online research of public cultural facilities including; libraries, museums, sports facilities, cinemas, and theaters for the performing arts.

### 3.1.1 Objective 1: Assessing Facilities

The team utilized Google My Maps to find and pinpoint these established facilities in Worcester. Within this service, the group created four separate maps, each containing the distribution of libraries, museums, sports facilities, and places for arts and entertainment inside Worcester’s borders. Once the team identified existing facilities, a group member researched them individually online to find admission prices and membership fees for further background information.

To accurately compare Worcester with Xiasha, the team developed a “per capita” metric where the quantity of each type of facility in each area is divided by the area’s population per 100,000 people. Since there is a drastic population difference between Worcester and Chinese cities, population density is an important comparative tool when analyzing these facilities.

### 3.1.2 Objective 2: Analyzing Usage and Perception

While in Hangzhou, the group continued this research by emailing the public cultural facilities to obtain data on the frequency of usage and citizen feedback. While the group sent 23 emails, only The Central Community Branch YMCA, Hanover Theatre, Worcester Jewish Community Center, Worcester Library, and Snap Fitness replied. The Hanover Theatre sent a map and an Excel sheet of the 2016-2017 Fiscal Year revenue categorized by zip code, and the Worcester Library provided a "Patron Survey 2017" PowerPoint and their "By the Numbers Info Sheet Breakdown" Excel sheet. The team compared this data with the results gained from the survey in Hangzhou. With this information, the group investigated how the citizens in Worcester perceive and make use of the cultural facilities available to them.

## 3.2 Interviews

Once in Hangzhou, Professor Wang advised the group to conduct preliminary interviews to gather more background information on Hangzhou's cultural infrastructure and citizens. These interviews with residents of Hangzhou provided insight that improved the quality of the subsequent survey. This phase of the project included two types of interviews, group and individual, which took place in the cultural facilities that the team analyzed. Figure 3.2-1 shows interview locations in Hangzhou. The interviews were akin to casual conversations with a few questions that the group prepared beforehand. It is also important to consider potential biases due to the small sample size of interviews. There are a wide variety of socioeconomic classes in Hangzhou, and these few interviews do not represent all of them.

Despite the potential biases, the interviews still provided critical information in improving the survey.

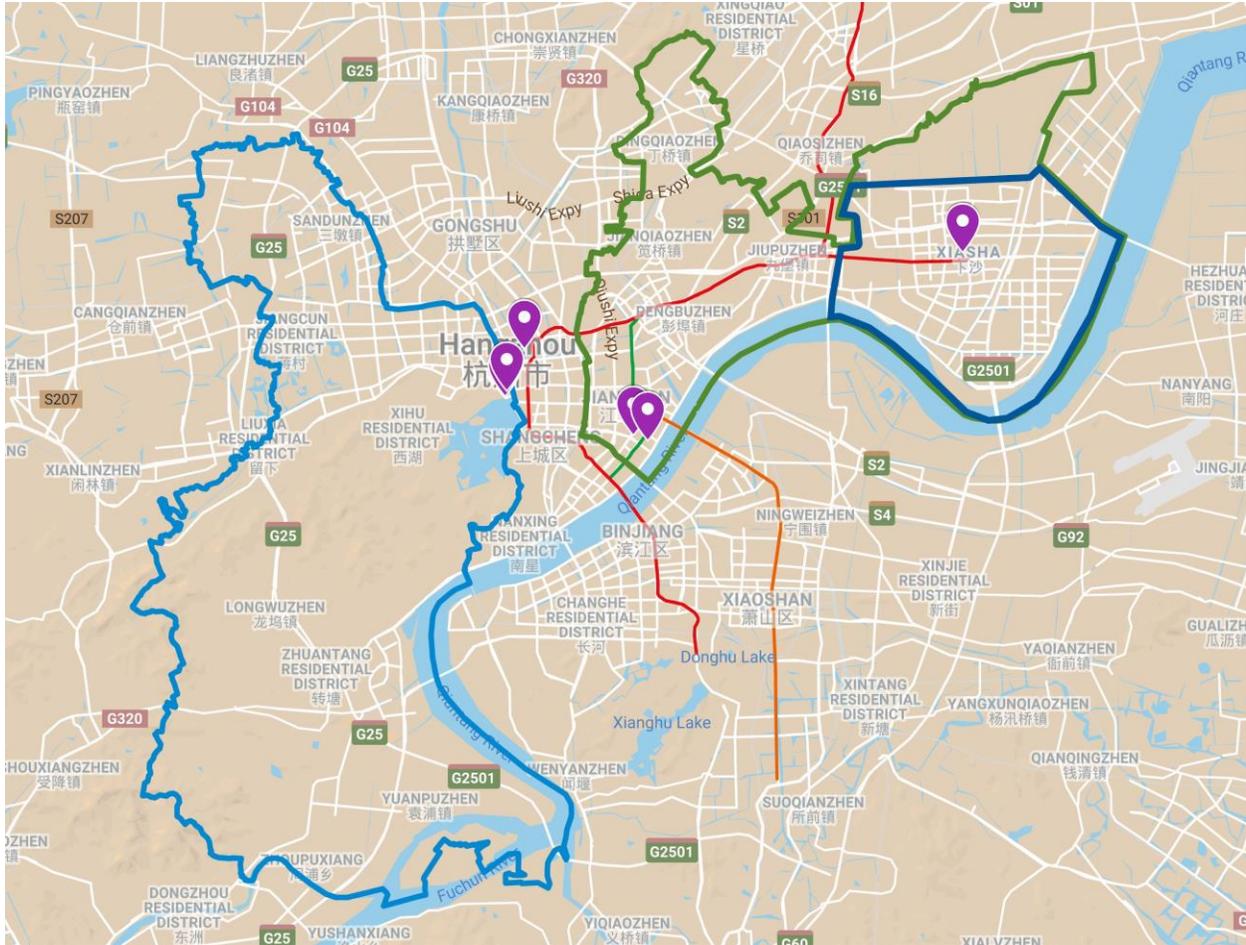


Figure 3.2-1: Map of interview locations in Xihu and Jianggan marked by purple pins

### 3.2.1 Interview Protocol

Interviewing took place on October 23rd, 24th, 25th, and November 2nd. The group employed a similar protocol for group and individual surveys for consistency. This section explains, in detail, the protocol for both types of interviews that the team conducted.

### 3.2.1.1 Group Interviews

Professor Wang arranged an interview with six professors from HDU (see in Figure 3.2-2). The team prepared questions (see Appendix A); however, the group did not strictly adhere to them as the conversation progressed. The team members took turns asking the printed questions, and the professors who spoke English served as translators for the rest of the group. Meanwhile, a team member recorded key points from their responses on paper for later reference.

In addition to the professors, the team conducted a group interview with one of Professor Wang's classes. In this interview, the project team asked questions to the students relating to their perception of the current state of facilities in the area (see Appendix A). The team broke the class into four groups with one project team member asking questions in each group of students. Each group had at least one English speaking student to translate the questions and responses. The students were not as proficient in English as the professors so each team member followed the questions more rigidly as it was difficult to maintain a natural conversation.

Both of these group interviews experienced bias. For the professor interview, every interviewee is in the same socioeconomic class because each is currently a professor at HDU. Additionally, the student group interviews included similar bias because every interviewee is a student. Students bias the answers in that they are all the same age, and therefore, make certain issues stand out more. This is not a concern with the professor group interview because various age groups were present.



Figure 3.2-2: Team in a group interview with HDU Professors

### 3.2.1.2 Individual Interviews

In addition to the group interview with the HDU Professors, the team interviewed individual people around the city of Hangzhou with Buddies from HDU. Buddies are HDU students who volunteered to aid the American students during their time in Hangzhou. They played a crucial role in the entire project and the following phase of this investigation would not have been completed without them. The group went to West Lake, Zhejiang Provincial Museum, Xiling Seal Society Art Gallery, Xihu Youth Palace, Hangzhou Public Library, and Citizen Center Park to conduct these interviews (see Figure 3.2-1) over the course of two weekdays. It is worth noting that the libraries in Xiasha are private university libraries and the Hangzhou Public Library in Jianggan is a public library that is close to Xiasha. Due to the language barrier, the Buddies primarily performed the interviews. The team prepared site-specific questions in English (see Appendix B) for each location. The Buddies used these questions to initiate a conversation for a few minutes with the interviewees, relaying the

questions in Mandarin. After the casual interview, the Buddies would convey the conversation back to the group in English, and a group member took notes on paper. The team interviewed people belonging to different socioeconomic classes, including a security guard, grandparent, gift shop employee, and people participating in activities around West Lake. Biases are most likely to occur from the small sample size of ten, and while the interviewees were from different socioeconomic classes, they do not represent their entire class.

### 3.2.2 Objective 1: Assessing Facilities

A critical part of this project was to assess the current cultural infrastructure in Hangzhou. The interviews provided insight into this assessment. For example, originally this investigation could not find detailed information on youth palaces in China during preliminary research. However, an interview with a grandparent at the Xihu youth palace yielded valuable information on the purpose, cost, and distribution of Youth Palaces in Hangzhou. Interviews with citizens of Xihu produced valuable information on West Lake's significance for local residents.

### 3.2.3 Objective 2: Analyzing Usage and Perception

The conversations that the HDU Buddies had with the interviewees enhanced the group's understanding of public usage of several of the facilities in Hangzhou. The interview with the security guard at Zhejiang Provincial Museum informed the team of who visits the museum regularly as well as the most popular visiting times. Conversations with three library patrons gave understanding into their usage habits and opinions of libraries in Hangzhou.

These interviews conveyed a strong foundation of people's perception of the current state of cultural facilities around Hangzhou.

### 3.3 Surveys

The largest portion of results for this project came from surveys distributed in both Xihu and Xiasha (see Appendix C and D). These surveys connected to all of the project's objectives and yielded tangible answers about the cultural infrastructure used to make recommendations to the city of Hangzhou. The team conducted surveys over the course of two weeks to gather many responses while leaving enough time for data analysis. During this time frame, the team gathered 395 survey responses consisting of 295 in-person and 100 online surveys. Figure 3.3-1 indicates locations where the team surveyed.

Professor Wang provided the team with the survey given to Chongqing residents by the HDU student team. This survey revealed how sports and cultural facilities may differ in China versus the United States. For example, the Chongqing survey asked about Youth Palaces, which are government-run locations that provide physical activities, extracurricular education, and social events for young people (Baidu Encyclopedia, 2018). The team modeled the Hangzhou survey (see Appendix C and D) after the Chongqing survey, as it provided a balanced array of questions in line with the goals our sponsor.

Once in Hangzhou and after the team conducted the informal interviews, the group restructured the survey to produce one better suited for Hangzhou specifically. This yielded more meaningful results as the questions focused on the city.

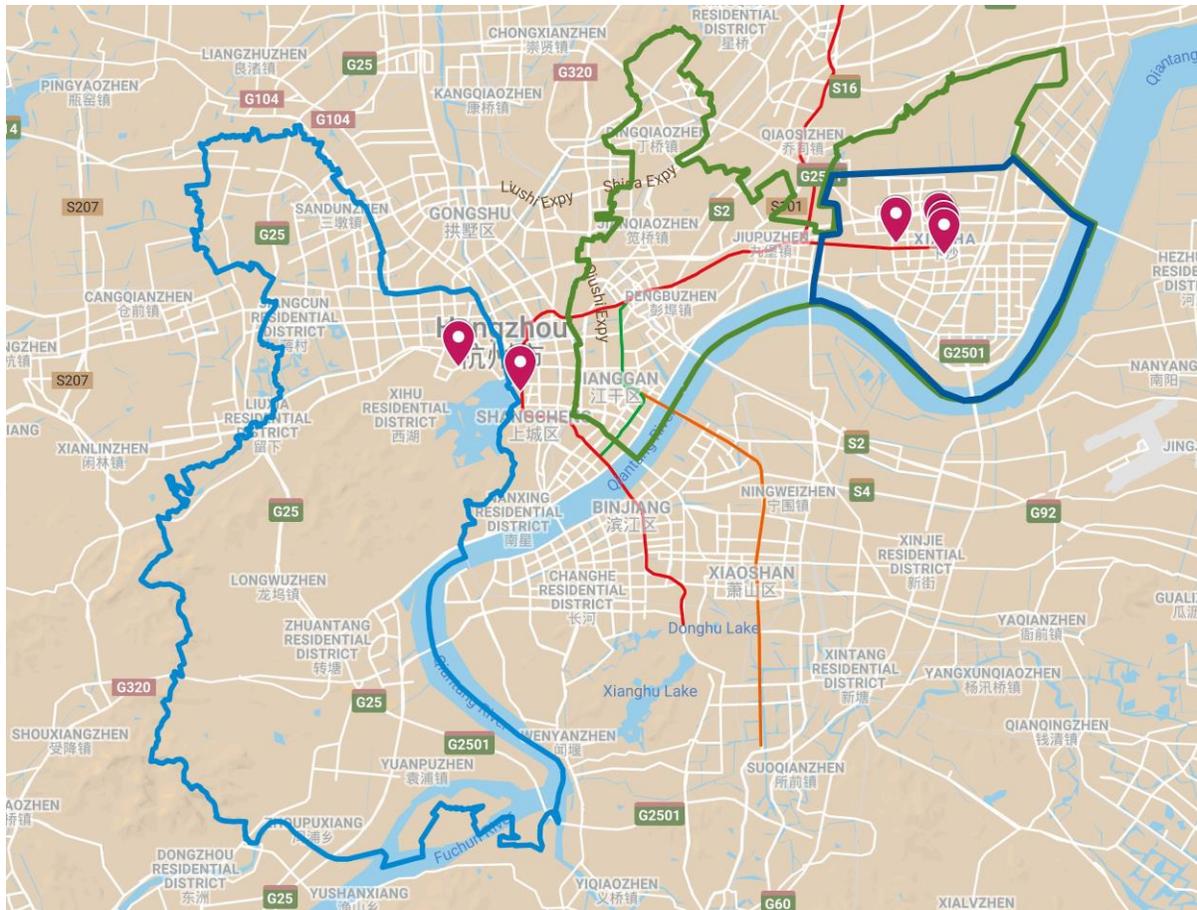


Figure 3.3-1: Map of survey locations in Xiasha and Xihu marked by red pins

### 3.3.1 Survey Protocol

Over the course of the two-week survey period, the team followed the same protocol for each day of surveying for consistency. The team collected paper surveys on November 8th, 9th, 10th, 15th, and 17th, 2018; the online survey opened on November 12th, 2018 and closed on November 20th. There are two separate protocols, one for online surveys and one for in-person surveys.

### 3.3.1.1 In-Person Surveys

With the HDU Buddies, the team traveled to different locations in both Xihu and Xiasha to gather a sufficient number of responses in each area to obtain a representative sample population. The team created two versions of the surveys, one in Chinese (see Figure 3.3-2) and one bilingual survey in Chinese and English. The team printed only 10 bilingual surveys since a vast majority of the people in Hangzhou are primarily Chinese speakers. Our HDU Buddies acted as translators for the entire survey process. They approached people, explained the survey in Chinese, and asked if he/she would complete the survey. One member of the team would then stand with the person taking the survey, collect it when he/she finished, and give the person a pack of tissues as a small gift.



Figure 3.3-2: Example of a survey with clipboard and tissue packet

The team surveyed in the following places in Xihu; Zhejiang Library, West Lake, and the shopping area near the lake. Places in Xiasha include; HEDA Town Mall (see Figure 3.3-3), Paradise Walk Mall, the Wumart on Wenze Road and surrounding area, HDU Teacher's Canteen, Building 9 at HDU, and the Mei-Yu Music and Dancing International Institute. To obtain a representative sample of the entire population in Xiasha the team chose to survey at malls and Wumart as those locations attract people of any age. The times the team was able to go with Buddies was when there were lots of young adults in these areas. To remedy this, the team surveyed at the remaining locations in HDU and in the Mei-Yu Institute to obtain more respondents older than 29 years. Professor Wang contacted a teacher from the institute in her network and arranged for the team to distribute the surveys to the parents of the students. The group played games with the students to provide exposure to English, and afterward, the parents completed the survey. Xiasha receives less overall traffic compared to Xihu because it has fewer community attractions; therefore, the team surveyed more frequently in Xiasha to ensure that the sample size for both Xiasha and Xihu would be acceptable.

These survey sites may contain certain biases due to the types of people there. For the Xihu district, surveying inside a library may have biased question 8 asking which types of infrastructure the person uses most frequently. For Xiasha district, surveying in two malls may have biased the survey responses. Students at the various universities visit these malls regularly, resulting in a bias towards 18-29 year old interviewees. Additionally, only people of certain socioeconomic classes go to malls due to the cost of shopping. Surveying HDU teachers also may bias survey responses within their socioeconomic class. These biases matter because

the recommendations this project provide are to encompass the desires across multiple socioeconomic classes so that all can enjoy the infrastructure equally.



Figure 3.3-3: The team giving out surveys in HEDA Town Mall

#### 3.3.1.1.1 In-Person Survey Management

Before the team began distributing the survey, the members agreed that it would be important to separate the responses by location. A common method to achieve this is by printing on paper of different colors, and using one color at each sampling site; however, the available printing facilities only offered standard, white paper. In addition, even if the survey papers were color-coded, the number of distinct sites would be limited by the number of colors available. Instead, the team collected completed surveys from each site in a string-tie envelope (see Figure 3.3-4). When the team transitioned to a new location, one team member would write the date and location on the envelope, number the envelope, and tie it closed. Once the team returned from surveying, the members would number the surveys inside each envelope, with

the envelope number in the hundreds place. This meant that each completed questionnaire had a unique index that identified its site and allowed the team to revisit individual surveys to interpret confusing responses or translate written comments. Additionally, the indices eased the process of data entry, ensuring that the team entered each survey only once into the statistical analysis software.

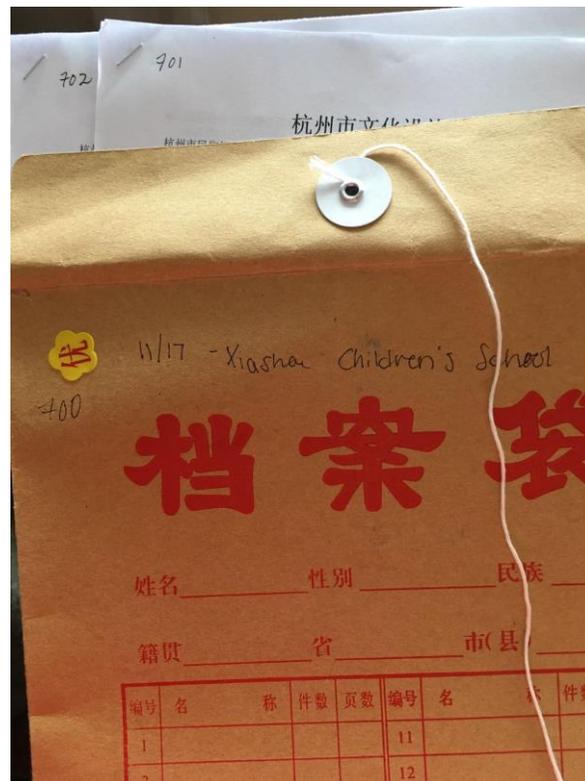


Figure 3.3-4: Example of the envelope and survey indexing

### 3.3.1.2 Online Surveys

To obtain more responses, the team used the app WJX.cn since it is compatible with WeChat, a popular social media and messaging app in China (see Figure 3.3-5). With the help of our Buddies to translate WJX.cn, the group created an online version of the survey and shared the link on the team members' and Buddies' personal WeChat accounts. The team reached out

to other Buddies that are native to Hangzhou with the link to the online survey so that these Buddies could forward the survey to their family members living in Hangzhou.

WeChat is used by a large majority of the people in China, but since the team only distributed this version to our Buddies and WeChat friends, there is a bias in this survey distribution towards college students.



Figure 3.3-5: Survey link distributed on WeChat (left) and example of survey questions on WJX.cn (right)

### 3.3.3 Objective 1: Assessing Facilities

In order to analyze the current offerings in Hangzhou, question 8 of the survey (see Appendix C and D) asks what type of facility the survey respondent frequents the most. For this

question, the team grouped various cultural facilities together under categories like performance venues, parks and city squares, sports and recreational facilities, and cultural exhibitions. The results for this question reflect which facilities are available and commonly used in the area. This information provides a baseline for readily available cultural facilities in Hangzhou.

### 3.3.4 Objective 2: Analyzing Usage and Perception

To analyze public usage and perception of these facilities, the team used questions 9, 11, and 12 on the survey (see Appendix C and D). Question 9 utilizes a five-point Likert Scale, and the survey respondent ranks his/her satisfaction with cultural infrastructure on a scale from very dissatisfied to very satisfied. This data shows if people are satisfied with the cultural infrastructure currently in place. However, even if people answer that they are generally satisfied with the available facilities, this does not mean that there are no problems with them. Questions 11 and 12 address this by asking the respondent to check off different issues such as too far away, poor quality, not enough, and too expensive, for several individual facility types. By knowing people's attitudes towards the current infrastructure, the team can identify which potential improvements should see the greatest public support.

### 3.3.5 Objective 3: Identifying Strengths and Weaknesses

To identify the strengths and areas for improvement in Xiasha's cultural infrastructure, questions 11 and 12 ask about specific facilities. Although these questions probe the people's perception of these facilities, as mentioned in section 3.3.4, they can characterize needed

improvements since the respondents are mentioning these as weak points. Knowing the weaknesses of current cultural infrastructure allows our list of recommendations to address everything that the survey respondents believe is wrong with the cultural infrastructure. These questions address the strengths as well since there is a “No Issues” column. Together, these two questions tell the team which facilities are strong and which need work, and which aspects are most problematic.

## 3.4 Data Management

The team acquired a large amount of data, some qualitative and some quantitative, from the various research methods used. The qualitative data, such as interview notes and email correspondence, did not require any special handling or processing. However, the hundreds of survey responses required a more sophisticated approach to facilitate later analysis. In order to organize, understand, and eventually present this data properly, the team utilized multiple software programs to enter, manipulate, and analyze the information.

### 3.4.2 Software Toolchain

In order to transfer the responses written on the paper-and-pencil surveys to a digital form, and then to analyze the data and explain our findings, this investigation used a number of software packages. Upon the sponsor’s request, the group utilized the Statistical Package for the Social Sciences (SPSS), a powerful tool for applications similar to this project and specifically. Additionally, Microsoft Excel and MATLAB accomplished data entry and processing, respectively. The details below explain each step of the process.

Data entry is a tedious and error-prone task, but it is unavoidable with offline surveys. A reliable way to digitize responses is to enter data from a completed survey directly into SPSS. However, the team employed Excel in parallel because not every group member had working installations of SPSS. Because SPSS is very particular about column and row names, especially with regard to prohibited characters, the team found it best to set up the spreadsheet in SPSS, and then export the empty document in the .xlsx format as a template. In this way, each team member could transcribe their own envelope of surveys into files with identical structure. A team member then merged individual files into a single SPSS file, containing the raw data from all surveys. From this point, the team was able to conduct preliminary analysis easily.

SPSS provides a simple interface to a wide array of statistical analysis methods. However, as most of our data is nominal or ordinal, not interval, ratio, or scalar, many of these in-depth analysis methods are simply not applicable to the data collected. The features that the team used most often were descriptive statistics, such as percentages, medians, and frequencies, as well as charts for data presentation. One challenge of using SPSS, however, is the limitation of its variable-case structure. The software assumes that each row represents a single case or sample and that each column completely represents a single experimental variable.

The prime example of this difficulty is the two grid-questions in which respondents associated specific issues with individual facility types. Because the survey instructed respondents to check all responses that applied, these two questions incurred the creation of over 50 SPSS variables, each in its own column. This greatly impeded the team's ability to analyze the data, so a member of the team developed a MATLAB script (see Appendix J) to process the data into a simpler form, better suited for analysis. The script simply counted the

number of times a check appeared in each box across all surveys from a single district, then tabulated these totals. The resulting tables used the facility types as row labels and issue types as column labels. One drawback of this approach is that filtering by age or occupation becomes impossible, as the details of each individual survey are lost in the process, but the team devised an additional script (see Appendix J) which could filter the entire dataset before the summing process takes place.

Another major limitation of SPSS is that it cannot plot multiple variables on the same axes as a clustered bar chart. For example, it is easy to plot the results of a five-point Likert scale, showing the total number of each response, but if one wishes to compare the results of two similar Likert scales, one must plot them on separate axes. The only way to produce a clustered bar chart with SPSS is by serializing all of the data into a single column, and adding an identifier variable which indicates which set of bars corresponds to the data point. This is a fairly simple task for MATLAB as well, but it entails the creation of a new script for each set of variables one wishes to graph, and is rather time-consuming as a result. The team developed three scripts of this style (see Appendix J).

Finally, MATLAB proved indispensable when the team downloaded the online survey results. The website which hosted the survey provided the data in the .sav file format used by SPSS, but used different numbers to represent the results for each question. In addition, some questions used a different number of columns in the online and offline data tables, making it impossible to simply concatenate the two tables. As a result, the team employed yet another script to convert the online data into the same format as the offline data (see Appendix J). It is quite lengthy, but not complicated in operation; it simply iterates through the columns,

changing the format as necessary for each. This makes for a total of six scripts, which accomplish a wide variety of tasks. Although the combination is a bit unorthodox, MATLAB's ability to automate nearly any kind of operation on large arrays of data pairs naturally with SPSS' rigid, yet powerful, workflow.

## 4. Results and Analysis

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This chapter presents the findings from the interviews and survey conducted in Xihu and Xiasha and analyzes the citizens' feedback on cultural infrastructure. Using SPSS, the team generated the following graphs, highlighting key questions in the survey that covered the investigation's objectives. The next section discusses the research conducted about Worcester, Massachusetts. Section 4.2 details the causal interviews conducted and how they helped our survey and background knowledge. Section 4.3 analyzes the survey results from Xihu and Xiasha and the last section summarizes the team's findings by objective.

### 4.1 Worcester, Massachusetts Results

To assess cultural infrastructure in Worcester, MA, the group contacted administration at the facilities mentioned in section 3.1.2 to inquire about visitation data and customer feedback. The team received replies from The Hanover Theatre and the Worcester Public Library, each offering a different window into the state of cultural facilities in Worcester.

The Hanover Theatre provided a map that shows the concentration of customer orders by zip code (Figure 4.1-1). The diagram employs a logarithmic scale, but it is clear that people travel not only across the city of Worcester, but across the state of Massachusetts, to attend shows at the Hanover Theatre. This is a result of the Hanover Theatre's reputation as an average person may not make such a journey often, but a high-profile production will draw people from near and far.

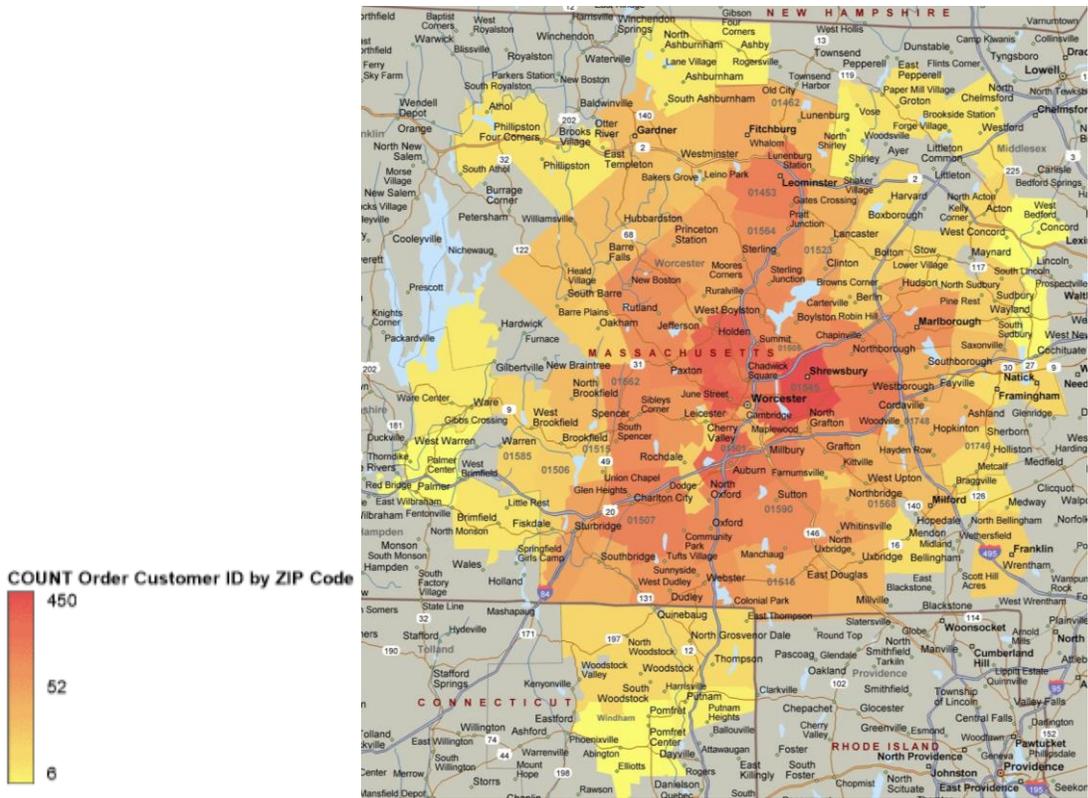


Figure 4.1-1 Map of The Hanover Theatre’s 2016–17 customer count by zip code

The Worcester Public Library sent a PowerPoint presentation with information from a patron survey which they conducted from January 3–21, 2017. The total 1,162 survey responses consisted of 1,055 library users and 107 non-users of the library (Geoff Dickinson, personal correspondence, November 5th, 2018). Among the feedback they received, 75.45% of respondents said that a wide range of arts and cultural experiences would be of value to them and their family in the next few years. Additionally, when asked which improvements to the library would be of value (see Figure 4.1-2) 60.71% answered, “preserving Worcester’s history and making them easily accessible to the public.”

Which of the items listed below would be of value to you and your family in the next few years?

## PUBLIC SERVICES & COMMUNITY ENGAGEMENT

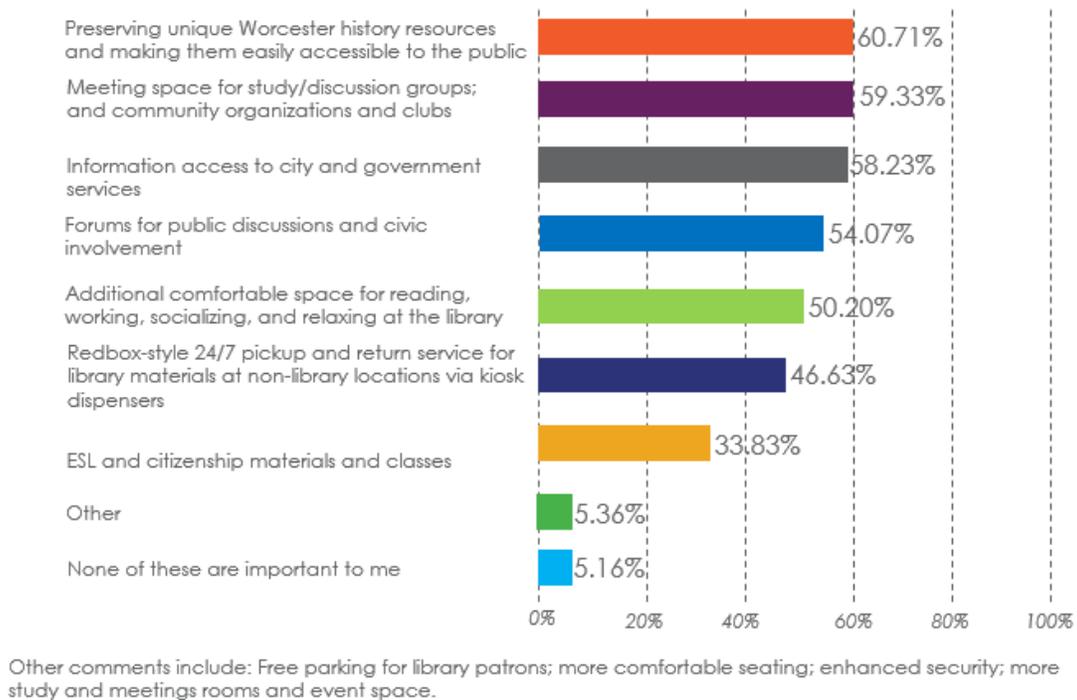


Figure 4.1-2 Survey question from Worcester Library 2017 Patron Survey (Geoff Dickinson, personal correspondence, November 5th, 2018)

From this feedback, Worcester’s citizens clearly value cultural infrastructure; however, the drastic population density difference between it and Xiasha makes extensive comparison difficult. However, the team utilized the “per capita” metric (see Section 3.1.1) to divide the population in Worcester by the number of the facility types below (see Table 4.1-1).

Table 4.1-1: Cultural Infrastructure “per capita” Metric for Worcester

Facility Type	Number of Facilities	Number per 100k Residents
Libraries	9	5.0
Museums	6	3.3
Sports Facilities	14	7.7
Arts and Entertainment	8	4.4
Parks	21	11.6

Currently in Xiasha, there are zero museums, while Worcester has six. In addition, there are no public libraries in Xiasha, while Worcester again has nine. This “per capita” metric comparison provides a tangible number to compare Xiasha’s infrastructure to Worcester’s and serve as a guideline for how many new facilities Xiasha should attempt to construct. Worcester serves as another example to support the information on the cultural infrastructure gap between Xiasha and Xihu as well as add a sense of urgency to make improvements. To make up for the challenge of comparing the two cities side-by-side, the team conducted additional research in Xiasha and Xihu.

## 4.2 Casual Interviews

Due to the aforementioned conversational nature of the interviews (see Section 3.2.1.2), they were not feasible to transcribe. As a result, the group was not able to code these interviews and create quantitative data to analyze. The interviews obtained responses that (see Appendices E-H) provided greater understanding into how cultural infrastructure plays a role in the daily lives of Xihu and Xiasha residents. Interviewees revealed useful information on the current perception of these cultural facilities and gave the team important background information that

this study could not have been found through traditional research methods. The team restructured the original survey using these interviews in order to obtain more accurate survey results.

#### 4.2.1 Anecdotal Evidence

During many of the interviews, the interviewees' personal thoughts provided crucial insight into the problems with facilities in Xihu and Xiasha. Although there were no transcripts to code, these insights ultimately proved to support and strengthen the survey data. Therefore, throughout the following sections of the survey results, the team included quotes and other facts from these casual interviews as supporting information for the findings the graphs of the quantitative data suggest.

### 4.3 Surveys

The team collected a total of 397 survey responses. Two of these were incomplete or unreadable, leaving 395 usable responses across all districts. Of these, there were 175 from Xiasha, 64 from Xihu, 42 from areas of Jianggan outside Xiasha, and 114 from other districts. Two of the following charts use the entire dataset (N=395) to characterize the sample population, but the remaining five graphs only use the responses from Xiasha and Xihu residents (N=175, 64, respectively) because the other districts of Hangzhou are not the focus of this investigation.

During data analysis, the team realized there could be multiple interpretations of a row of only blank checkbox in survey questions 11 and 12, which ask to indicate certain issues with

different facilities. Hence, the team defined what these blank checkboxes mean for the purposes of the analysis. A blank checkbox can hold one of two possible meanings: a negative response, meaning the facility explicitly does not have the issue, or a blank response, meaning the respondent does not use the facility or know about its issues. Therefore, if a respondent leaves an entire row blank, he/she may have issues other than those listed, or he/she may simply have no opinion on the facility. This ambiguity makes the results harder to analyze, but as long as one properly understands the limitations of the metric which the following charts present, valid conclusions can still be drawn.

Sections 4.3.2–4.3.6 present data from survey questions 11 and 12 using a percentage metric. For all figures, the percentages are simply the number of reports of the relevant issue divided by the total number of respondents from the relevant area. This system interprets any blank checkbox as a negative response, as opposed to excluding responses which seem to be skipped. As a result, if a facility has a serious issue, but sees very little visitation, our metric will return a low percentage for this issue. While not reporting the closest reflection of the objective state of each facility, this metric factors in general public interest. The only way for an issue to reach a high percentage is for an issue to affect a majority of the population. Therefore, the tallest peaks in our charts may not indicate the facilities that are in the worst state; however, they do identify the most important facilities to improve.

### 4.3.1 Demographics Overview

The team strove to assemble the most representative sample population possible, but it is inevitable that sampling error does arise. Demographics questions in the survey helped

mitigate the sampling error and allowed the team to view the data through an appropriate lens. Figure 4.3-1 shows the age and gender makeup of all surveys collected in Xiasha and Xihu; a similar trend applies to each district or area as well.

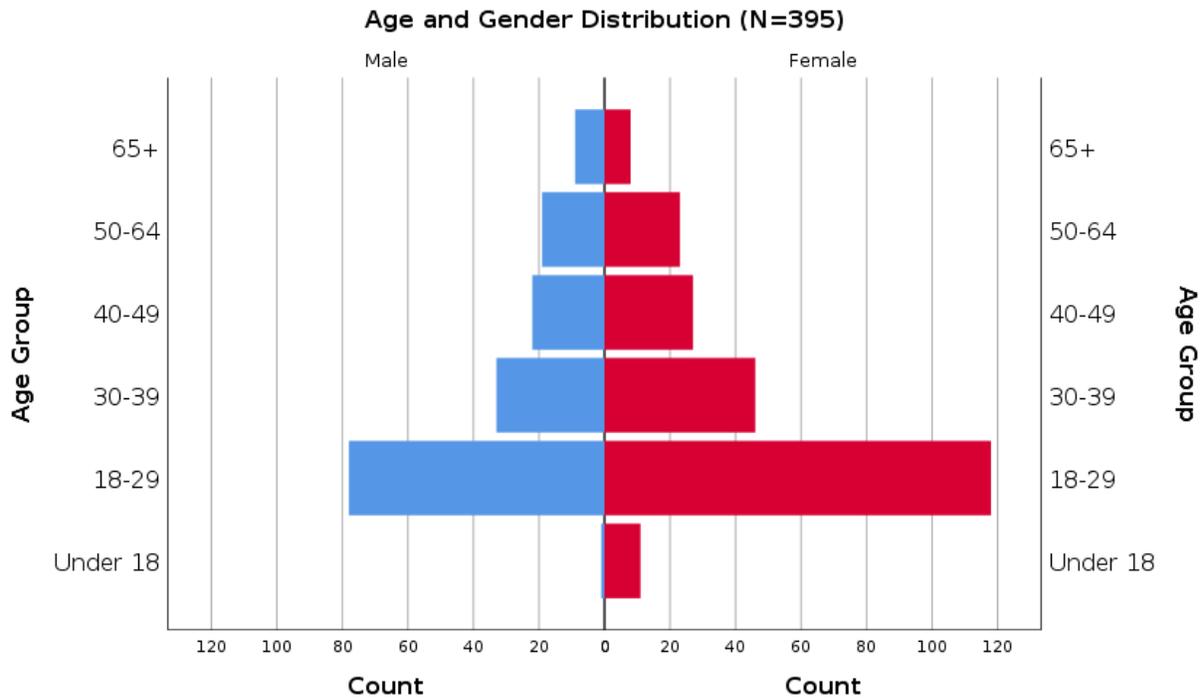


Figure 4.3-1: Age and gender distribution of survey respondents

People between the ages of 18-29 years contributed 196 survey responses; they accounted for 70% of the online responses (see Chapter 3 Section 3.3.1.2) and were nearly a majority in the overall sample population. The distribution of other age groups is even, but there is still bias towards younger people, as older age groups submitted fewer responses than younger groups. Additionally, 59% of respondents were female. Although this is not perfectly balanced, the disparity in age representation has a much greater chance to affect the data's characteristics. In order to determine how much error the age imbalance introduces, the team

split the dataset into under-30 and 30+ respondents and compared a few key results between the two age groups. The team found no drastic difference between age groups, and there was clear consensus across both age groups on all major issues (see Appendix I). As such, we did not filter the data or otherwise correct for the age imbalance in the graphs below all the graphs, since the team detected no major bias.

**Satisfaction with Cultural Facilities in Hangzhou (N=395)**

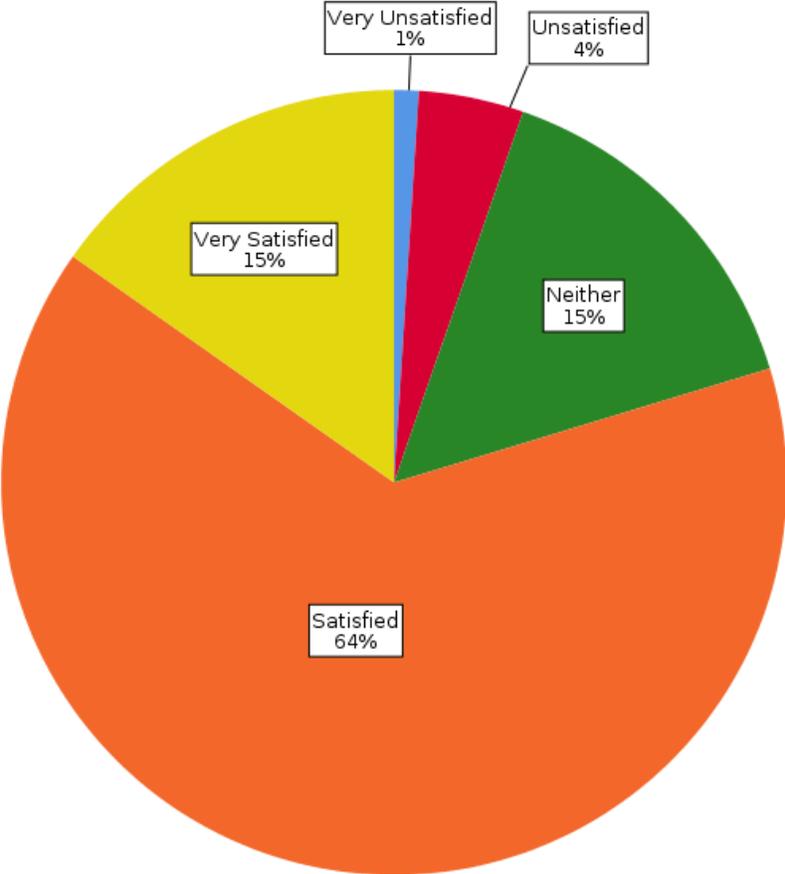


Figure 4.3-2: Satisfaction levels with current facilities in Hangzhou

In the assessment of the state of infrastructure in Hangzhou, the survey revealed that 64% of all respondents are “satisfied” with the current facilities available (see Figure 4.3-2). This

shows that the people of Hangzhou regularly incorporate cultural infrastructure in their lives. Interviews the team conducted with the professors at HDU also demonstrate that Hangzhou citizens regularly use cultural infrastructure. Many professors mentioned that they go to facilities in their spare time, and they usually bring their children so that they can enjoy it as well. In the HDU Professors Group Interview, Interviewee A stated that the diversity within the infrastructure, “widens children’s eyes” (see Appendix E), and they enjoy going to these places when they can.

#### 4.3.2 Issues with Distances to Cultural Facilities

Xiasha residents are unable to travel to many facilities due to them being too far away. Museums, youth palaces, and theatres are the highest bars on the graph in Figure 4.3-3, but in Xiasha, survey respondents rated all facility types but one as further away than in Xihu. The reason for the significant amount of “too far” responses is due to the distribution of these facilities throughout the city of Hangzhou.

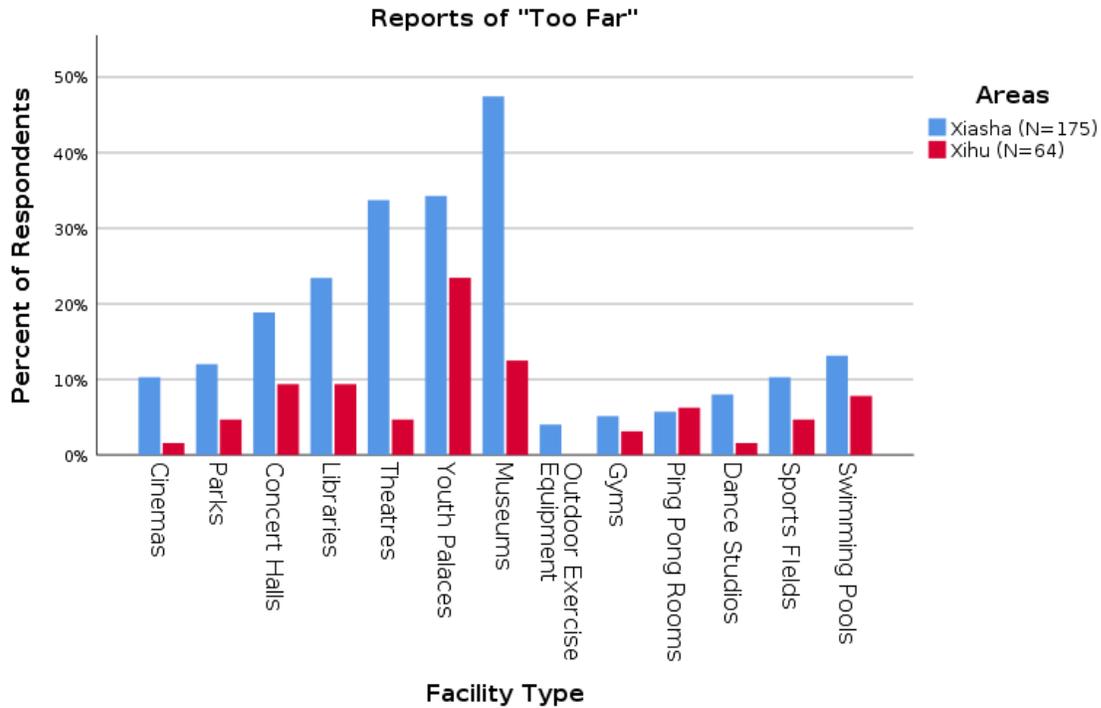


Figure 4.3-3: Reports of “Too Far” in Xihu versus Xiasha

Museums are concentrated in the Xihu area. Xihu (see Section 2.5.1.1) is the cultural district of Hangzhou and contains West Lake. Therefore, there are more museum locations surrounding the historical sites and tourist areas. West Lake is approximately 60 minutes away from Xiasha by public transport, making it difficult to access for working-class people and students.

Theatres are more distributed throughout the city, but the closest popular theatre near Xiasha is the Hangzhou Grand Theatre which is approximately 40 minutes away by public transportation. This again makes it not easily accessible to students or working-class people who are the main residents of Xiasha. In our interviews with HDU students, one interviewee

mentioned that there are various shows in which she is interested at the Grand Theatre, but she cannot attend most of them because of her classes and the lengthy travel time (see Appendix H).

In the HDU Professor interviews (see Appendix E), the team learned that there is usually one youth palace per district. Therefore, one's proximity to the youth palace is based on where he/she lives within the district. There are other institutions that offer the same types of special interest classes, but they are privately owned, therefore making them more expensive. Parents try to avoid these institutions because of the increased financial burden (see Appendix E). The youth palace bar in Figure 4.3-3 is high for both Xihu and Xiasha because of the sparse number of these facilities.

### 4.3.3 Issues with Quantity of Cultural Facilities

For a majority of the facilities, Xiasha has a higher percentage of “not enough” responses (see Figure 4.3-4). Because of Xiasha's designation as HEDA, there is a deficit of cultural facilities that do not support Xiasha as an economic and educational hub. The Xiasha government did not construct these facilities because this infrastructure does not contribute to the sub-district's focus of commerce. Specifically, swimming pools, ping-pong rooms, and outdoor exercise equipment are the facilities the respondents indicated as the fewest in number. The HDU student group interview (see Appendix H) also gave context to these results. One student stated that she does not go to the currently available public swimming pools because they are extremely overcrowded. By building more pools there will be less overcrowding, and people will be inclined to go more often as they will not face cramped spaces.

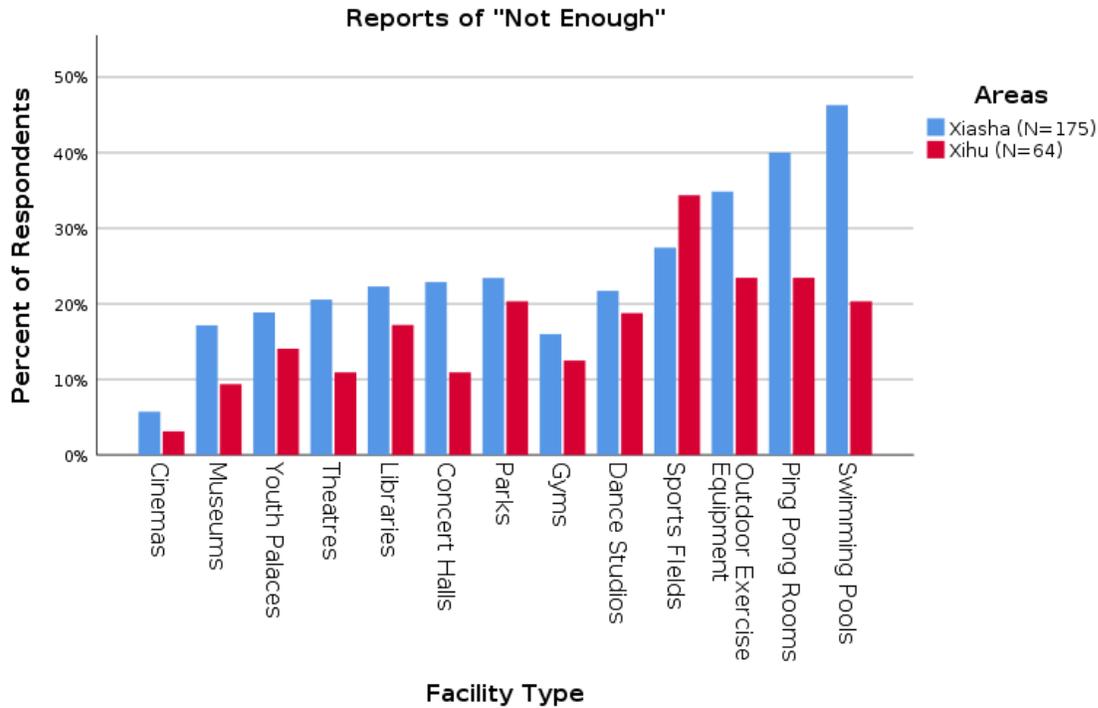


Figure 4.3-4: Reports of “Not Enough” in Xihu versus Xiasha

In certain aspects, Xiasha bests Xihu, specifically in terms of sports fields. This is due to the plethora of higher education facilities located in Xiasha. Most of these universities have various soccer fields, basketball courts, and other types of fields to which the students and faculty have free access. Students, which is a large population group in Xiasha, have access to many sports fields, yielding the fewer ‘not enough’ responses. During the HDU student group interviews, Student C, who plays sports regularly, said that he is very satisfied with the number of sports fields since HDU offers many different kinds (see Appendix H). Xihu, on the other hand, does not have as many universities as Xiasha and therefore have fewer sports fields. West Lake and its surrounding scenic area contribute to this disparity of fields because together they take up a lot of the free space in this district.

### 4.3.4 Issues with Quality of Cultural Facilities

Although most of the survey respondents indicated they are satisfied with the cultural infrastructure overall (see Section 4.3.1) there are still a few “poor quality” issues with cultural infrastructure in Xihu and Xiasha. Figure 4.3-5 displays the number of “poor quality” responses in both Xihu and Xiasha. It is worth noting that the scale on this graph is significantly lower than the other graphs of issue reports (Figures 4.3-3, 4.3-4, 4.3-6). Each of these figures plots the percent of respondents who reported issues, but while other issues tended to peak in the 40-50% range, the maximum of Figure 4.3-5 is near 20%. This supports the previous evidence that Hangzhou residents are satisfied overall with the quality of the current facilities.

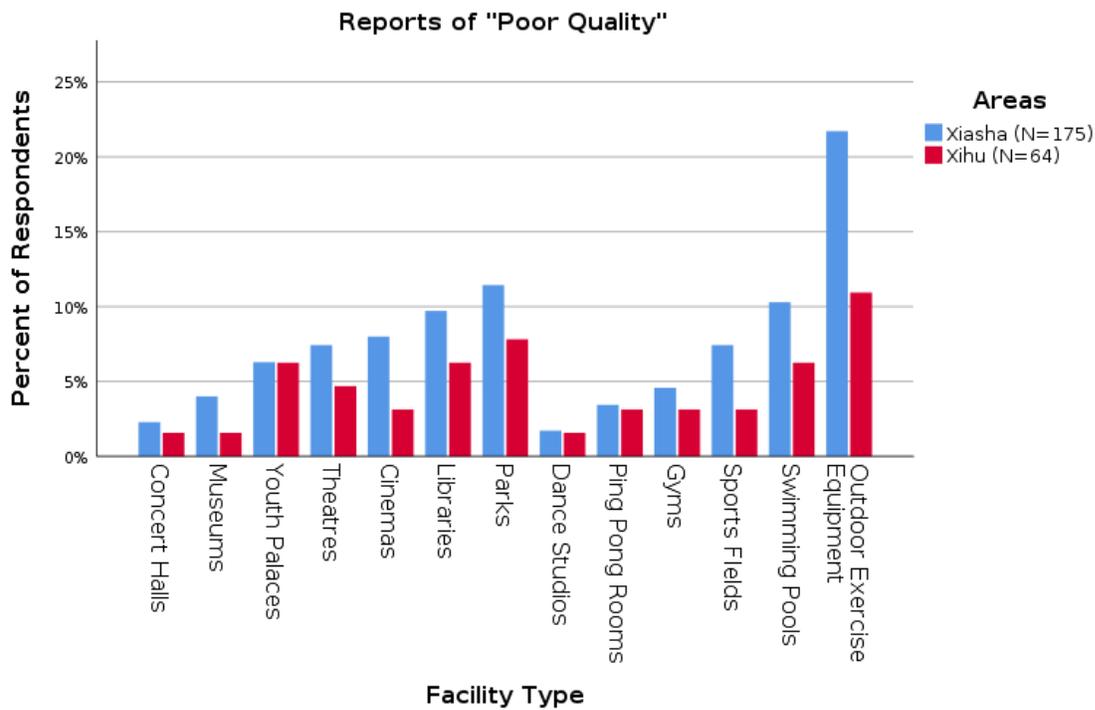


Figure 4.3-5: Reports of “Poor Quality” in Xihu versus Xiasha

Outdoor exercise equipment is aerobic equipment, such as ellipticals, that one can find in parks and various outdoor spaces that are open to the public. Outdoor exercise equipment is the largest outlier in this data set, showing that it is the only thing that is very poor quality. It also had a relatively high bar in the “not enough” data (see Figure 4.3-4). These two trends suggest, the amount of outdoor exercise equipment is inadequate and both Xiasha and Xihu should refurbish their current equipment. The popularity of this type of exercise equipment is due to the Asian practice of doing various kinds of exercise in parks, like jogging, tai chi, and dancing (Professor Du, personal communication, September 19th, 2018). Additionally, although all other scores were in the low range compared to other response categories, Xiasha received worse scores than Xihu for all facility types in this category. This serves as a reminder to continue to maintain all facilities in good condition, even if clear problems have yet to arise.

#### 4.3.5 Issues with Costs of Using Cultural Facilities

Some facilities are too expensive for people to enjoy as much as they would like. Due to the large student population of Xiasha, the cost of facilities is also a factor to consider. Figure 4.3-6 reveals the residents’ attitudes in both districts about the prices of certain facilities.

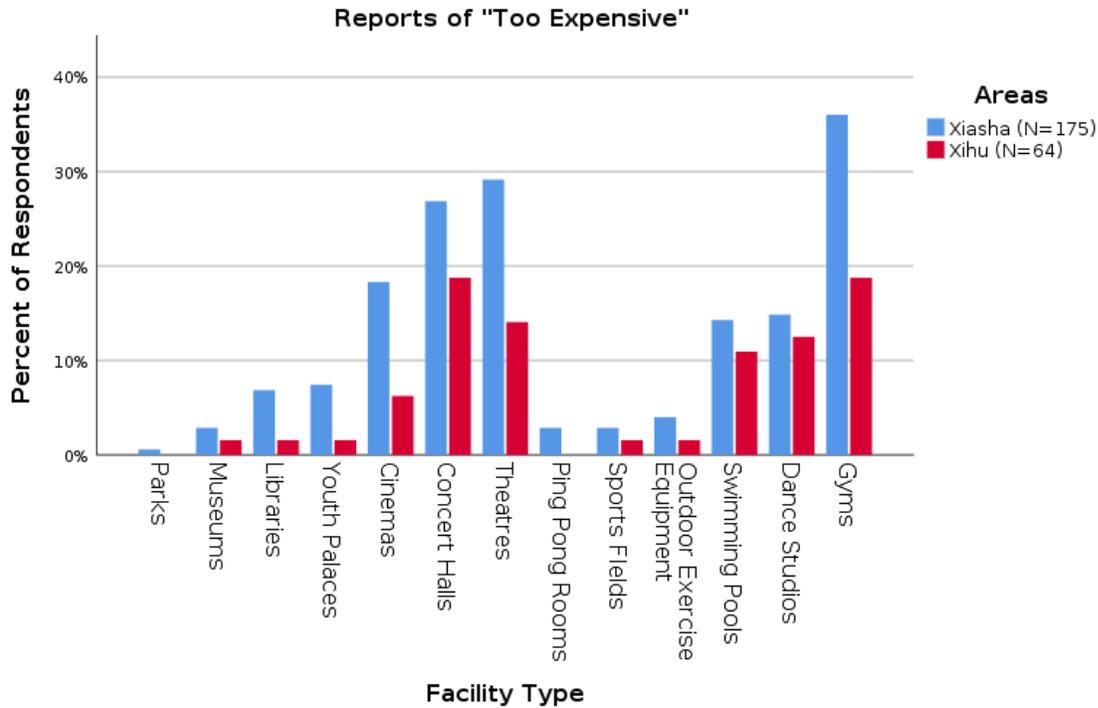


Figure 4.3-6: Reports of “Too Expensive” in Xihu versus Xiasha

Gyms, theatres, and concert halls scored the highest on this question. Concert halls and theatres prices vary, depending on the show playing, and more popular concerts and shows bring higher prices due to the high demand for tickets. In regard to gyms, the membership price is usually monthly, and the cost depends on the quality of the equipment and other offerings. During the HDU student interviews, several students mentioned that they see a gym membership as a waste of money because the limited number of times they would go does not justify the cost (see Appendix H). Depending on someone’s personal budget, expensive memberships or tickets may not be a feasible purchase. Taking this consideration into account allows the list of recommendations to represent people of multiple socioeconomic classes.

### 4.3.6 No Issues with Cultural Facilities

The questionnaire not only allowed respondents to indicate certain issues for individual facilities, it also provided a column where respondents could confirm that a facility has absolutely no issues. A higher incidence of “no issues” reports for a facility type indicates most respondents have access to a sufficient number of that facility type, and that they are of good quality. In other words, it functions as a type of aggregate score for each facility. Unlike the previous charts, a higher percentage is desirable for the “no issues” measurement.

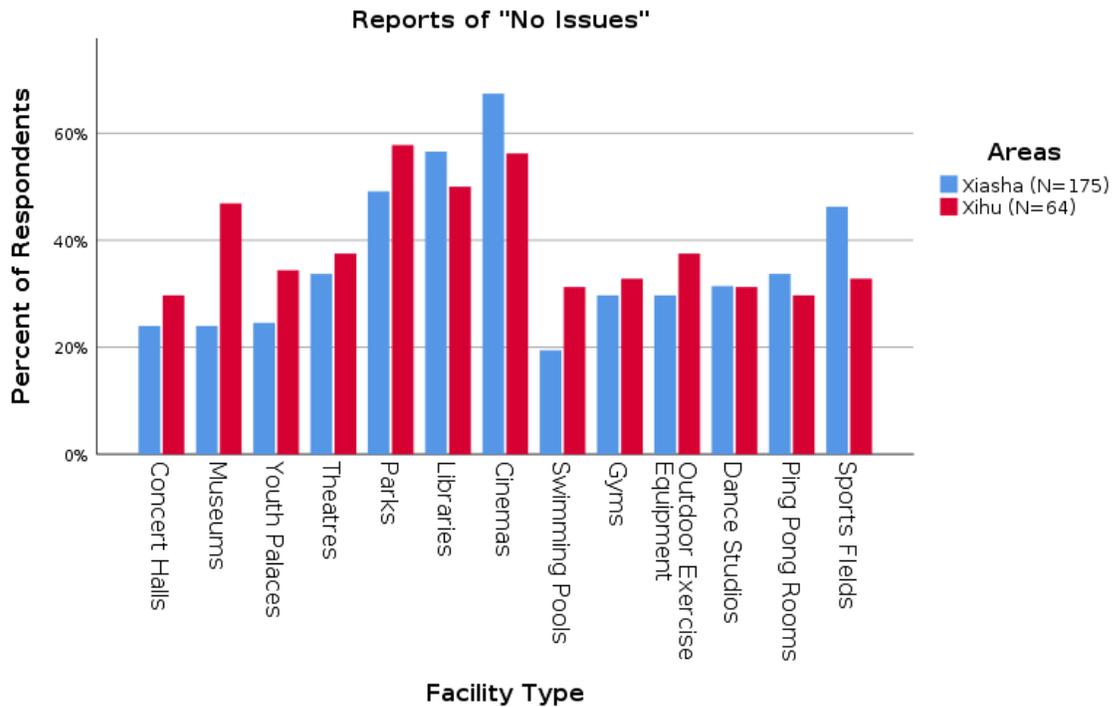


Figure 4.3-7: Reports of “No Issues” in Xihu versus Xiasha

Overall, most facility types received roughly the same scores from both areas. Xiasha outscored Xihu on libraries and sports fields and was nearly the same for most other sports facilities. This may be due to the universities in Xiasha, which maintain these facilities and

provide them to students and faculty, free of charge. In addition, Xiasha residents gave highly positive reviews of its cinemas, outshining even Xihu's positive feedback. This is due to the number of cinemas since they are built into malls. However, Xiasha lags behind for all other cultural facilities, especially museums, and also received the most negative reviews of all for its swimming pools. This agrees with the observation that Xiasha has insufficient cultural infrastructure, and also suggests that cultural infrastructure may be even more sparse in the areas not in proximity to the universities.

## 5. Conclusion and Recommendations

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The results demonstrate a stark difference between the cultural facilities in Xiasha and Xihu. To address this, the team created a list of recommendations that will begin to mitigate the current disparity of cultural infrastructure in the Xiasha sub-district of Hangzhou, China.

Because of differing sample populations and incomplete coverage of both districts, this section also covers future work that needs to be done for a more complete assessment of both areas.

### 5.1 Recommendations

Through conducting interviews and a survey, the team created a list that our sponsor, Professor Wang, will present to Xiasha's government, recommending that it establish more cultural infrastructure sites, refurbish certain facilities, and reduce prices for admission. The list of recommendations is as follows:

- Reduce prices or raise incentive to pay for gyms, swimming pools, and theatres through promotions or membership loyalty programs
- Publicize and refurbish parks in Xiasha to make the parks visually appealing and more well-known to residents
- Add more and improve current outdoor exercise equipment in Xiasha's parks to provide workout variety to residents and park attendees
- Build more libraries and youth palaces in closer proximity to Xiasha to reduce travel time and costs

- Establish more theatres in Xiasha to increase accessibility, as well as the number and variety of shows
- Raise the number of ping-pong rooms and public swimming pools in Xiasha to create a wider variety of physical activity options

Xiasha and Xihu residents indicated that certain facilities have expensive admission costs, which prevent people from enjoying their favorite activities, such as seeing a movie or theatrical performance. This barrier can make it difficult for people of certain socioeconomic classes, like students or working-class people, to get out of their residence and effectively use their free time.

Old and outdated facilities are unsightly and potentially dangerous. Equipment available for public use, like outdoor exercise equipment, if ignored and left unmanaged can become hazardous for the people who want to use it and could cause injury. If parks are left unmanaged, this can lead to an unattractive space that goes unused. Refurbishing facilities that have gone into disrepair can attract more patrons as they will look clean and new. Knowledge of the updated infrastructure can spread through either publicizing the location or simply through word of mouth from the residents living nearby.

Cultural infrastructure being located far from certain areas means that residents living in these areas cannot go as often as they please. Xiasha residents indicated that many facilities are too far away for travel. Overcrowded subways and limited free time are a few reasons why people would not want to travel 40–60 minutes on public transportation to access cultural

infrastructure. Therefore, people living in Xiasha are at a disadvantage in regard to utilizing cultural infrastructure with the transportation and time available to them.

## 5.2 Conclusion

The goal of this project is to raise the quality of life in Xiasha through improving the cultural infrastructure. Implementing these recommendations will increase the number of cultural infrastructure sites and make them more accessible to all residents. Increased leisure activities and exercise help to boost mental and physical health, while the expansion of cultural infrastructure gives residents more opportunities to participate in these activities.

This list of recommendations is not all-inclusive, leaving opportunity for future research. Sampling error is an issue with the final survey results as the team intended to sample people from multiple socioeconomic classes to ensure that cultural infrastructure is available for all types of people. A sampling issue arises because there is no guarantee that the survey respondents represent the majority of their respective socioeconomic classes. Another issue to consider is the sampling locations for the survey. Although all sampling locations were high traffic areas, they were not similar in both Xihu and Xiasha. In Xihu, surveying occurred in shopping areas as most people in these types of areas have disposable income and come from certain socioeconomic classes. In Xiasha, surveying occurred outside of a local Wumart, a popular Chinese grocery store, which attracts people from any socioeconomic class and provides a more varied sampling population. Future research should focus on ensuring that all classes of people in Xiasha have access to cultural infrastructure.

## 5.3 Lessons Learned

During the team's time in Hangzhou working on the project, we encountered some unexpected roadblocks and had to navigate around them. Surveying in Hangzhou is difficult because of both the language barrier and the suspicion of the police. American students conducting surveys about the city and how to improve it raises the suspicion of the police officers who are wary of foreigners interfering with the city and bothering residents. Consequently, the team needed a letter of recommendation from our sponsor with the appropriate stamp to survey in certain locations, although some places were off-limits even with the letter. Residents of Hangzhou tend to ignore people distributing papers, assuming they are trying to sell them something. It is usually necessary to approach individual people and ask them to take the survey, but once they realize that the survey is for research purposes, residents are generally happy to take a survey. However, they will often ask questions about the survey as they take it, so using a translator is necessary to explain what the survey is about and then help with any questions the respondent may have during the survey.

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# Appendix A: Group Interview Questions

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## HDU Professor Group Interview Questions:

### Interview on Current Cultural Facilities in Hangzhou, China

#### 中国杭州当前文化设施访谈录

Hangzhou Citizens,

In order to understand the current urban cultural infrastructure in your area and raise the quality of life, this interview is made specifically to inquire about your usage of public cultural facilities. Please answer these questions to the best of your ability. All information provided is used only for research and study, and your answers will be kept confidential.

Thank you for taking the time to answer these questions!

—Worcester Polytechnic Institute and Hangzhou Dianzi University Survey Team  
gr-hculture-b18@wpi.edu

杭州市民您好,

为了了解您所在地区当前的城市文化基础设施并提高生活质量，本访谈专门用于询问您对公共文化设施的使用情况。请尽最大努力回答这些问题。所提供的所有信息仅用于研究和学习，您的答案将保密。感谢您抽出宝贵时间回答这些问题！

—伍斯特理工学院和杭州电子科技大学调查组

1. Are you a Hangzhou citizen, and how long have you lived here?
2. What district do you live in?
3. Which type of cultural facility do you visit most frequently? For example: cinemas, museums, libraries, sports facilities, etc.
4. Are you satisfied with these facilities and why?
5. Do you use sports facilities, and if so, which ones?
6. For your frequented facilities, are they close to you or far away?
7. Do you pay for these facilities?
8. For people with children, are there other places that you frequent?
9. Are there any places that are hard to get to, or that there are not enough of?
10. Do you go to concerts or shows in Hangzhou, and if so how often?

## **Student Group Interview Questions:**

1. What facilities do you use the most? Why?
2. Do you go to theatres and cinemas? If so, how often? If not, why not?
3. Do you go to the gym? If so, how often? If not, why not?
4. Do you go to a swimming pool? If so, how often? If not, why not?
5. Are there any things that you would like to do in your spare time, but don't? Why don't you do these things?

# Appendix B: Individual Interview Questions

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## **Museum Employee Questions:**

1. What kind of people come here?
2. What is the busiest time here?

## **Art Gallery Employee Questions:**

1. Are you a Hangzhou citizen?
2. What district do you live in?
3. Which type of cultural facility do you visit most frequently? For example: cinemas, museums, libraries, sports facilities, etc.
4. Are you satisfied with these facilities and why?
5. Do you use sports facilities, and if so, which ones?
6. What kind of people come here?
7. Are you satisfied with the facilities in Hangzhou?

## **Children's Palace Questions:**

1. Why do you bring your children here?
2. How many classes per week?
3. How long are the classes?
4. What classes do you children take?

## **West Lake Questions:**

1. How often do you come here?
2. What do you like to do here?
3. What kinds of people usually come here?

## **Library Questions:**

1. Is the selection of books adequate?
2. Is there a good balance of books and electronics?
3. How often do you bring your children?
4. Would you go to a library versus staying in your home to do research?

**Park Questions:**

1. How often do you come here?
2. What do you like to do here?
3. Do you have any problems with the facilities here?

# Appendix C: Bilingual Survey Distributed in Hangzhou

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## 杭州市文化设施问卷调查 Questionnaire on Cultural Facilities in Hangzhou, China

杭州市民您好,

为了改善您所在地区的城市文化基础设施, 以此提高您的生活质量, 我们设计了此次调查。本调查专门用于调查市民对公共文化基础设施的需求。请您尽最大努力填写此调查表。我们承诺您所提供的所有信息仅用于研究和学习, 并且会得到保密。感谢您抽出宝贵时间填写此调查!

—伍斯特理工学院和杭州电子科技大学调查组  
gr-hculture-b18@wpi.edu

Hangzhou Citizens,

In order to improve urban cultural infrastructure in your area and raise the quality of life, this survey is made specifically to inquire about the needs for public cultural facilities. Please fill out this survey to the best of your ability. All information provided is used only for research and study, and your answers will be kept confidential. Thank you for taking the time to fill in this survey!

—Worcester Polytechnic Institute and Hangzhou Dianzi University Survey Team  
gr-hculture-b18@wpi.edu

1. 您的性别是?

What is your gender?

- 男  
Male
- 女  
Female

2. 您的年龄段是?

How old are you?

- 18 岁以下  
Under 18
- 18-29
- 30-39
- 40-49
- 50-64
- 65+

3. 您居住在杭州哪个地区?

Which district do you live in?

- 江干区  
Jiangan
- 西湖区  
Xihu
- 其他:  
Other: \_\_\_\_\_

4. 如果您居住在江干区, 请问您居住在下沙街道吗?

If you live in Jiangan, do you live in Xiasha?

- 是的  
Yes
- 不是  
No
- 我不居住在江干区  
I do not live in Jiangan

5. 您是什么身份?

Which best describes you?

- 杭州市民  
Hangzhou Citizen
- 在杭州学习  
Student living in Hangzhou
- 在杭州工作  
Working in Hangzhou
- 游客  
Tourist
- 其他:  
Other: \_\_\_\_\_

6. 您在杭州居住了多久?

How long have you lived in Hangzhou?

- 不到一个月  
Less than a month
- 不到一年  
Less than a year
- 1-5 年  
1-5 years
- 五年以上  
More than 5 years
- 不居住在杭州  
I do not live in Hangzhou

7. 您一般在什么时间有空?

When do you have the most free time?

请在你的选择下打勾。

Please check all that apply.

	06:00-12:00	12:00-17:00	10:00-21:00	21:00-06:00
工作日 Weekdays	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
周末 Weekends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. 您最经常去哪些文化设施场所进行娱乐?

Which type of cultural facility do you visit most frequently?

- 演出场地 (音乐厅, 歌剧院, 电影院, 剧院等)  
Performance venues (concert halls, opera houses, cinemas, theatres, etc.)
- 城市广场和公园  
City square and parks
- 户外运动及健身地点  
Recreation or sports facilities
- 文化展览 (博物馆, 美术馆, 纪念馆, 名人院等)  
Cultural exhibitions (museums, art galleries, memorial houses, celebrity homes, etc.)
- 教育设施 (书店, 图书馆, 视听店, 阅览室等)  
Educational facilities (bookstores, libraries, audiovisual stores, reading rooms, etc.)
- 其他:  
Other: \_\_\_\_\_

9. 您对杭州目前的城市文化设施满意吗?

Are you satisfied with current cultural facilities in Hangzhou?

- |                          |                          |                                   |                          |                          |
|--------------------------|--------------------------|-----------------------------------|--------------------------|--------------------------|
| 非常不满意                    | 不满意                      | 没有感觉                              | 满意                       | 很满意                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> |
| Very dissatisfied        | Dissatisfied             | Neither satisfied or dissatisfied | Satisfied                | Very satisfied           |

10. 为了体验上述文化设施,你愿意走多远?

How far would you be willing to travel to these facilities?

	在小区内 In my neighborhood	在我的街道内 In my sub-district	在所在的行政区内 In your district	在整个杭州市内 In Hangzhou	不会去设施 Would not go to facility
图书馆 Libraries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
公园 Parks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
博物馆 Museums	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
体育设施 Sports Facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. 对于以下的基础文化设施,你认为他们分别有哪些不足?

Which issues do you think apply to each of these facilities?

请在你的选择下打勾。如不确定,则不需打勾。

Please check all that apply. Leave blank if unsure.

	质量差 Poor quality	数量不够 Not enough	路途太远 Too far	费用过高 Too expensive	没有问题 No issues
少年宫 Youth Palaces	<input type="checkbox"/>				
博物馆 Museums	<input type="checkbox"/>				
公园 Parks	<input type="checkbox"/>				
音乐厅 Concert Halls	<input type="checkbox"/>				
电影院 Cinemas	<input type="checkbox"/>				
图书馆 Libraries	<input type="checkbox"/>				
剧院 Theatres	<input type="checkbox"/>				

12. 对于以下的基础体育设施，你认为他们分别有哪些不足？

**Which issues do you think apply to each of these sports facilities?**

请在你的选择下打勾。如不确定，则不需打勾。

Please check all that apply. Leave blank if unsure.

	质量差 Poor quality	数量不够 Not enough	路途太远 Too far	费用过高 Too expensive	没有问题 No issues
乒乓室 Ping Pong Rooms	<input type="checkbox"/>				
健身房 Gyms	<input type="checkbox"/>				
舞蹈室 Dance Studios	<input type="checkbox"/>				
户外运动器材 Outdoor Exercise Equip- ment	<input type="checkbox"/>				
运动场（篮球场，足球场 等） Sports Fields (Basketball Courts, Football Fields, etc.)	<input type="checkbox"/>				
游泳池 Swimming Pools	<input type="checkbox"/>				

13. 您还有其他意见吗？

**Do you have any additional comments?**

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谢谢!  
Thank you!

# Appendix D: Chinese Survey Distributed in Hangzhou

## 杭州市文化设施问卷调查

杭州市民您好,

为了改善您所在地区的城市文化基础设施, 以提高您的生活质量, 我们设计了此次调查。本调查专门用于调查市民对公共文化基础设施的需求。请您尽最大努力填写此调查表。我们承诺您所提供的信息仅用于研究和学习, 并且会得到保密。感谢您抽出宝贵时间填写此调查!

—伍斯特理工学院和杭州电子科技大学调查组  
gr-hculture-b18@wpi.edu

1. 您的性别是?

- 男
- 女

2. 您的年龄段是?

- 18 岁以下
- 18-29
- 30-39
- 40-49
- 50-64
- 65+

3. 您居住在杭州哪个地区?

- 江干区
- 西湖区
- 其他: \_\_\_\_\_

4. 如果您居住在江干区, 请问您居住在下沙吗?

- 是的
- 不是
- 我不居住在江干区

5. 您是什么身份?

- 杭州市民
- 在杭州学习
- 在杭州工作
- 游客
- 其他: \_\_\_\_\_

6. 您在杭州居住了多久?

- 不到一个月
- 不到一年
- 1-5 年
- 五年以上
- 不居住在杭州

7. 您一般在什么时间有空?

请在你的选择下打勾。

	06:00-12:00	12:00-17:00	17:00-21:00	21:00-06:00
工作日	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
周末	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. 您最经常去哪些文化设施场所进行娱乐?  
请在你的选择下打勾。

- 演出场地 (音乐厅, 歌剧院, 电影院, 剧院等)
- 城市广场和公园
- 户外运动及健身地点
- 文化展览 (博物馆, 美术馆, 纪念馆, 名人院等)
- 教育设施 (书店, 图书馆, 视听店, 阅览室等)
- 其他: \_\_\_\_\_

9. 您对杭州目前的城市文化设施满意吗?

- 非常不满意       不满意       没有感觉       满意       很满意

10. 为了体验上述文化设施,你愿意走多远?

	在小区内	在我的街道内	在所在的行政区内	在整个杭州市内	不会去设施
图书馆	<input type="checkbox"/>				
公园	<input type="checkbox"/>				
博物馆	<input type="checkbox"/>				
体育设施	<input type="checkbox"/>				

11. 对于以下的基础文化设施,你认为他们分别有哪些不足?  
请在你的选择下打勾。如不确定,则不需打勾。

	质量差	数量不够	路途太远	费用过高	没有问题
少年宫	<input type="checkbox"/>				
博物馆	<input type="checkbox"/>				
公园	<input type="checkbox"/>				
音乐厅	<input type="checkbox"/>				
电影院	<input type="checkbox"/>				
图书馆	<input type="checkbox"/>				
剧院	<input type="checkbox"/>				

12. 对于以下的基础体育设施，你认为他们分别有哪些不足？  
请在你的选择下打勾。如不确定，则不需打勾。

	质量差	数量不够	路途太远	费用过高	没有问题
乒乓室	<input type="checkbox"/>				
健身房	<input type="checkbox"/>				
舞蹈室	<input type="checkbox"/>				
户外运动器材	<input type="checkbox"/>				
运动场（篮球场，足球场等）	<input type="checkbox"/>				
游泳池	<input type="checkbox"/>				

13. 您还有其他意见吗？

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谢谢!

# Appendix E: October 23rd Professor Group

## Interview

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There were seven interviewees. Our interview format encouraged open discussion between respondents, so we can attribute only a few responses to specific, individual professors.

1. "Are you a Hangzhou citizen, and how long have you lived here?"
  - 12 yrs
  - 14 yrs
  - 2 yrs
  - 10 yrs
  - 12 yrs
  - 13 yrs
  - 18+ yrs
2. "What district do you live in?"
  - Jianggan
  - Xihu (West Lake District)
  - Jianggan
  - Jianggan
  - Jianggan
  - Jianggan
  - Xiasha (HDU district)
3. "Which type of cultural facility do you visit most frequently? For example: cinemas, museums, libraries, sports facilities, etc."
  - Everyone frequents cinemas
    - Most popular
  - Libraries
    - Some offer lunch, dinner, coffee
    - Quiet place to study
  - Scientific museums
  - Art museums
  - Gym

- These places usually are frequented with their children, never usually by themselves
  - Can also see shows at museums
4. "Are you satisfied with these facilities and why?"
- Overall everyone is very satisfied with the places they go
  - Best part: convenience
  - Diversity also a plus
    - 'Widens children's eyes'
5. "Do you use sports facilities, and if so, which ones?"
- Gongshang University → also in Hangzhou
  - Ping pong rooms
  - Sports rooms in residential areas
    - A kind of common room type deal
  - Parks
  - Walking along the Tian Qiang River
  - HDU
  - Yoga gym
    - Aka yoga studio
  - Walk and jog in the wetlands preserve close by the river
    - "Road is perfect" in this preserve
    - Can ride bikes if you want to
6. "For your frequented facilities, are they close to you or far away?"
- All are very close bc they are in the city
    - Usually go to far away ones once a month
  - "Only free time is on the weekends, so you go to ones in the city close by so that it cuts down on travel time"
  - When it is sunny out they can drink tea, read, and sit by the river
  - Swimming in the summertime, also close by
7. "Do you pay for these facilities?"
- For pool, yes
    - Not free anywhere
      - HDU students and faculty have to pay to use it
  - Museums are free
  - Youth palaces yes you have to pay
    - More on it below in question 8
8. "For people with children, are there other places that you frequent?"
- Some have interest classes on the weekends
    - Need to go somewhere fast, doesn't take long

- Youth palaces
    - Interest classes available here
      - Piano, writing, English, singing, drawing, etc.
    - Every district has its own
      - Too far to travel to another district
      - Only one per
    - More money for a class with fewer children in it (8,9,10 children: 1 teacher)
      - This is preferred, people wait online to click the button right when it opens to get their child into these classes
    - Number of youth palaces do not meet parents needs
9. “Are there any places that are hard to get to, or that there are not enough of?”
- Youth palaces
  - Jianggan district does not have enough art museums, theatres, or other art places
  - 14 Universities in HDU’s district
  - Takes more than 1 hour to get to city center
10. “Do you go to concerts or shows in Hangzhou, and if so how often?”
- If the show is near, then yes they will go
    - If they hear about it in time
  - Usually 2x a year they will go to things like this
  - Goes to the city center for this about 1x a year
  - For their children, they will also attend shows

### **Miscellaneous Notes**

Each bullet point represents a comment from the interview which did not match the question that prompted it. These comments are in chronological order, and are from the end of the interview, after the team had exhausted their prepared questions. The numbered comments beneath each topic are from other interviewees, which they offered in response to the original comment. Due to the interview format, it is not possible to attribute specific comments to individual respondents.

- Hangzhou has many theatres and high-level shows
  1. Gets out at 10 PM
  2. People go to enjoy themselves and post pictures to share the happiness
- Some people do not go to these shows and things because they do not enjoy them
  1. Jobs get in the way
  2. Just not their thing
- Facilities are good for all ages

- 1. Age groups go to different ones
  - Young kids: parks, youth palaces
  - Elderly: chess rooms, tea houses
- Xiasha has a big demand for cultural infrastructure bc of the new growth and economic growth
  - 1. Has advanced and developed since being created
- Least developed district: Xiaoshan district (airport district)
  - 1. Site of factories and a lot of industry
  - 2. No museums at all
- West Lake district (Xihu District—most developed district)
  - 1. Most art and museums are located here
- Gyms and theatres at different universities but are not public
  - 1. Outdoor playgrounds are public
  - 2. Indoor gyms are not
    - But you can pay per month to join
    - Pay money but also need to apply
      - Like actually apply, not like just fill out a form
- People sometimes don't go places b/c they work and dont have the time/ energy
- People with children go to a lot of different museums and other places
  - 1. Keeps children busy
- Don't go to the gym as often as they want
  - 1. Like the gym, but they don't hear about the games that are going on so they miss them and don't go
- Hangzhou is a beautiful place to live
- West Lake district is for creativity and arts
- Air quality depends on time of year
  - 1. Bad air quality makes it so outdoor facilities are less desirable
  - 2. May, December, and at night are top times when air is bad

# Appendix F: October 24th Individual Interview

## Notes

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### **Interviewee 1: Zhejiang Provincial Museum Employee**

1. "What kind of people come here?"
  - There are lots of children who come here
    - Primary School students will come after other activities are finished
      - After-school activities, sports, homework, etc.
  - Most common people who come here are university students
  - Old men also frequent here to learn about the history
  - Chinese Party Members
    - Come here because of the Chinese Revolution exhibit
    - October 1—National Holiday → a lot of people come during this time to pay their respects to the people who died in the Revolution
  - All different classes of people come here
    - Students, officials, middle class, etc.
      - Museums are free
2. "What is the busiest time here?"
  - When festivals are going on way more people show up
    - Ching Ming Festival
      - Come here to remember the men who have died

### **Interviewee 2: Zhejiang Provincial Museum Art Gallery Employee**

1. "Are you a Hangzhou citizen?"
  - Is a Hangzhou citizen
2. "What district do you live in?"
  - Lives in West Lake district
3. "Which type of cultural facility do you visit most frequently? For example: cinemas, museums, libraries, sports facilities, etc."
  - She does not usually go to different activities
    - Mostly goes to museums and libraries
4. "Are you satisfied with these facilities and why?"
  - Satisfied with the facilities
5. "Do you use sports facilities, if so which ones?"

- Exercises at home, not in a gym or sports facility
6. "What kind of people come here?"
    - Most people go to the art museum because of their hobbies
      - If they like art or jade jewelry
    - Usually very quiet there
    - Students also go to this museum
    - People will come if they have money or don't
      - Aka all types of economic classes
      - Their interest in the art museum comes from hobbies, not money
  7. "Are you satisfied with the facilities in Hangzhou?"
    - Hangzhou is a very developed city
    - Very satisfied with the facilities she uses

**Interviewee 3: Hangzhou Youth & Children's Center (West to Xihu Huayuan) Patron**

1. "Why do you bring your children here?"
  - Cost is cheaper at the youth palace because it is government run
    - Private schools are very expensive
2. "How many classes per week?"
  - To get into a class they log onto the website and choose a number
  - You can take 3 classes per week
    - Therefore people usually come to the palace 3x a week"
3. How long are the classes?"
  - Classes are usually an hour long
    - 10 min rest in the middle
      - They play games between classes
4. "What classes do your children take?"
  - Types of classes depend on age
    - What days of the week and times they come to the youth palace depend on the class
      - Different classes on different days and times
  - Interviewee takes their baby to enlightenment lessons at the palace
5. Other comments
  - They came from far away, they live in another district
    - The teacher for the lessons they want is better at this particular youth palace so they are willing to travel farther

**Interviewee 4: Under-60-Year-Old Woman at West Lake**

1. "How often do you come here?"

- Comes to West Lake almost every day
  - Lives close by
- 2. “What do you like to do here?”
  - Older people will sit and listen to Opera and chat with friends
  - Visits West Lake frequently to make new friends that are her age
  - Older people will go here because there are a lot of people and lively atmosphere so they feel less lonely
- 3. “What kinds of people usually come here?”
  - Younger elderly people (50–60 years old) will dance and sing opera
    - Older elderly people (< 60 years old) will watch

**Interviewee 5: Over-60-Year-Old Woman at West Lake**

1. “How often do you come here?”
  - Lives in Hangzhou, and will sometimes comes here
    - Comes to play with friends
    - Tea House is nearby
      - Goes here to drink tea with friends
2. “What do you like to do here?”
  - Likes to square dance
    - Note: not American Style Square Dancing
  - Likes West Lake but will not stay for a very long time
    - Maybe will make friends here, but might not because they do not stay for long
  - Only comes to West Lake when she has spare time
    - Usually goes into the village to drink tea
      - Tea House
      - Also likes to experience the life of the village
3. “What kinds of people usually come here?”
  - No response recorded

# Appendix G: October 26th Individual Interview

## Notes

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### **Interviewee # 1—Library Patron**

1. “Is the selection of books adequate?”
  - Selection of books is good, hard to find books though
2. “Is there a good balance of books and electronics?”
  - Prefers to read books because electronic screens are hard on the eyes
    - Paper has a better feeling when reading
3. “How often do you bring your children?”
  - No response recorded
4. “Would you go to a library versus staying in your home to do research?”
  - Enjoys coming to the library because she can find more books to read
  - Prefers to come to the library to read/research because it is boring at home

### **Interviewee # 2—Library Patron with a Child**

1. “Is the selection of books adequate?”
  - Selection at the library is okay
2. “Is there a good balance of books and electronics?”
  - Good balance between electronics and paper
3. “How often do you bring your children?”
  - No response recorded
4. “Would you go to a library versus staying in your home to do research?”
  - Comes about 1x a month
  - Prefers to read at home, and only come to the library to check out and borrow books from library

### **Interviewee # 3—Library Patron**

1. “Is the selection of books adequate?”
  - Selection of books is okay
2. “Is there a good balance of books and electronics?”
  - There is a good balance of electronics and paper
    - Prefers paper to read
3. “How often do you bring your children?”

- Comes usually 1x a month with her children
  - Children read the books at home or read electronic books
    - So they only come to check out new books—hence the 1x a month
- 4. “Would you go to a library versus staying in your home to do research?”
  - Comes to the library by herself sometimes to do research/work
    - Is able to focus better at the library
    - More devoted to work

**Interviewee #4—Person in Citizen Center Park**

1. “How often do you come here?”
  - Lives near the park and works there
    - There is an outlet mall underneath the park
  - Comes to the park 1–2x a week
2. “What do you like to do here?”
  - Likes to eat with friends in the park
    - A lot of restaurants nearby
  - Enjoys going shopping
    - There are a lot of malls nearby and underneath the park
    - Also goes to the markets nearby
3. “Do you have any problems with the facilities here?”
  - Facilities are very complete

**Interviewee #5—Second Person in Citizen Center Park**

1. “How often do you come here?”
  - Works in the park—comes here everyday because of it
  - Enjoys basking in the sun
    - In the park
2. “What do you like to do here?”
  - Comes for the sweet scented Osmanthus flower trees
    - Enjoys the smell
    - This flower is the city flower of Hangzhou
  - Shopping and delicious food
3. “Do you have any problems with the facilities here?”
  - Hardly gets into the theatre nearby
    - Tickets are very expensive
    - Are hard to get as well

# Appendix H: HDU Student Group Interview Notes

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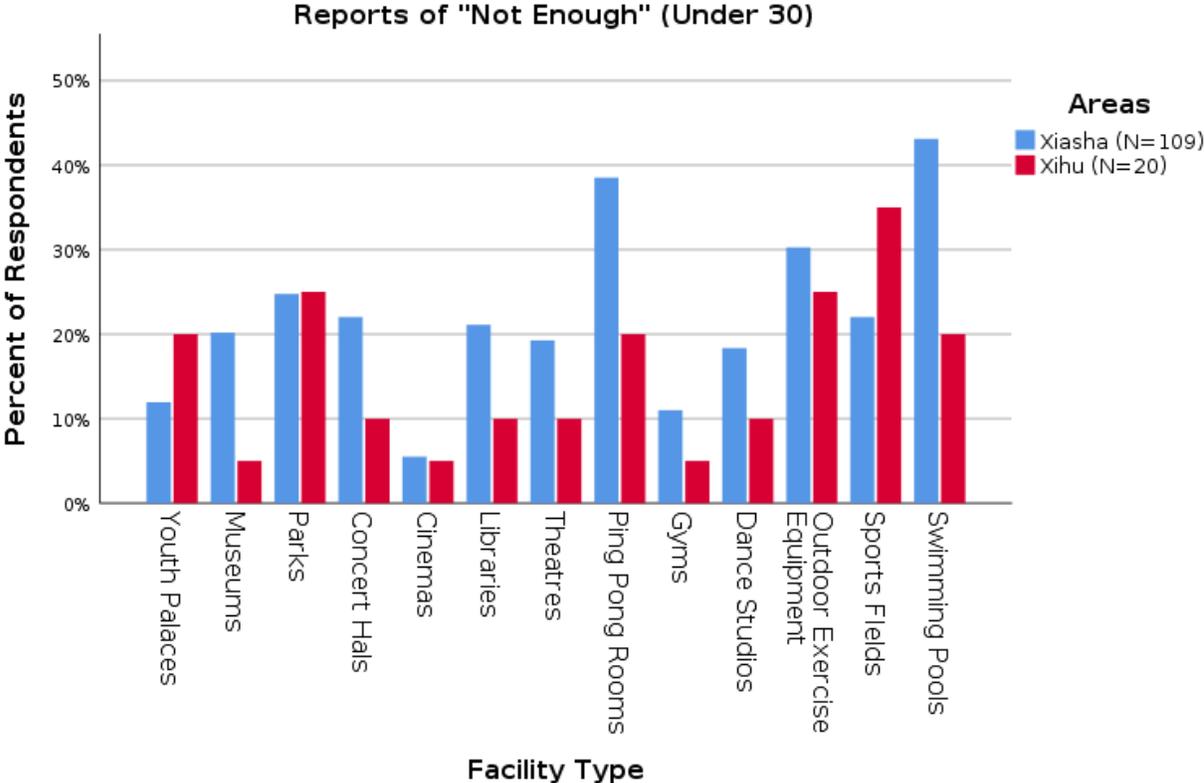
The team conducted multiple group interviews with HDU students in parallel, using similar questions. We tallied common responses per-question and recorded a few unique responses as well.

1. What facilities do you use the most? Why?
  - a. Restaurants - 1
  - b. Gym - 3
  - c. Cinema - 2
  - d. Park - 2
  - e. Student Activity Center - 1
  - f. Library - 8
  - g. Museum - 2
2. Do you go to theatres and cinemas? If not, why? If yes, how often?
  - a. Close to HDU or many nearby - 1 or more
  - b. Depends on movies - 3
  - c. Depends on weather - 1
  - d. With friends - 1
  - e. Twice a month - 2
  - f. Every 2 months
  - g. Doesn't go to theatres because she doesn't like watching the shows
  - h. Goes to a theatre
    - i. Likes to go and watch the shows, but does not go often
      1. Too far away and traffic is often inconvenient

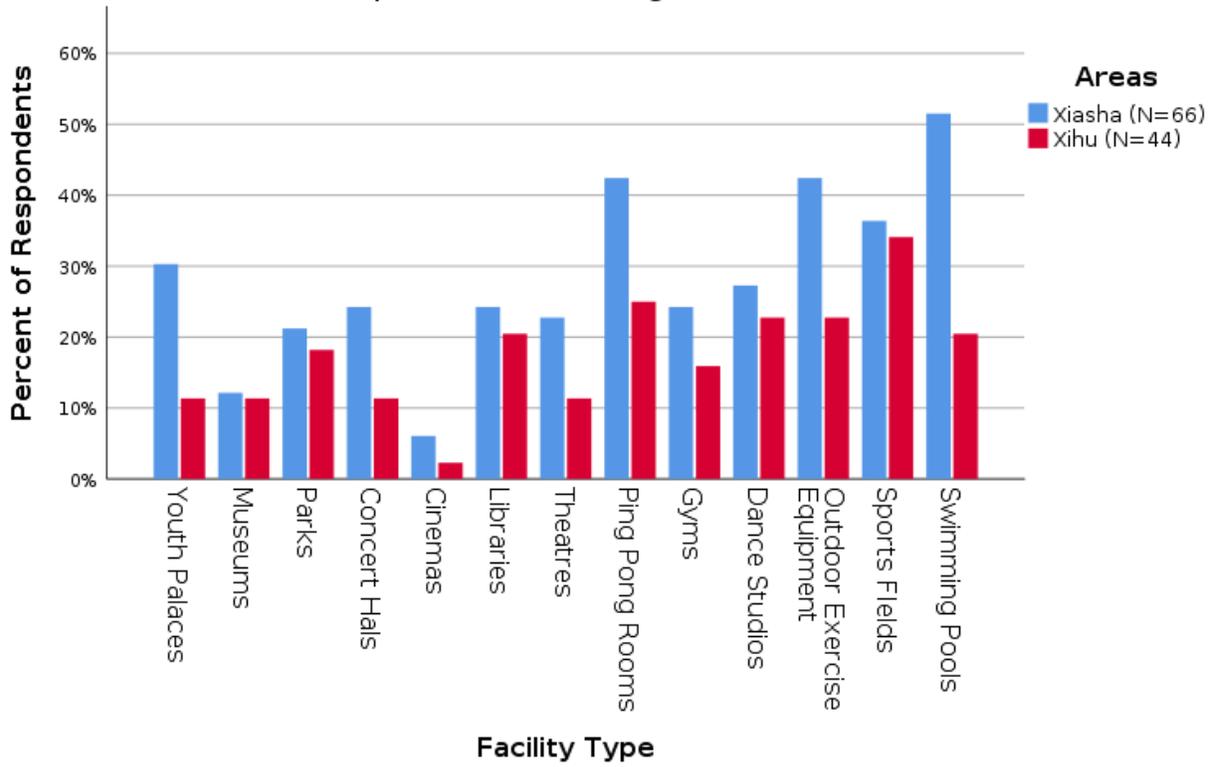
Doesn't go to the theatre because he does not like it
3. Do you go to the gym? If yes, how often? If not, why not?
  - a. Paid for gym - 3
  - b. Once a week - 2
  - c. Work out at parks 4 times a week - 1
  - d. Everyday - 2
  - e. Does not go - 2
  - f. Once a month - 1
  - g. Run outdoors - 1
  - h. Goes running and plays badminton, in the summertime will go swimming
    - i. Does not have to pay to use these facilities

4. Do you go to a swimming pool in the summertime? If yes, how often? If not, why not?
  - a. No pool in gym - 1
  - b. Pool under construction at HDU - 1
  - c. Too expensive - 4
  - d. Can't swim - 3
  - e. Use rivers instead - 1
  - f. Too crowded - 2
  - g. Go to beach - 1
  - h. Others don't go (4?)
  - i. Doesn't have anyone to go with
    - i. If you go to the pools at Primary or Middle Schools you do not have pay
    - ii. Some other places you do need to pay
  
5. Are there any things that you would like to do in your spare time, but don't? Why don't you do these things?
  - a. Lifting weights - 2
  - b. Working out in general - 3
    - i. Too lazy - 3
  - c. Shopping
  - d. Hot pot
  - e. Video games
  - f. International Film Documentaries and Exhibitions at West Lake
    - i. Doesn't have the time to go and it is too far away to travel to
    - ii. Also would like to go to a museum to listen to lectures
      1. These happen on Thursdays or Fridays usually, she cannot go because she has class on these days
  - g. See theatre answer -- same thing
  - h. Wants to play basketball but then gets distracted by his computer and plays games instead

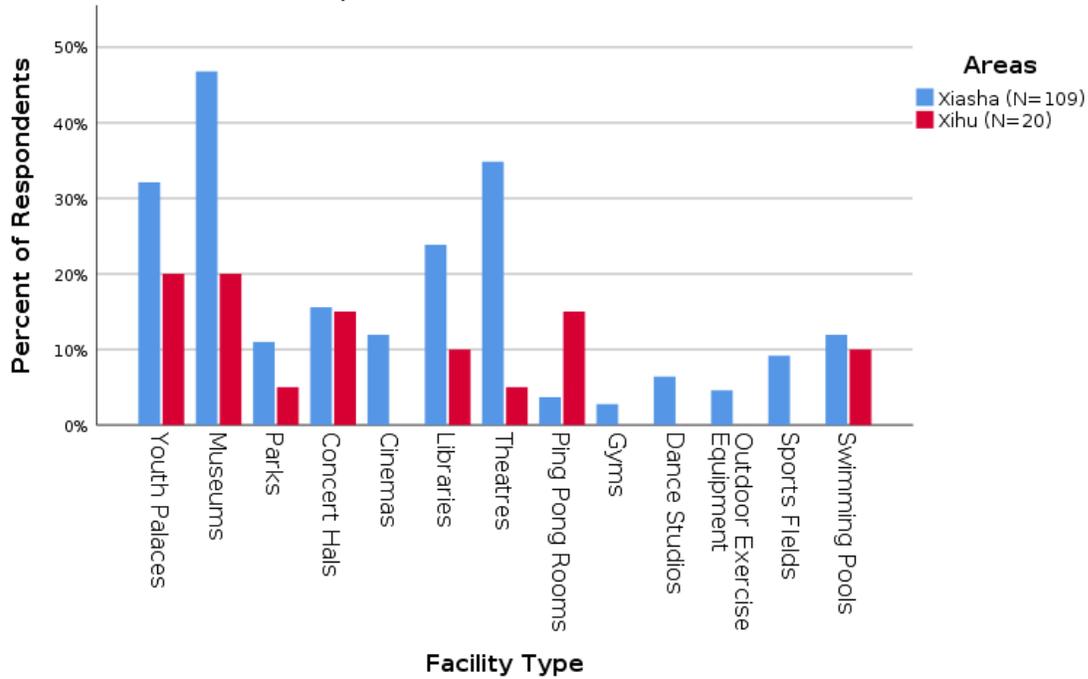
# Appendix I: Supplemental Graphs



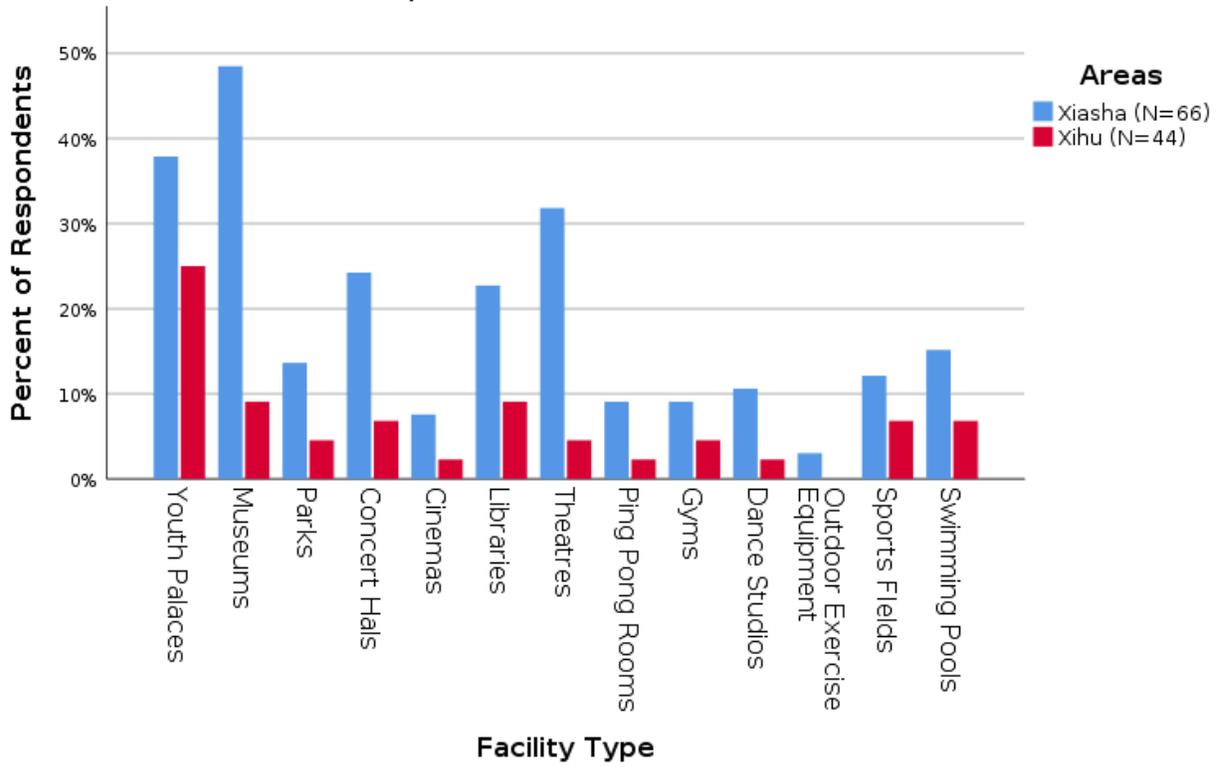
Reports of "Not Enough" (30+)



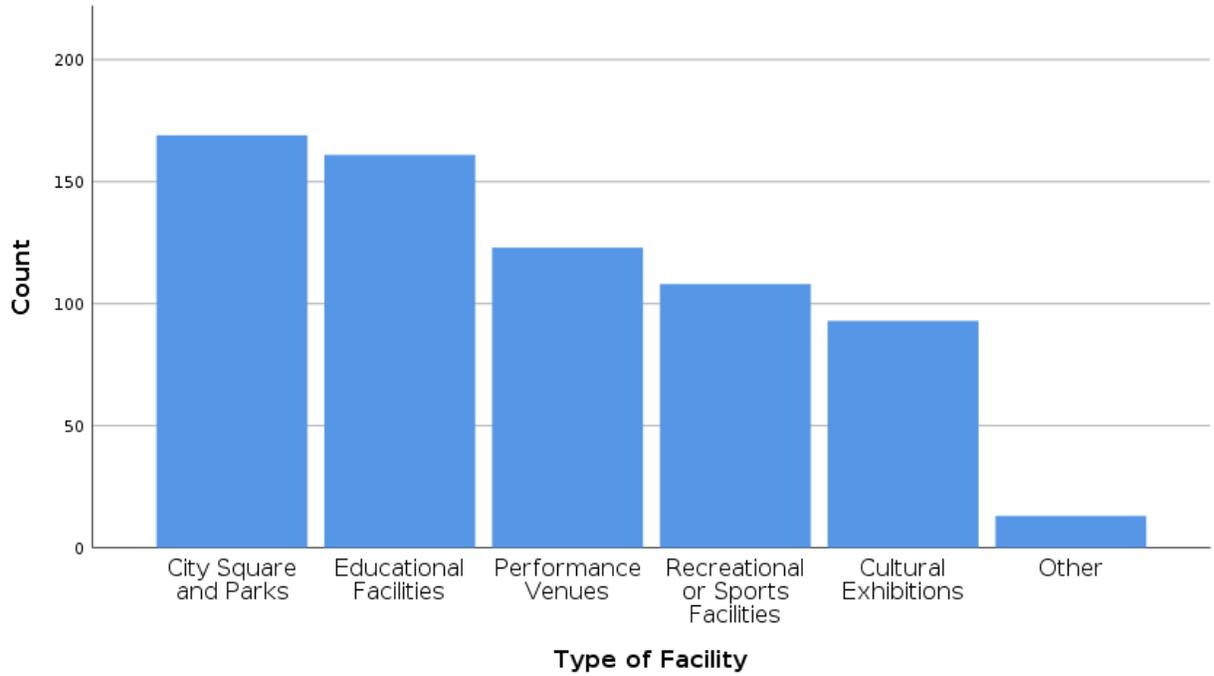
Reports of "Too Far" (Under 30)



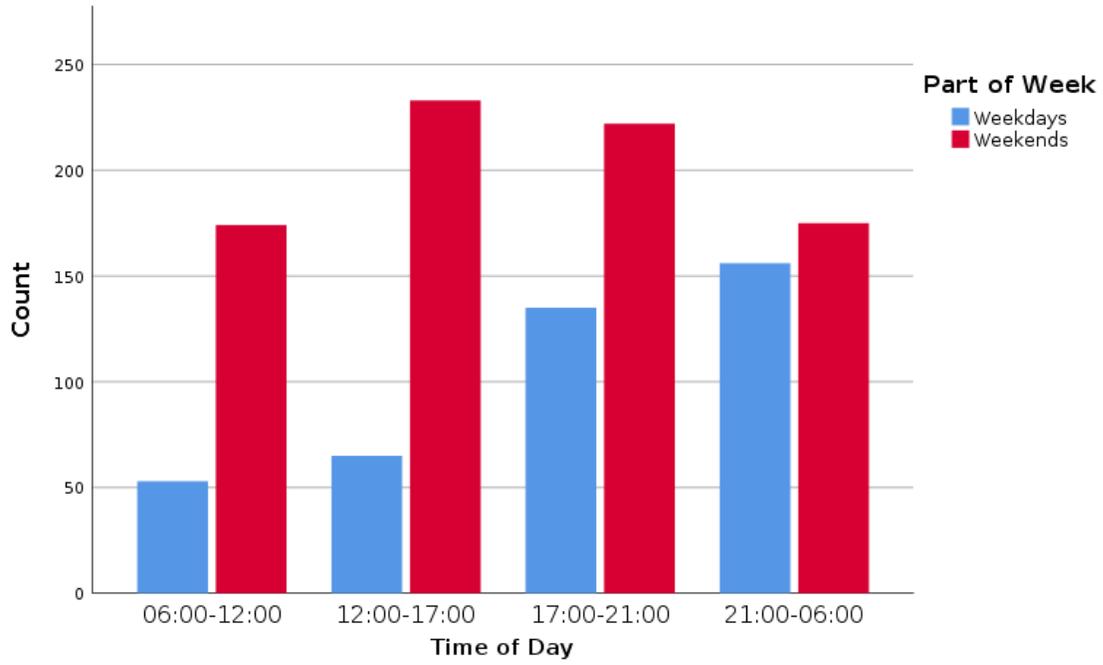
Reports of "Too Far" (30+)



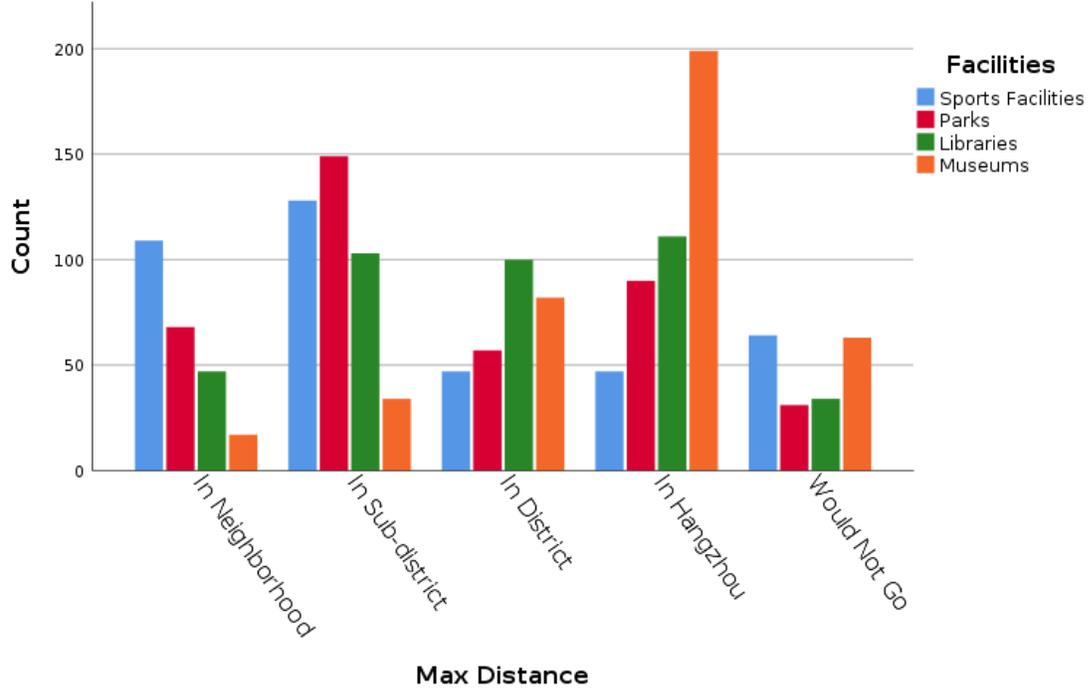
Frequently-Visited Facilities (N=395)



Weekly Free Time of Respondents (N=395)



Maximum Travel Distance Per Facility (N=395)



# Appendix J: Matlab Script

---

## SPSS2MATLAB.m

```
% SPSS2MATLAB.m
% Lorenzo Castoldi
% Processes raw data (direct from the survey) to be easier to analyze
% Removes problem surveys, totals issues per area in separate files,
% and simplifies a few variables in the main table
% xlsx files are used as intermediates between SPSS and MATLAB

clear;
clc;
cd '~/Documents/College/IQP';

% Remove surveys marked as problematic (incomplete, incorrectly done, etc.)
allData = readtable('Raw survey data/All_Survey_Data.xlsx');
allData = allData(allData.problems ~= 1,:);
acc = allData;

% Divide AllData into smaller tables by area
% If Xiasha was checked by respondent, survey is marked as from Xiasha,
% even if a district other than Jianggan was selected in the first
% question. Jianggan does not include Xiasha.
xiasha = acc(acc.xiasha == 1, :);
acc = allData(allData.xiasha ~= 1,:);
xihu = acc(acc.district == 2, :);
acc = acc(acc.district ~= 2, :);
jianggan = acc(acc.district == 1,:);
acc = acc(acc.district ~= 1, :);
otherDist = acc(acc.district == 3,:);
acc = acc(acc.district ~= 3, :);

% Ensure no double-counted responses, no dropped valid responses
assert(height(acc) == 0, 'Leftover responses')
assert(height(xiasha) + height(xihu) + height(jianggan) ...
+ height(otherDist) == height(allData), ...
'Bad row sum, double-counted or dropped responses')
clear acc;

% Ugly one-liners; each one sums the issues per area and reshapes to
% tabulate by facility type
jiangganIss = array2table(reshape(sum(table2array(jianggan(:,28:92))), [5 13]'), ...
'VariableNames',{'poor','enough','far','exp','no'}, ...
'RowNames', {'yp','mus','park','conc','cin','lib','theat','ping', ...
'gym','dance','outdoor','fields','pool'});
otherDistIss = array2table(reshape(sum(table2array(otherDist(:,28:92))), [5 13]'), ...
'VariableNames',{'poor','enough','far','exp','no'}, ...
'RowNames', {'yp','mus','park','conc','cin','lib','theat','ping', ...
'gym','dance','outdoor','fields','pool'});
xihuIss = array2table(reshape(sum(table2array(xihu(:,28:92))), [5 13]'), ...
'VariableNames',{'poor','enough','far','exp','no'}, ...
'RowNames', {'yp','mus','park','conc','cin','lib','theat','ping', ...
'gym','dance','outdoor','fields','pool'});
xiashaIss = array2table(reshape(sum(table2array(xiasha(:,28:92))), [5 13]'), ...
```

```

    'VariableNames', {'poor', 'enough', 'far', 'exp', 'no'}, ...
    'RowNames', {'yp', 'mus', 'park', 'conc', 'cin', 'lib', 'theat', 'ping', ...
    'gym', 'dance', 'outdoor', 'fields', 'pool'});

writetable(jianganIss, 'MATLAB processed/issues_jiangan.xlsx', 'WriteRowNames', 1);
writetable(otherDistIss, 'MATLAB processed/issues_otherDist.xlsx', 'WriteRowNames', 1);
writetable(xihuIss, 'MATLAB processed/issues_xihu.xlsx', 'WriteRowNames', 1);
writetable(xiashaIss, 'MATLAB processed/issues_xiasha.xlsx', 'WriteRowNames', 1);

% Individual tables not needed for analysis (can filter by area in SPSS)
% Also keeps workspace from getting cluttered
clear jiangan otherDist xiasha xihu;

% Combine district and Xiasha responses, using same logic as earlier
% Makes filtering in SPSS easier
% 0 == Xiasha, 1 == Jiangan, 2 == Xihu, 3 == other district
% Also convert type_other to numeric
for i = 1:height(allData)
    if allData.xiasha(i) == 1
        area(i, 1) = 0;
    else
        area(i, 1) = allData.district(i);
    end

    if isempty(cell2mat(allData.type_other(i))) ...
        | cell2mat(allData.type_other(i)) == '0'
        type_other(i, 1) = 0;
    else
        type_other(i, 1) = 1;
    end
end
clear i;

processed = [allData(:,1) allData(:,3:4) array2table(area) ...
    allData(:,7:21) array2table(type_other) allData(:,23:width(allData))];
writetable(processed, 'MATLAB processed/all_data_processed.xlsx');

% processed is better for analysis than allData
% Clear it and other temp variables to reduce clutter
clear area type_other allData;

```

## online2std.m

```

% online2std.m
% Lorenzo Castoldi
% Converts the online survey data to the standard format used with the
%     paper surveys.
% Renames variables, changes nominal values, etc.

clear;
clc;
cd '~/Documents/College/IQP';

std = readtable('Raw survey data/All_Survey_Data.xlsx'); % as a template
onlineRaw = readtable('Raw survey data/Excel sheets/1000_Online_raw.xlsx');

% Strategy: Create a table with the correct dimensions and labels, filled
%     with placeholder values (table should contain no occurrences of this

```

```

%     value by the end), and fill in the correct values cell by cell, row
%     by row. Source table (onlineRaw) and template (std) are not modified.

onlineFixed = ones(height(onlineRaw), width(std)) .* -999; % placeholders
onlineFixed = array2table(onlineFixed);
onlineFixed.Properties.VariableNames = std.Properties.VariableNames;

for i=1:height(onlineFixed) % iterate by row
    onlineFixed.index(i) = str2double(cell2mat(onlineRaw.index(i))) + 1000;

    onlineFixed.problems(i) = NaN;

    if onlineRaw.Q1(i) == 1
        onlineFixed.male(i) = 1;
    else
        onlineFixed.male(i) = 0;
    end

    onlineFixed.age(i) = onlineRaw.Q2(i);

    onlineFixed.district(i) = onlineRaw.Q3(i);

    if onlineRaw.Q4(i) == 1
        onlineFixed.xiasha(i) = 1;
    else
        onlineFixed.xiasha(i) = 0;
    end

    onlineFixed.occupation(i) = onlineRaw.Q5(i);

    onlineFixed.how_long(i) = onlineRaw.Q6(i);

    onlineFixed.free_week_6_12(i) = onlineRaw.v1(i);
    onlineFixed.free_week_12_17(i) = onlineRaw.v2(i);
    onlineFixed.free_week_17_21(i) = onlineRaw.v3(i);
    onlineFixed.free_week_21_6(i) = onlineRaw.v4(i);

    onlineFixed.free_end_6_12(i) = onlineRaw.v5(i);
    onlineFixed.free_end_12_17(i) = onlineRaw.v6(i);
    onlineFixed.free_end_17_21(i) = onlineRaw.v7(i);
    onlineFixed.free_end_21_6(i) = onlineRaw.v8(i);

    onlineFixed.type_performance(i) = 0;
    onlineFixed.type_parks(i) = 0;
    onlineFixed.type_sports(i) = 0;
    onlineFixed.type_exhib(i) = 0;
    onlineFixed.type_education(i) = 0;
    onlineFixed.type_other(i) = 0;
    switch onlineRaw.Q8(i)
    case 1
        onlineFixed.type_performance(i) = 1;
    case 2
        onlineFixed.type_parks(i) = 1;
    case 3
        onlineFixed.type_sports(i) = 1;
    case 4
        onlineFixed.type_exhib(i) = 1;
    case 5
        onlineFixed.type_education(i) = 1;
    case 6
        onlineFixed.type_other(i) = 1;
    end
end

```

```

end

onlineFixed.satisfaction(i) = onlineRaw.Q9(i);

if onlineRaw.v13(i)
onlineFixed.far_lib(i) = 5;
elseif onlineRaw.v12(i)
onlineFixed.far_lib(i) = 4;
elseif onlineRaw.v11(i)
onlineFixed.far_lib(i) = 3;
elseif onlineRaw.v10(i)
onlineFixed.far_lib(i) = 2;
elseif onlineRaw.v9(i)
onlineFixed.far_lib(i) = 1;
end

if onlineRaw.v18(i)
onlineFixed.far_park(i) = 5;
elseif onlineRaw.v17(i)
onlineFixed.far_park(i) = 4;
elseif onlineRaw.v16(i)
onlineFixed.far_park(i) = 3;
elseif onlineRaw.v15(i)
onlineFixed.far_park(i) = 2;
elseif onlineRaw.v14(i)
onlineFixed.far_park(i) = 1;
end

if onlineRaw.v23(i)
onlineFixed.far_mus(i) = 5;
elseif onlineRaw.v22(i)
onlineFixed.far_mus(i) = 4;
elseif onlineRaw.v21(i)
onlineFixed.far_mus(i) = 3;
elseif onlineRaw.v20(i)
onlineFixed.far_mus(i) = 2;
elseif onlineRaw.v19(i)
onlineFixed.far_mus(i) = 1;
end

if onlineRaw.v28(i)
onlineFixed.far_sports(i) = 5;
elseif onlineRaw.v27(i)
onlineFixed.far_sports(i) = 4;
elseif onlineRaw.v26(i)
onlineFixed.far_sports(i) = 3;
elseif onlineRaw.v25(i)
onlineFixed.far_sports(i) = 2;
elseif onlineRaw.v24(i)
onlineFixed.far_sports(i) = 1;
end

onlineFixed.iss_yp_poor(i) = onlineRaw.v29(i);
onlineFixed.iss_yp_enough(i) = onlineRaw.v30(i);
onlineFixed.iss_yp_far(i) = onlineRaw.v31(i);
onlineFixed.iss_yp_exp(i) = onlineRaw.v32(i);
onlineFixed.iss_yp_no(i) = onlineRaw.v33(i);

onlineFixed.iss_mus_poor(i) = onlineRaw.v34(i);
onlineFixed.iss_mus_enough(i) = onlineRaw.v35(i);
onlineFixed.iss_mus_far(i) = onlineRaw.v36(i);

```

```

onlineFixed.iss_mus_exp(i)    = onlineRaw.v37(i);
onlineFixed.iss_mus_no(i)    = onlineRaw.v38(i);

onlineFixed.iss_park_poor(i)  = onlineRaw.v39(i);
onlineFixed.iss_park_enough(i) = onlineRaw.v40(i);
onlineFixed.iss_park_far(i)   = onlineRaw.v41(i);
onlineFixed.iss_park_exp(i)   = onlineRaw.v42(i);
onlineFixed.iss_park_no(i)    = onlineRaw.v43(i);

onlineFixed.iss_conc_poor(i)  = onlineRaw.v44(i);
onlineFixed.iss_conc_enough(i) = onlineRaw.v45(i);
onlineFixed.iss_conc_far(i)   = onlineRaw.v46(i);
onlineFixed.iss_conc_exp(i)   = onlineRaw.v47(i);
onlineFixed.iss_conc_no(i)    = onlineRaw.v48(i);

onlineFixed.iss_cin_poor(i)   = onlineRaw.v49(i);
onlineFixed.iss_cin_enough(i) = onlineRaw.v50(i);
onlineFixed.iss_cin_far(i)    = onlineRaw.v51(i);
onlineFixed.iss_cin_exp(i)    = onlineRaw.v52(i);
onlineFixed.iss_cin_no(i)     = onlineRaw.v53(i);

onlineFixed.iss_lib_poor(i)   = onlineRaw.v54(i);
onlineFixed.iss_lib_enough(i) = onlineRaw.v55(i);
onlineFixed.iss_lib_far(i)    = onlineRaw.v56(i);
onlineFixed.iss_lib_exp(i)    = onlineRaw.v57(i);
onlineFixed.iss_lib_no(i)     = onlineRaw.v58(i);

onlineFixed.iss_theat_poor(i) = onlineRaw.v59(i);
onlineFixed.iss_theat_enough(i) = onlineRaw.v60(i);
onlineFixed.iss_theat_far(i)  = onlineRaw.v61(i);
onlineFixed.iss_theat_exp(i)  = onlineRaw.v62(i);
onlineFixed.iss_theat_no(i)   = onlineRaw.v63(i);

onlineFixed.iss_ping_poor(i)  = onlineRaw.v64(i);
onlineFixed.iss_ping_enough(i) = onlineRaw.v65(i);
onlineFixed.iss_ping_far(i)   = onlineRaw.v66(i);
onlineFixed.iss_ping_exp(i)   = onlineRaw.v67(i);
onlineFixed.iss_ping_no(i)    = onlineRaw.v68(i);

onlineFixed.iss_gym_poor(i)   = onlineRaw.v69(i);
onlineFixed.iss_gym_enough(i) = onlineRaw.v70(i);
onlineFixed.iss_gym_far(i)    = onlineRaw.v71(i);
onlineFixed.iss_gym_exp(i)    = onlineRaw.v72(i);
onlineFixed.iss_gym_no(i)     = onlineRaw.v73(i);

onlineFixed.iss_dance_poor(i)  = onlineRaw.v74(i);
onlineFixed.iss_dance_enough(i) = onlineRaw.v75(i);
onlineFixed.iss_dance_far(i)   = onlineRaw.v76(i);
onlineFixed.iss_dance_exp(i)   = onlineRaw.v77(i);
onlineFixed.iss_dance_no(i)    = onlineRaw.v78(i);

onlineFixed.iss_outdoor_poor(i) = onlineRaw.v79(i);
onlineFixed.iss_outdoor_enough(i) = onlineRaw.v80(i);
onlineFixed.iss_outdoor_far(i)   = onlineRaw.v81(i);
onlineFixed.iss_outdoor_exp(i)   = onlineRaw.v82(i);
onlineFixed.iss_outdoor_no(i)    = onlineRaw.v83(i);

onlineFixed.iss_fields_poor(i) = onlineRaw.v84(i);
onlineFixed.iss_fields_enough(i) = onlineRaw.v85(i);
onlineFixed.iss_fields_far(i) = onlineRaw.v86(i);
onlineFixed.iss_fields_exp(i) = onlineRaw.v87(i);

```

```

onlineFixed.iss_fields_no(i) = onlineRaw.v88(i);

onlineFixed.iss_pool_poor(i) = onlineRaw.v89(i);
onlineFixed.iss_pool_enough(i) = onlineRaw.v90(i);
onlineFixed.iss_pool_far(i) = onlineRaw.v91(i);
onlineFixed.iss_pool_exp(i) = onlineRaw.v92(i);
onlineFixed.iss_pool_no(i) = onlineRaw.v93(i);

% text encoding mangled by SPSS, so comments are discarded
onlineFixed.comments(i) = NaN;
end
clear i;

if find(ismissing(onlineFixed, -999))
    fprintf('Leftover placeholder values detected!\n')
end

% Formatting is sometimes preserved while overwriting xlsx files
% Delete first to start fresh
delete('Raw survey data/Excel sheets/1000_Online.xlsx');
writetable(onlineFixed, 'Raw survey data/Excel sheets/1000_Online.xlsx');

clear std onlineRaw;

```

## freeTime.m

```

% freeTime.m
% Lorenzo Castoldi
% Sums and tabulates the times that survey respondents indicated they are
% free during the weekdays and weekends, so it can be graphed in SPSS

clear;
clc;
cd '~/Documents/College/IQP';

% Read in all survey responses (already processed by SPSS2MATLAB)
proc = readtable('MATLAB processed/all_data_processed.xlsx');

% Simiar one-liner to SPSS2MATLAB--sum free time columns, then put in table
freeTime = [array2table([1;0], 'VariableNames', {'weekday'}) ...
    array2table(reshape(sum(table2array(proc(:,7:14))), [4 2]), ...
    'VariableNames', {'free_06_12', 'free_12_17', 'free_17_21', ...
    'free_21_06'}, 'RowNames', {'weekdays', 'weekends'})];

% Formatting is sometimes preserved while overwriting xlsx files
% Delete first to start fresh
delete('MATLAB processed/free_time.xlsx');
writetable(freeTime, 'MATLAB processed/free_time.xlsx');

clear proc;

```

## combineIssues.m

```

% combineIssues.m
% Lorenzo Castoldi
% Concatenate the per-area issue tables, and convert them to percentages
% (percent of respondents from each area who reported each issue)

```

```

clear;
clc;
cd '~/Documents/College/IQP';

proc = readtable('MATLAB processed/all_data_processed.xlsx');
xiashaIss = readtable('MATLAB processed/issues_xiasha.xlsx');
jiangganIss = readtable('MATLAB processed/issues_jianggan.xlsx');
xihuIss = readtable('MATLAB processed/issues_xihu.xlsx');
otherDistIss = readtable('MATLAB processed/issues_otherDist.xlsx');

% MATLAB requires unique row names, format is 'area_facility'
rowNames = jiangganIss.Row;
allRows = [
    strcat('xiasha_', rowNames)
    strcat('jianggan_', rowNames);
    strcat('xihu_', rowNames);
    strcat('other_dist_', rowNames);
];

% For filtering in SPSS
% 0 == Xiasha, 1 == Jianggan, 2 == Xihu, 3 == other district
area = array2table([
    ones(size(rowNames)) * 0;
    ones(size(rowNames)) * 1;
    ones(size(rowNames)) * 2;
    ones(size(rowNames)) * 3;
], 'VariableNames', {'area'});

% Also for filtering in SPSS
% Numbers 1 to 13 correspond to each type of facility (yp=1, mus=2, ...)
facility = array2table([1:13 1:13 1:13 1:13]', 'VariableNames', {'facility'});

% Count total respondents from each area
areaCount = zeros(1,4);
for i = 1:height(proc)
    if proc.area(i) == 0
        areaCount(1) = areaCount(1) + 1;
    elseif proc.area(i) == 1
        areaCount(2) = areaCount(2) + 1;
    elseif proc.area(i) == 2
        areaCount(3) = areaCount(3) + 1;
    elseif proc.area(i) == 3
        areaCount(4) = areaCount(4) + 1;
    end
end
areaCount = areaCount / 100; % In SPSS, .3 is 0.3%, not 30%

% Divide each total by the number of respondents from the area
% to get percentage metric
allIssues = [
    array2table(table2array(xiashaIss(:,2:6)) / areaCount(1));
    array2table(table2array(jiangganIss(:,2:6)) / areaCount(2));
    array2table(table2array(xihuIss(:,2:6)) / areaCount(3));
    array2table(table2array(otherDistIss(:,2:6)) / areaCount(4))
];
allIssues = [area facility allIssues];
allIssues.Properties.RowNames = allRows;
allIssues.Properties.VariableNames = {'area' 'facility' 'poor' 'enough' ...
    'far' 'exp' 'no'};

```

```

% Formatting is sometimes preserved while overwriting.xlsx files
% Delete first to start fresh
delete('MATLAB processed/issues_all.xlsx');
writetable(allIssues, 'MATLAB processed/issues_all.xlsx');

% Reduce clutter
clear allRows area areaCount facility i jiangganIss otherDistIss proc ...
      rowNames xiashaIss xihuIss;

```

## splitAge.m

```

% splitAge.m
% Lorenzo Castoldi
% Splits the table of processed surveys into responses from young people
%     (29 and below) and old people (30 and up)

```

```

clear;
clc;
cd '~/Documents/College/IQP';

all = readtable('Raw survey data/All_Survey_Data.xlsx');

young = all(all.age <= 2,:);
old = all(all.age >= 3,:);

```

```

% Formatting is sometimes preserved while overwriting.xlsx files
% Delete first to start fresh
delete('Raw survey data/young.xlsx');
delete('Raw survey data/old.xlsx');
writetable(young, 'Raw survey data/young.xlsx');
writetable(old, 'Raw survey data/old.xlsx');

```

```
clear all;
```

```

% To process these files further (i.e. issues tables), backup and rename
%     all_data_processed.xlsx, then rename old.xlsx or young.xlsx to
%     all_data_processed.xlsx and run SPSS2MATLAB.m and friends
% Don't forget to backup all_data_processed.xlsx first! This will also
%     overwrite all the processed.xlsx files, but not the sav files.
% Make sure to keep track of which data is being fed into SPSS2MATLAB.m,
%     and name the sav files accordingly.

```

## maxDist.m

```

% maxDist.m
% Lorenzo Castoldi
% Sums and tabulates the maximum distances that survey respondents
%     indicated they would go to get to specific facilities, so it can be
%     graphed in SPSS

```

```

clear;
clc;
cd '~/Documents/College/IQP';

```

```

% Read in all survey responses (already processed by SPSS2MATLAB)
proc = readtable('MATLAB processed/all_data_processed.xlsx');

```

```

distances = array2table(zeros(4*height(proc), 2), ...
    'VariableNames', {'facility', 'distance'});

for i=1:height(proc)
    % 4 variables per row -> 4 rows in same column
    distances.distance(4*i - 3) = proc.far_lib(i);
    distances.distance(4*i - 2) = proc.far_park(i);
    distances.distance(4*i - 1) = proc.far_mus(i);
    distances.distance(4*i - 0) = proc.far_sports(i);

    % For filtering in SPSS
    distances.facility(4*i - 3) = 1; % libraries
    distances.facility(4*i - 2) = 2; % parks
    distances.facility(4*i - 1) = 3; % museums
    distances.facility(4*i - 0) = 4; % sports facilities

    % Replace 0 (left blank) with 5 (would not go)
    if distances.distance(4*i - 3) == 0
        distances.distance(4*i - 3) = 5;
    end
    if distances.distance(4*i - 2) == 0
        distances.distance(4*i - 2) = 5;
    end
    if distances.distance(4*i - 1) == 0
        distances.distance(4*i - 1) = 5;
    end
    if distances.distance(4*i - 0) == 0
        distances.distance(4*i - 0) = 5;
    end
end

clear i;

% Replace NaN/system missing with 5 (would not go)
distances = fillmissing(distances, 'constant', 5);

% Formatting is sometimes preserved while overwriting excel files
% Delete first to start fresh
delete('MATLAB processed/max_dist.xlsx');
writetable(distances, 'MATLAB processed/max_dist.xlsx');

clear proc;

```