A survey on the satisfaction of living environment in old urban residential areas from the perspective of public infrastructure

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Abstract. Under the circumstance of constantly accelerated urban development process, the old residential areas in urban areas have a lot of problems, such as earlier construction year, longer construction time, aging public infrastructure and lack of public services, etc., which directly affect the satisfaction of residential residents with the living environment. In this paper, a simple data analysis method is used to conduct a questionnaire survey on the residents of Chengnan Garden Residential District, Jiaxing City. The survey results are quantified and analyzed to understand the residents’ satisfaction with the public infrastructure of the old residential district. In this paper, the author analyzes the reasons for the satisfaction, and puts forward transformation suggestions for these problems.

1. Introduction

Under the circumstance of constantly accelerated urban development process, the old residential areas in urban areas have a lot of problems, such as earlier construction year, longer construction time, aging public infrastructure and lack of public services, etc., which directly affect the satisfaction of residential residents with the living environment [1]. Aiming at solving the practical problems in urban and rural construction, human settlement environment attempts to establish a new scientific group centering on the coordination between man and nature. It takes the living environment as the research object, and its theoretical basis is derived from the “Ekistics” of C.A.Doxiadis [2]. Public facilities are one of the basic factors for the evaluation of human settlements [3]. This study will investigate the satisfaction of community residents with the public infrastructure of the community and provide the direction and focus for the reconstruction of the old community. This investigation content is mainly the satisfaction with public infrastructure in residential area, and based on the existing research [3-5] and by combining with the actual survey, the community public infrastructure is divided into seven factors, including “medical and health facilities”, “public security and fire safety”, “water and electricity supply”, “recreational activities”, “physical fitness facilities”, and "vehicle management".

The questionnaire adopts Likert five-level scale, and the evaluation of each indicator is divided into five grades, including “very satisfied”, “satisfied”, “average”, “dissatisfied”, “very dissatisfied”. For quantitative analysis, the five factors are assigned with the rating of 5, 4, 3, 2 and 1, respectively.
2. Research methods and data sources

2.1 Research object
Jiaxing City is in the northeast of Zhejiang Province. The object of this study is Chengnan Garden Residential Area in Nanhu District, Jiaxing City. Completed in 1999, the residential covers a total floor area of about 80,000 square meters, with a plot ratio of 1.2 and a greening ratio of 36%.

2.2 Research method
Among the methods to evaluate human settlements, there are five relatively mature methods, including simple data analysis method, linear weight method, fuzzy comprehensive evaluation method, GIS analysis method and BP neural network model method[6]. The main research content is the satisfaction of residents in Chengnan Garden Community with the public infrastructure. Public infrastructure is a single part of the human settlement environment research, and its study subject is a single residential area, and the investigation scope and sample size are limited, so in this paper, the simple data analysis method is adopted to analyze the data.

2.3 Data resources
Table 1. The questionnaire survey.

| Total number | Valid number | Effective rate |
|--------------|--------------|----------------|
| 80           | 75           | 93.75%         |

The survey data of this study was from the residents of this community. During the investigation process, a total of 80 questionnaires were issued, of which 75 were valid and the effective rate was 93.75% (Table 1).

2.4 Reliability analysis
Cronbach coefficient α is often used as an index to evaluate internal reliability. If a value is greater than 0.7, it indicates a high reliability, and if it is between 0.35 and 0.7, it indicates a fair reliability, and if it is less than 0.35, it indicates a low reliability [7]. The software SPSS is used to calculate the reliability of 7 factors in the questionnaire, and it is obtained that the Cronbach coefficient α is 0.802, so the data of the questionnaire has a high reliability.

3. Results and analysis

3.1 Survey information statistics
Table 2. Gender statistics of interviewed households.

|               | Man     | Woman   |
|---------------|---------|---------|
| People number | 40      | 35      |
| Rate          | 53.33%  | 46.67%  |

In this survey, 40 men and 35 women were interviewed by questionnaires, accounting for 53.33% and 46.67%, respectively (Table 2). The proportion of men and women in this survey is relatively balanced, which can better reflect the comprehensiveness of the survey results.

Table 3. Statistics of the age distribution of the interviewed households

| Age    | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | Over 60 |
|--------|-------|-------|-------|-------|-------|---------|
| People number | 1 | 8 | 13 | 21 | 12 | 10 |
| Rate   | 1.33% | 10.67% | 17.33% | 28.00% | 16.00% | 26.67% |

In this investigation, the age grades who are investigated are mainly as follows: over 40 years old, accounting for 70.67%, 17.33% for 30-39 years old, and 12% for under 30 years old, 44.00% for 40 to 59 years old, who are not only the main source of income in the family but also undertake the responsibility of taking care of the elderly. The elderly over 60 years old accounts for 26.67%, who
often take a leisurely walk in the community. As the main population in the community, they can accurately reflect the public infrastructure of the old community (Table 3).

| Years of residence | <1 | 1-5 | 6-10 | 11-20 | >21 |
|--------------------|----|-----|------|-------|-----|
| People number      | 2  | 12  | 30   | 21    | 10  |
| Rate               | 2.67% | 16.00% | 40.00% | 28.00% | 13.33% |

In this investigation, the residents surveyed are mainly as follows: those who have lived for more than 10 years account for 41.33%; those who have lived for 6-10 years account for 40.00%, and those who have lived less than 6 years account for 18.67%. The surveyed households generally have lived for a longer period, so they can more accurately reflect the specific conditions of the community’s public infrastructure and increase the accuracy of the survey results.

3.2 Analysis on the satisfaction of public infrastructure in Chengnan Garden Community

Table 5. Mean value and standard deviation of public infrastructure satisfaction in Chengnan Garden Community

| Factor                        | Mean   | Standard deviation |
|-------------------------------|--------|--------------------|
| Medical and Health facilities | 3.0533 | 0.8778             |
| Public security and Fire safety | 3.6667 | 0.8055             |
| Water and Electricity supply  | 3.5467 | 0.8049             |
| Recreational activities       | 3.2267 | 0.8575             |
| Physical fitness facilities   | 3.4000 | 0.8641             |
| Vehicle management            | 2.6800 | 1.1095             |
| Supporting facilities for education | 3.3200 | 0.8352 |
| Total                         | 3.2705 |                    |

In this survey research, the evaluation of 7 factors is divided into 5 grades, and values are assigned to them with “1-5”. The higher the satisfaction is, the higher the score will be. According to the questionnaire survey, the data as shown in table 5 is obtained. The overall satisfaction is 3.2705, and residents are generally satisfied with the public infrastructure of Chengnan Garden Community. Among them, the satisfaction degree of residents in the community with medical and health facilities, recreational activities, public construction facilities and educational supporting facilities is between 3 and 3.5, with a moderate satisfaction. “Medical and health facilities” mainly include the medical facilities of the community. There is a community hospital in the community, which is only 300 meters away from Jiaxing People’s Hospital. The survey result of this term is 3.0533, which is relatively satisfactory. In terms of “public security and fire safety”, the monitoring system covers the community, and there are often fire drills and public security lectures. The score of this survey result is 3.6667, which is relatively satisfactory. In terms of “water and electricity supply”, there hasn’t been water and electricity supply failure in the community in the past year. There were a few problems in some residents and professional maintenance team is also available in time. The score of this survey result is 3.5467, which is relatively satisfactory. In terms of “recreational activities”, the community has an “association for the elderly”, which regularly holds recreational activities such as “table tennis competition” and “Mid-Autumn festival evening party” and so on. The score of this survey result is 3.2267, which is relatively satisfactory. In terms of “physical fitness facilities”, there are public fitness equipment and a small basketball court in the community. The score of this survey result is 3.4, which is relatively satisfactory. In terms of “supporting facilities for education”, there is a kindergarten in the community and Jiaxing Experimental Junior Middle School is less than 2 kilometers away, with perfect educational facilities. The score of this survey result is 3.32, which is relatively satisfactory. However, the satisfaction of “vehicle management” in the community is less than 3, which is not satisfactory. Therefore, a further analysis and research will be conducted to vehicle management.
Table 6. Vehicle management

|                | Upground Park | Underground Park | Car   |
|----------------|---------------|------------------|-------|
| Number         | About 100     | 0                | About 360 |

Table 7. Parking Modes and Disadvantages of Vehicles

| Mode                                      | Parke on both sides of the road | Parke in public square | Parked in front of building |
|-------------------------------------------|---------------------------------|------------------------|-----------------------------|
| Rate                                      | About 72%                       | About 23%              | About 5%                    |
| Disadvantages                             | Reduce community traffic area   | Reduce community public area | Congestion at the entrance of residential buildings, causing inconvenience to the entire population |
|                                           | Prone to traffic accidents      | Cause congestion and inconvenience for residents | Inconvenience to passing vehicles |

Chengnan Garden Community, completed in 1999, is an old community. Therefore, under the circumstance that most families have private cars, the parking spaces in the community are in short supply, and motor vehicle parking spaces are far from enough (Table 6). As the overall lack of vehicle parking spaces, there are a variety of vehicle management problems in the community: parking wars, parking disorder and other phenomena emerge in endlessly. The main parking ways in the community are divided into three situations: parking on both sides of the community road; Parking in a public square; Parking at the gate of the residential building (Table 7).

In the community, many vehicles are parking on both sides of the community road, so the road becomes very narrow, seriously affecting the convenience of residents’ life and walking. In the rush hour, there is usually a phenomenon that two cars are opposite, which also leads to the phenomenon of traffic jam in part of the community. The roads of the community originally bear the traffic function. However, due to the parking of vehicles, the traffic capacity is reduced, which is also easy to cause traffic accidents. In addition, it will also lead to the deterioration of the surrounding environment and landscape of the community. Both sides of the road cannot meet the demand for parking, and the entrance of small squares and public fitness equipment are also occupied by vehicles, which also seriously affects residents’ daily outdoor fitness activities, greatly reduces the public activity space, and declines their sense of life happiness to a certain extent.

4. Conclusions

In the research on urban living environment of older communities from the perspective of public facilities survey on the satisfaction of residents living in Chengnan Garden Community in Jiaxing, the community residents’ satisfaction with medical and health facilities, cultural activities, construction of public facilities, and education facilities is relatively good, but they aren’t satisfied with vehicle management, and this is mainly because the old village parking space cannot meet the increasing number of vehicles. Therefore, in order to solve such problem, the following several suggestions are proposed.

4.1 Improve road organization in old community

Due to the lack of popularity of cars in the early years in China, “people and cars diverge” wasn’t considered in the old residential areas, and in many old residential areas, pedestrians and vehicles share the same road system. With the increase of private cars in the community, this kind of road organization has caused safety risks for residents to travel. Therefore, improving the road organization in the old community has become one of the factors to be considered in the transformation process of the old community. For example, the sidewalks should be extended on the main roads of the main communities. Meanwhile, footpaths can be constructed in the green landscape of the communities to effectively separate pedestrians from vehicles and reduce safety risks.
4.2 Build new parking lots
The government can choose sites around the old residential areas and build new public parking spaces to meet the parking needs of residents in the old residential areas nearby. Meanwhile, it can also build three-dimensional parking spaces, multi-storey parking spaces, or special parking buildings. At the same time, the current science and technology can be used for the unified, scientific, efficient and standardized management of parking lots. Through building new parking lots, the parking difficulty and parking chaos in old residential areas can be improved.

4.3 Share parking spaces
There is a large commercial centre near Chengnan Garden Community, and Wal-Mart is 300 meters away, Huafu Square is 500 meters away, and Yaohan is 1.5 kilometers away, so the parking spaces of the commercial centre can be fully used and the parking facilities can be shared, so as to effectively enhance the utilization rate of the parking spaces, improve the urban travel environment to a certain extent, and alleviate the parking problems.

4.4 Strengthen parking management
In view of the problem of parking chaos in the old residential areas, the government shall formulate corresponding rules and regulations and improve the level of property management. Meanwhile, it shall manage and timely rectify the phenomenon of disorderly parking in the residential areas and may give corresponding legal penalties to vehicles that don’t meet the regulations. In addition, the management of access control at the entrance of the community shall be enhanced, external vehicles shall be registered and charged, etc.

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