Micro Renewal of Public Spaces in Communities Surrounding Colleges and Universities

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Abstract The community located around colleges and universities is a place where university students and community residents engage in production and life together. Due to the influence of colleges and universities, these communities have spontaneously formed various other functions, resulting in the disorderly development of the entire space and a lack of effective guidance and control. With the development of colleges and universities, problems within the community are gradually increasing. These factors affect the spatial quality of the communities, as well as the environmental atmosphere of colleges and universities, and cause damage to the spatial environment of the entire region. By sorting out the issues between universities and surrounding communities, the development of universities is linked with that of communities, and a path of cooperation and win-win development is sought.

Keywords Surrounding communities of colleges and universities, Public space, Micro renewal

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University town is a special functional area of the city, where several universities gather in space to form an independent geographical area with a considerable scale for teaching or research activities[1]. University is a special space in the city, often symbolizing the cultural connotation of the city. However, the development of universities is constrained by land in most cases, which makes it difficult for universities to easily expand outward. The urban space outside the university gradually develops around the university and takes on the logistical role of the university.

In the 1990s, China entered a period of rapid construction of university towns. By 2021, 21 provinces and cities had built university towns, and some cities had also built multiple university towns, such as Xianlin University Town, Jiangning University Town, and Pukou University Town in Nanjing[2]. University towns cover a large area and are built at a fast pace, often located in suburban areas. They not only have a significant impact on the local ecosystem and cultural context, but also commonly suffer from problems such as the dual structure of towns (universities) and villages, mixed population and business formats, and conflicts in architectural styles[3-4]. With the development of the open campus concept, the campus space of colleges and universities has also undergone a transformation from closed to open. However, the boundary between universities and surrounding block spaces has not completely disappeared, and even some campuses are still in a closed state to the outside world. However, the integration of universities and blocks in space and function is becoming increasingly evident[5].

The communities and neighborhoods outside colleges and universities are important places for students and residents to engage in production and living activities, but most of these activities are spontaneous and lack effective management, resulting in slow construction of public order. These issues often lead to practical problems such as chaotic public spaces in the surrounding communities and neighborhoods of colleges and universities, outdated infrastructure, and disorderly commercial development. Therefore, how to solve the problems existing in the university towns through effective planning methods, promote the revitalization of the university towns, develop in harmony with colleges and universities, create places conducive to student exchange and creation, and harmonious coexistence of residents' production and operation, and ultimately achieve the revitalization of the urban area, is an urgent problem to consider.

In recent years, the theory of "micro renewal" has been increasingly applied in various fields, with most cases concentrated in old urban areas, historic streets, and historic districts of big cities. In this paper, the surrounding communities of Yaohu colleges and universities in Nanchang City, Jiangxi Province are taken as the research objects. Through field research on the development status of the surrounding communities in colleges and universities, as well as the problems in the public spaces of the communities, combined with some excellent renovation cases at home and abroad, it is expected to propose more reasonable and effective methods for the renovation and updating of public spaces in the surrounding communities of colleges and universities, and to guide and control the renovation and development of the surrounding communities of colleges and universities. The research can enrich the research on the theory of "micro renewal" in community coordinated governance. At the same time, it could provide theoretical and methodological strategies for the renovation of community spaces around colleges and universities.

1 Research and analysis of the surrounding communities of Yaohu Campus

The community near Yaohu University Town in Nanchang City, as an affiliated area of university construction, has close relationships with surrounding universities. These communities are not only just traditional residential areas, but more importantly, extensions of efficient commercial, residential, and educational activities in the surrounding areas. It is of great significance to conduct research on the rectification of these surrounding communities and promote their harmonious development with surrounding universities.

1.1 Relationship with surrounding neighborhoods

Jiangxi Normal University Yaohu Campus is located in Nanchang County, Nanchang City. The school is surrounded by Ziyang Avenue, Tianxiang Avenue, Yaohu West Avenue, and Yaohu No.1 West Road (Fig.1). Ziyang Avenue and Tianxiang Avenue on the southwest side of the school are some large-scale commercial complexes facing the street, and the areas adjacent to the school are some open living communities. Due to the community being located around commercial complexes and

connected to the school and subway entrance, it is convenient for students to enter and exit. Therefore, it has gradually developed spatial functions related to student leisure, entertainment, consumption, and other activities, and has a close interactive relationship with campus space.

1.2 Spatial function of community

The community on the west side of the school is closed, mainly residential space with only some commercial functions, and the connection with the school is relatively weak. The community in the southern part of the school has evolved from a village to a community after the construction of the school. Due to the existence of the school, the space in this part of the community is open, and the internal space of the community has become a commercial space, undertaking the logistics service function of the school. The commercial space within the community is mainly transformed from bottom residential buildings to commercial shops, from residential functions to commercial functions, and has developed into a commercial street over time. The entire community has a high commercial atmosphere and strong commercial vitality.

The commercial space within the community is mainly transformed from the lower-level residential areas. The shops are small in scale and mostly operated by external tenants. Most of these shops are spontaneously transformed by the operators. Due to the small size of the shops, the stalls continue to expand outward to obtain a larger business scope, resulting in the occupation of roads within the community and

Fig.1 Location of Jiangxi Normal University and surrounding communities

chaotic occupation of various shops.

1.3 Spatial scale of community

The space within the community can be divided into two types: one is the commercial space transformed from residential to commercial, and the other is the original living space of the community. The living space mainly consists of the community front space and some secondary road spaces between residential buildings. The living space is a transitional space within the community that transforms from a private space to an open space. Commercial space refers to various commercial shops within the community, which exist as lower-level businesses within the community, transforming residential roads into commercial streets and alleys. These two different spaces undertake different functions within the community, and their scales and environments are also different. The community is mainly composed of mixed use of people and vehicles. But it was built early, and the scale between residential buildings is relatively small, making it difficult to drive. Therefore, walking is the main mode of transportation within the community.

1.3.1 Analysis of spatial scale of commercial streets and alleys. The residential buildings within the community are mostly small high-rise buildings with varying distances between them. Most of them are relatively small, and some buildings with shorter construction time have larger spaces between them. In the commercial spaces within residential buildings, the spaces between buildings are often obstructed by canopies and signs on the upper part of the shops, while the lower space is occupied by randomly placed seats, making the entire space relatively cramped. During peak dining periods, the entire space is even more crowded, and the width of the space makes it difficult for pedestrians to travel. Most students leave immediately after buying. However, due to the crowded space, students' wandering needs are difficult to meet, so commercial spaces are mainly focused on the catering industry, with a relatively single type of business.

1.3.2 Analysis of spatial scale of residential streets and alleys. The living space is closely related to the lives of residents within the community and is the main place for residents to engage in daily activities. This type of space is usually located at the innermost level of the community, far away from universities, and retains its original residential function. The space is mainly composed of the front of the house and the internal roads of the community, mainly responsible for the living functions of residents.

1.4 Spatial interface of community

The residential buildings within the community are the main ones, with a small number of self built commercial buildings. The overall architectural style of the community is gray tone, with disorderly addition of anti-theft windows and air conditioning units on the exterior. There is less pavement on the ground, mostly cement roads. The overall color of the space is suppressed, and the facade and the interface are messy. The ubiquitous canopies and clothes drying, as well as shop canopies and billboards, define the space, making it oppressive and cluttered. At the same time, shop signs and storefronts are often spontaneously designed by the operators, with significant differences in style, resulting in chaotic and discontinuous spatial interfaces and unclear styles.

2 Transformation of interface form in public spaces

For the transformation of public spaces, the change in material form characteristics is the most intuitive experience of the spatial subject for spatial change, while the realization of the comprehensive value of public spaces in multiple aspects and levels is the essential requirement for public space transformation. The transformation of spatial material form must be combined with the development of society, economy, and culture, otherwise it will only become a formality[5].

The interface of public space can most intuitively reflect the quality of public space in the community, and different decorations and materials can have different effects on the space. The interface of public space can reflect the image and atmosphere of the entire community. It can transform the interface of public space to match with the cultural atmosphere of the university, to enhance the spatial quality of the entire area.

2.1 Vertical interface transformation

Firstly, it is necessary to rectify the buildings that have been spontaneously added and constructed in the space, in order to avoid damage to the interface caused by disorderly structures. Secondly, an interface with the cultural characteristics of universities and in line with their style should be created.

Firstly, the commercial space should be renovated, including the self built and expanded booth billboards in stores. The store area should be strictly controlled, and illegal expansion and occupation of road space should be prohibited. Secondly, it should maintain the facade of the community, prohibit graffiti and the construction
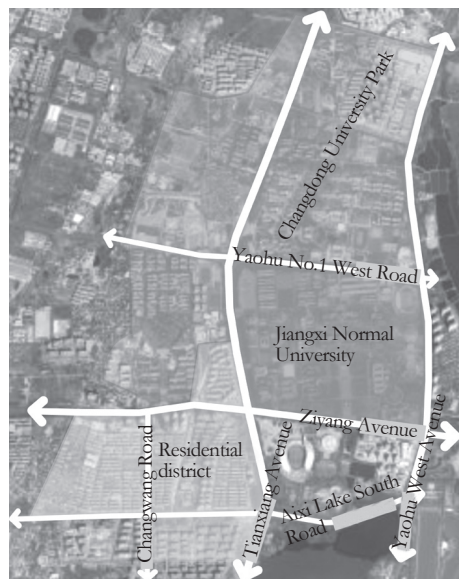
of structures on the walls that damage the integrity and continuity of the walls. In addition to specific display walls, advertising and creative walls can be specifically designated within the community. It could repair contaminated walls and areas, demolish illegal buildings and stalls, and maintain road integrity and building continuity.

Unified governance should be carried out for billboards within the community. It should prohibit billboards that do not conform to core values from appearing in the community and damaging the overall appearance of the community. At the same time, it should be clearly stipulated that advertising billboards are prohibited from being placed on roads. It should set up a specialized advertising posting area within the community to provide convenience for those in need within the community.

2.2 Shape transformation of horizontal interface

The roads within the community are mostly cement, which have a dull color and do not match with the surrounding environment. In addition, there are also some damaged road surfaces with obvious repair marks, and the road appearance is poor. The paving of the ground should choose colors and materials that correspond to the community environment and atmosphere, and different paving colors and materials can create different spatial levels. For commercial spaces within the community, different colored paving can be used to construct pedestrian roads with different systems. By using different colored paving, commercial and living spaces can also be distinguished. In addition, different areas can be defined by paving with different materials, and special paving can improve regional discrimination, such as simply distinguishing pedestrian areas from vehicular areas through paving.

In addition, while meeting the daily passage of residents within the community, it is necessary to improve the greening of the community. Due to the limitations of the internal space, road greening is the most reasonable form. Considering the complexity of roads within the community, road greening should be implemented according to the actual situation of the roads. When the road width is above 1.5 m, greening should be considered on both sides of the road. When the road width is below 1.5 m, a single-sided greening should be set up. The setting of greening should be tailored to local conditions, in line with climate and road location. Small trees such as willow and *Ficus microcarpa* can be planted for greening near the river

channel, and shrubs can be planted in flower beds for residential roads. Although a small number of roads within the existing community have been greened, they are far from meeting the needs. There are many talents in landscape architecture from surrounding universities, and the preserved community is necessary to seek technical guidance and assistance from surrounding universities to jointly improve the road greening within the community.

3 Community governance

As a gathering place between universities and society, the surrounding blocks of colleges and universities are different from the ordinary block spaces in old cities. The existence of universities makes the block spaces more complex. By centering on the university space, it promotes the common development of public spaces between universities and surrounding blocks. The transformation of public spaces in the surrounding blocks of colleges and universities should also take into account the characteristics of both universities and blocks[6].

In terms of community governance, cooperation should be established with colleges and universities to jointly create a model of university–community cooperation and development. By breaking down the barriers between the two, incentivizing connections, and promoting continuous spatial development, it can achieve common development. To have a real impact on campus, community, and between communities, it is necessary to establish a sustained partnership with both parties' investments[7].

3.1 Zoning of spatial function

The internal scale of the community is relatively small, and the setting of shops facing the street brings certain difficulties to internal traffic. The rain shelters and seats set up by shops further squeeze the public space of the community. It should divide commercial activities, distinguish between setting up stalls and shops, and designate temporary stall space. It is prohibited to randomly place stalls on the street and occupy street space. The arbitrary expansion of shops along the street and the use of tables and chairs to occupy street space should be prohibited. The private rain shelters in shops should be cleaned up to restore the community style. Illegal additions within the community should be demolished, followed by the removal of hard barriers such as walls and iron fences within the community. Greening is used as a means of isolation to enhance the community's green space and openness.

The community space should be zoned,

and private living areas and commercial activity areas are designate. It should protect areas without commercial activities. By setting up checkpoints at various intersections, external vehicles and pedestrians are restricted from entering and leaving freely. It should plan unified non motorized vehicle parking points at intersections to avoid street congestion caused by non motorized vehicles parking indiscriminately.

3.2 Developing a business cooperation model of "community–university"

There are resources and needs between the community and universities, and the two can explore commercial cooperation in the following areas. In the symbiotic development of open universities and surrounding commercial spaces, several development principles can be followed: people-oriented and emphasis on experiential development of commercial spaces; personalized creation of commercial space; adapting to local conditions and responding to the natural environment; combining concentration and dispersion[8].

3.3 Establishing a creative commercial street with university characteristics

Colleges and universities have their own distinct characteristics, and the surrounding communities are influenced by colleges and universities, with buildings and spatial environments bearing the characteristics of universities. For the commercial spaces generated within the surrounding communities of colleges and universities, colleges and universities should leverage their own characteristics and create a commercial environment with university characteristics within the commercial district. By providing training and technical guidance to entrepreneurs, it can assist them in starting their own businesses and influence them through cultural influence. A university brand and a creative district with university characteristics should be created. The community should also actively respond to the cultural spillover of colleges and universities, create an environment that is connected to the university environment, integrate the community into the unique spatial atmosphere of universities, develop together with colleges and universities, and forge its own path of development.

3.4 Facility upgrade

Due to the openness, nighttime commercial activities are active in the surrounding communities of colleges and universities, so nighttime lighting within the community is very important. At the same time, the community also needs to undertake residents' nighttime activities, and the safety and usefulness of the main

spatial nodes for residents' activities need to be ensured. Therefore, it is essential to improve the community lighting system. It should improve lighting facilities in the main commercial activity areas, main activity nodes, and main traffic road areas within the community. Different lighting fixtures should be chosen for different spaces and functional areas to create different atmospheres.

3.5 Creating a public space for cultural exchange

The planning and renovation of old communities require the design of public open spaces with creative elements and diverse green configurations. In urban renewal, the original texture can be considered to form highly recognizable public open spaces[9].

As important cultural venues in cities, colleges and universities are also symbols of cultural identity and spiritual cohesion in urban areas. Colleges and universities have interactions of material space such as demand space interaction and industrial development interaction with their surrounding neighborhoods. In order to better promote emotional and cultural exchanges between universities and neighborhoods, cultural interaction activities can be carried out to allow neighborhoods to experience the cultural atmosphere of universities and expand the influence and sense of identity of colleges and universities. Communities can also collaborate with colleges and universities to carry out

design activities that attract college students to participate in design and renovation, and jointly create creative communities that meet the needs of both parties.

4 Conclusions

With the large-scale renewal and renovation activities in the old city area, the communities surrounding colleges and universities in the city are gradually receiving attention. Taking the renovation of communities around colleges and universities as an example, it hopes to help these communities develop in a healthy and harmonious manner through various renewal measures. At the same time, it aims to assist these communities in enhancing their capacity to undertake projects, in order to meet the higher demands placed on them by the development of colleges and universities. Compared to other communities in the city, the surrounding communities of colleges and universities are more distinctive and special. The transformation of the surrounding communities of colleges and universities is not only about renovating and improving the community, but also optimizing and upgrading the spatial quality of the entire area.

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experience of out-of-cabin communal washrooms, were placed in the opportunity zone. Finally, ten items, such as the auditory and olfactory sense of in-cabin ward environments, were located in the improvement zone.

3 Conclusions

In conjunction with the findings of the analysis, it is recommended that the ward's decoration should place greater emphasis on the aesthetic preferences of middle-aged women. The decoration may incorporate floral wall paintings, murals, natural decorative elements, and wall hangings that evoke a sense of hope, such as sunflowers. It is advisable to refrain from utilizing landscape decorations featuring oceans, lakes, or docile animals.

For medical staff, the environmental visual environment of the nurses' lounge and the out-of-cabin classroom should be prioritized in improvement efforts. This improvement

should include the incorporation of botanical landscapes, such as leaves, fruits, flowers, and branches, while avoiding the use of naturalistic curtains, bed linens, and towels[8].

Additionally, natural sounds, such as the rustling of leaves and bamboo, may be played in the ward, and natural fragrances, including flower-scented essential oils, can be utilized without compromising the aseptic environment of the ward.

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