

Article

Designing for Intergenerational Communication among Older Adults: A Systematic Inquiry in Old Residential Communities of China's Yangtze River Delta

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Abstract: Presently, a substantial majority of older individuals in urban regions of China prefer to inhabit older residential communities over newer counterparts. Within these aging communities, the intricate matter of intergenerational communication among older adults presents a complex and multifaceted issue that warrants comprehensive investigation from a systematic perspective. This paper first employs the observational method to study multiple old residential communities in a city in the Yangtze River Delta region of China. The POEMS framework and the AEIOU framework are applied, focusing on the analysis of individuals and the interaction between individuals and objects, respectively. Semistructured interviews are then conducted with three groups of people, emphasizing community participation by older adults, intergenerational interaction from the perspective of older adults, and intergenerational interaction from the perspective of young people. Finally, the paper categorizes the types and characteristics of individuals in the old communities, identifying the intersections between these groups. The current social situation of older adults and young people is summarized, including behavioral and psychological characteristics and social interaction challenges. Based on these findings, ten system design directions to enhance intergenerational interaction in old communities are proposed, and three of these system design directions are further developed.



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1. Introduction

The aging population in China is gradually increasing, resulting in the world's largest older population. It is projected that by 2050, older adults population will reach 500 million people [1]. Due to limited nursing facilities and the constraints of traditional Chinese culture, aging in place is the most common choice for older individuals. Currently, the majority of Chinese older people in urban areas reside in older residential communities rather than newer ones [2]. However, currently, there are widespread issues in eldercare spaces, including relatively closed-off communities, lack of resident interaction, weak intergenerational relationships, and even significant conflicts and tensions. This is particularly evident in forgotten and dilapidated neighborhoods. From a global perspective, these older neighborhoods represent typical forms of disadvantaged communities, yet they are a common phenomenon in urban development in China [3]. The General Office of the State Council of the People's Republic of China defines older residential communities (ORCs) as residential neighborhoods constructed in earlier periods that suffer from poor maintenance, lack proper management, need municipal and community service facilities, and where residents strongly desire revitalization [4].

Intergenerational-friendly communities focus on meeting the needs of all residents, especially children and older adults, through municipal planning and programming, and typically aim to promote meaningful interaction and cooperation among individuals from different generations [5]. There is an increasing focus from various sectors of society on the

construction of intergenerational-friendly communities, which is seen as a future development trend. Especially for China, which has entered an aging society, intergenerational-friendly communities is not only a reflection of changing demographic patterns but also a response to the multifaceted challenges and opportunities that emerge from the coexistence of diverse age groups within residential communities: First, it benefits the enrichment of social cohesion and cultural diversity within these communities. As distinct generations come together, a natural exchange of experiences, knowledge, and perspectives occurs. Second, from an economic standpoint, the sharing of resources and skills between generations can lead to cost savings, as collaborative efforts can provide solutions to common challenges. Third, enhancing intergenerational interactions holds the potential to mitigate the sense of isolation that can sometimes afflict older adults. By delving into the depth of these implications, studying intergenerational-friendly communities not only contributes academically, but also to the larger endeavor of shaping more inclusive, vibrant, and harmonious communities for all age groups.

In response to this framework, this paper delves into the realm of older residential communities within a city situated in the Yangtze River Delta region of China. Employing a combination of observational techniques and interviews, it meticulously examines the behaviors and interactions exhibited within these community settings. By categorizing the diverse typologies and inherent characteristics of individuals, it systematically identifies commonalities and interplays among various groups. Additionally, the paper provides a comprehensive overview of the sociocultural landscape inhabited by both older adults and young individuals, encapsulating their distinct behavioral traits and the challenges they face in terms of social interactions.

The underlying aim of this exploration is to attain a profound comprehension of how these intricate dynamics intricately weave into the tapestry of community life. This knowledge serves as a foundational cornerstone, guiding the formulation of innovative directions for system design. Through the meticulous dissection of these multifaceted interactions, the study seeks to unveil latent prospects for fostering cross-generational engagement and bolstering the bonds of social cohesion. Ultimately, the endeavor aspires to contribute to the creation of living environments that are not only more inclusive but also radiate vibrancy, catering to the diverse needs of all inhabitants, irrespective of their age.

In the pursuit of this objective, this paper outlines ten distinct system design directions aimed at enriching intergenerational interactions, with a focus on further elaborating upon three of these directions. By doing so, the paper effectively demonstrates how the empirical findings from the fieldwork directly inform the considerations that underpin the envisaged system design enhancements.

2. Related Work

2.1. Older Adults' Social Interaction

Social isolation refers to a state characterized by limited contact and integration with others, as well as a generally low level of involvement in community life [6]. Research has provided evidence and explanations that demonstrate the direct and indirect impact of an individual's social relationships on their mental health, as well as on both morbidity and mortality rates [7,8]. Older individuals are more prone to loneliness compared to other age groups, which can lead to psychological issues such as anxiety, low self-esteem, and depression, among others.

According to the data analysis of the population distribution of older individuals in different age groups in China in 2022, it is revealed that the younger older population, aged 60–74, accounts for 62.85% of the total older population. Moreover, this age group of older individuals is relatively younger and tends to engage in outdoor activities more frequently, indicating potential for strengthening intergenerational communication with younger individuals [9]. In China, there is a notable phenomenon among older individuals where grandparents play a crucial role in caring for the children of their migrant offspring [10]. Research shows that there was a significant difference in life satisfaction between older

Chinese adults who provided grandchild care and those who did not [11]. Additionally, depression in Chinese older adults is affected by grandchild care, and this effect is more prominent in female older adults and the older adults who do not have a spouse [12].

Regarding older adults' social communication, public spaces play a significant role in the daily lives of residents. The quality of everyday public spaces is associated with the health of its residents, including both physical and mental well-being [13,14]. Public spaces also provide opportunities for social interaction, contributing to the establishment of community awareness and neighborly relationships [15]. Leisure activities are also crucial for the physical and mental well-being of older individuals [16].

2.2. Designs Supporting Intergenerational Communication

Kaplan et al. offers a rich how-to toolkit to help develop, activate, and nurture intergenerational spaces [17]. Regarding designs for older adults' intergenerational communication, it can be categorized into two main directions: (1) strengthening the connections between older adults and their existing social circles, primarily composed of family members, and (2) expanding older adults' social networking by meeting strangers.

For strengthening the connections, some designs try to combine the older adult's everyday objects with a display to enhance communication with family members, for example, SocialMedicineBox, a communication system for older adults using a medicine box [18]. Computer-mediated games, such as adopting the game console Wii, could play a role in supporting intergenerational interaction between older adults and youths [19]. Photographs are also seen as compelling media that facilitate communication: a paper-digital photo album could provide a focal point for communication between older adults and family members [20].

For expanding social circles, a system called StoryCube was developed to help residents of nursing homes make connections through sharing stories and expressing their identity [21]. Waycott et al. investigated the role of digital content created by older adults, which could be used to forge new relationships among young strangers [22]. Their findings demonstrate that creating and sharing content provides opportunities for them to build new intergenerational communications.

2.3. Old Residential Communities' Studies

Urbanization in China can be divided into three stages: the exploratory development stage (1949–1978), the rapid development stage (1979–2011), and the quality-oriented development stage (2012–present) [23]. One relevant study is related to urban planning and architecture, for example, Chenyang Dai's research utilized questionnaire surveys and semistructured interviews to identify the landscape preferences of residents in older residential communities toward community green spaces [24]. Matthijs van Oostrum conducted a comparative study of urban villages and older neighborhoods in China and India from three perspectives; their research articulates the ways in which access networks, building density, and functional mix are spatially organized, how they are mutually interdependent, and what inferences can be made on how urban villages transform over time [25]. The second is related to policies: Jiaqi Wu's study measures resident participation in the renewal of older residential communities in China under policy change [26]. Shiwang Yu conducted a correlational study on the outdoor environment and outdoor activities of older individuals in older residential communities. They found that in older residential communities with poor outdoor environmental quality, residents' outdoor daily activities were hindered, providing policy guidance for the renovation of such older communities [27]. In summary, the current literature primarily focuses on the regulatory and institutional deficiencies in the development of old residential communities in China. This study, on the other hand, focuses on older adults and explores intergenerational design possibilities for older communities from a design perspective through the methods employed in design research.

2.4. Interactive Public Installation for Older Adults

Interaction with public installations can foster communication among audiences, promoting a sense of harmony and closeness, thereby exhibiting the potential to contribute to social integration. Some exploratory studies have investigated the role of public installations in promoting social interaction, such as utilizing interactive devices for social-emotional nurturing [28] or employing interactive systems that provide sensory feedback: For example, studies on applying interactive art to active aging among older adults, exemplified by the work “Yuechun” [29], research pertaining specifically to older adults predominantly aims at alleviating anxiety in specific older subgroups through the utilization of intelligent interactive public installations [30]. These studies are often confined to the boundaries of eldercare facilities. For instance, some investigations focus on interactive installations utilizing window metaphors [31]. Additionally, certain designs draw inspiration from art therapy principles, such as interactive wall designs aimed at reducing wandering behavior associated with dementia [32]. Given and Kuys’ work presents memorial design as information creation; the memorial design embeds three types of information: explicit (e.g., photographs), implicit (e.g., national flowers), and embodied (e.g., pathway elevation) [33].

In summary, in the context of older adult population, the current existing research primarily focuses on specific groups within eldercare institutions (dementia population). While some exploratory studies have investigated the role of public installations in promoting social interaction, these studies are often confined to the boundaries of eldercare facilities.

2.5. Summary

Urbanization in China has transformed social dynamics for older adults, who often face limited social interaction and higher loneliness rates. However, the younger older population shows potential for intergenerational communication. Public spaces play a crucial role in residents’ well-being, but older residential communities face regulatory and institutional challenges. Interactive public installations have been explored for promoting social interaction among older adults, primarily within eldercare institutions. Extending research to public spaces is necessary. Addressing the social communication needs of older adults is vital for their well-being and intergenerational connections.

3. Research Method: Observational Study

This study employed two observational frameworks, namely POEMS and AEIOU, each with a different focus. The POEMS framework emphasizes the analysis of individuals, while the AEIOU framework focuses on interactions between individuals. The two observation frameworks enable detailed recording of user information and facilitate the extraction of key points for experience design, cluster observations, comparison of population differences, and extraction of behavioral characteristics.

3.1. Observation Methods

3.1.1. POEMS Observation Framework

POEMS is an acronym representing people, objects, environments, messages, and services (Figure 1). It offers a straightforward framework for rapid and insightful user observation. It emphasizes the analysis of individuals [34].

PROJECT	NAME	DATE	LOCATION		
PEOPLE		OBJECTS	ENVIROMENT	MESSAGES	SERVICES
List main groups of people		List objects that are used by the people and that populate the environment	Describe the surroundings. What are the main features?	What are the messages or conversations being communicated and how?	List services being offered. List services available to the people
Comments about user experience			General thoughts and comments		

Figure 1. POEMS observation framework checklist.

3.1.2. AEIOU Observation Framework

AEIOU basically stands for activities, environments, interactions, objects, and users (Figure 2). It emphasizes the interactions between a person and someone else or thing [35].

PROJECT	NAME	DATE	LOCATION		
ACTIVITIES		ENVIRONMENTS	INTERACTIONS	OBJECTS	USERS
What actions and behaviors are people taking		What is the overall setting in which the activities are taking place	What are the basic interactions occurring for people	How do objects relate to people, activities and interactions	Who are the people being observed
Comments about user experience			General thoughts and comments		

Figure 2. AEIOU observation framework checklist.

3.2. Observation Site

The research city is located in the Yangtze River Delta region of China—Wuxi City (Figure 3). Wuxi is a representative urban area in the Yangtze River Delta region of China. It holds a moderate development level compared to other cities in the region, making it a suitable representative for the average standards in the Yangtze River Delta. We conducted observations in the following typical old communities:

- **QinYuan Community.** It covers 2756 households with a population of 7477 residents. The floating population is 557 people.
- **Nanyang New Village.** This community was completed in 1995, with a total of 1381 households.
- **Yangming Road Community.** The community consists of 2304 households with a population of 6431 individuals, including a floating population of more than 1000. It covers an area of 1.13 square kilometers.
- **Jincheng New Village.** It comprises 57 residential buildings; there are 2377 households and a total population of approximately 6370 people in this community. There are over 1700 elderly individuals aged 60 and above. The community was established in 1987.

Additionally, we also observed the surrounding parks (*Taihu Square, Nanchang Street, Taosha Lane*) and the local market (*Nanheban*).

These communities are all older residential areas with a relatively high proportion of elderly residents, exceeding 30%. They predominantly date back to the period between the 1970s and 1990s, characterized by aging infrastructure and facilities. No buildings are equipped with elevators. The housing units and open spaces are comparatively small, leading to high building density and limited interbuilding spacing. The communities have relatively complete supporting facilities but with a lower level of quality. Convenient transportation options are available, with nearby markets and parks in close proximity. Despite the compact living spaces, these communities command high housing prices, as

they are properties near key schools for children, attracting both local older residents and newcomers who have recently acquired properties in the city (Figure 4).



Figure 3. Geographical location of Wuxi in China.



Figure 4. Buildings and the environment in old residential communities.

3.3. Observation Results

3.3.1. POEMS Observation Results

Table 1 presents the observation results based on the POEMS framework.

Table 1. POEMS observation results.

P (People)	O (Object)	E (Environment)	M (Message)	S (Service)
Residents of Qinyuan District: older adults 	Fishing rod, bucket, bait, motorcycle	Branch of the canal, outside the garden area	Feeding stray cats, cooking for self-consumption, enriching conversations	Offline purchase of fishing equipment
Residents of Qinyuan District: children and older adults 	Stroller, fitness equipment, snacks, thermos, public benches	Good greenery and facilities, roaming stray cats	Older adults busy caring for children, limited leisure time, engagement in exercise	Personnel consultations, entertainment facilities, purchases of households products

Table 1. Cont.

P (People)		O (Object)	E (Environment)	M (Message)	S (Service)
Residents of Nanyang District: children and older adults		Iron public benches, canes	Old buildings, small residential area, poor infrastructure	Regular daily routines, less outings, often gather and chat with friends and neighbors	Frequent grocery shopping alone
Residents of Nanyang District: older adults		Abandoned daily items, vegetables, plants, etc.	Within the District area, close to the residential area	Not applicable	Older adults collect waste materials
Residents of Nanyang District: older adults		Touchscreen mirror, traditional storage cabinet	Compact traditional home environment	Business attributes, middle-aged individuals go out for shopping, older adults being taken care of, few outings	Offline shopping, personnel consultations
Other community residents: middle-aged individuals		Thermos, outdoor folding chairs, folding strollers	Taihu Square lawn	Activities have relatively stable characteristics with fixed locations	Not applicable
Older individuals next to the breakfast shop		Wheelchair, crutches	Nucleic acid testing point, breakfast shop	Conducting nucleic acid testing, purchasing youtiao (fried dough sticks), returning home	Personal communication, item exchange
Older woman at the storefront		Handbag, knitting tools	Shop entrance	Knitting sweaters, chatting	Personal consultation
Older individuals by the riverbank		Dog, leash	Walking path along the park riverbank	Dog walking	Leisure activities
Old building residents: older individuals		Chess, knitting tools, shopping bag, dog leash	Community fitness facilities, benches, stone stools, gazebo	People sitting in groups chatting, playing chess, knitting sweaters, evening square dancing	Temperature-controlled seating, comfortable, scattered placement of belongings
Old building residents: older individuals		Cellphone	Home, community public areas	Hurried footsteps, watching children and using smartphones in the leisure area in the evening	Child safety

Table 1. Cont.

P (People)		O (Object)	E (Environment)	M (Message)	S (Service)
Shop owners, young people		Shop	Shop	Engaging in casual conversation with customers, doing business, rarely leisure activities	Leisure anywhere
Regular residents are young people		Bench, mobile phone	Community public area	Engaging in casual conversation with customers, doing business. Rarely leisure activities	Comfortable seating
Old building residents: older individuals		Blanket	Community-wide outdoor clothes rack	Taking out the blanket, hanging it on the rack, and fluffing it	Reminder to cover blankets to avoid contamination of clothes by street dust
High-rise building residents: older individuals		Clothes	Balcony extended clothes rack	Hanging freshly washed clothes on the clothes rack	Preventing garments from falling off
Shop owners, young people		Clothes	Self-built clothes rack or clothesline in the courtyard	Hanging freshly washed clothes on the clothes rack	Avoiding contamination of clothes by street dust

3.3.2. AEIOU Observation Results

Table 2 presents the observation results based on the AEIOU framework.

Table 2. AEIOU observation results.

Activity	Environment	Interaction	Objects	User	
Public embedded chessboard activity in park		Stone table and chairs, integrated with the exercise area and sports spaces	Play chess	Chessboard and chess pieces	Inclusive of all ages
Group dog walking		Park lawn	Chatting, discussing dog-raising experiences, and interacting with dogs	Leashing a dog, playing fetch with a ball, feeding a dog	Older adults in their sixties and seventies, five or six young adults
Tai Chi practice in a group		Riverside corridor	Daily exercise and practicing skills with a pillar, chatting with friends while smoking	Cigarette, pillar, water cup	Three individuals in their sixties and seventies

Table 2. Cont.

Activity	Environment	Interaction	Objects	User
Group grocery shopping 	Vegetable market	Bargaining with vegetable vendors, chatting with friends, taking a walk	Stroller, tote bag	Two individuals in their seventies
Group square dancing 	Open square	Follow the lead and dance to the music	Speaker, water bottle, sportswear	A team of forty- to seventy-year-olds, consisting of around fifty people
Group walking 	Park pathway	Lead and carry the flag, occasionally shout slogans when there are people around	Flag, uniform vest, microphone	An estimated group of over twenty people, mostly in their forties to sixties
Group singing 	Park corner	Sing loudly	Screen, sound system, microphone	A group of five or six older individuals in their seventies, with older age
Taking children for a walk 	Near the park slide	Interact with children or wait for children, engage in casual conversations with other parents	Jacket, balloon, toy	Older individuals in their sixties or seventies and middle-aged individuals
Having tea 	Park tea house	Enjoy a pot of tea and a plate of melon seeds, chat for the afternoon	Thermos, tea leaves, melon seeds	A table of three or four older individuals, ranging from their forties to seventies
Walking birds 	Park pavilion	Discuss bird care-related topics, play chess or engage in chess discussions	Chess, birdcage	Three or four older individuals in their sixties to seventies
Playing table tennis 	Near the ping pong table in the park	Play sports or wait on the sidelines and chat, discuss and comment on the game.	Ping pong ball, ping pong paddle, water bottle	A group of over ten older individuals
Playing basketball 	Park basketball court	Play basketball	Basketball, water, towel	A group of six or seven middle-aged and older individuals
Fitness equipment 	Park equipment area	Leg press, waist rotation	Fitness equipment	Solitary older adults

Table 2. Cont.

Activity	Environment	Interaction	Objects	User	
Parcel pickup and drop-off		Placed on one side of the public area	Delivery personnel deliver the packages, and residents retrieve them while interacting with touchscreen displays	Parcel lockers and delivery vehicles	Both younger and older individuals

3.4. Findings of Observation

Observations were conducted in the aforementioned old communities during morning, afternoon, and evening; the observation period covered an entire day, which yielded the following conclusions.

3.4.1. Activities of Older Adults in Old Communities

Social activities among older adults mainly encompass hobbies, physical exercise, and street engagements. Activity groups typically consist of three to five familiar friends, forming relatively stable yet less fluid social circles. The activity locations and times are relatively fixed, lacking flexibility. Community-organized activities are limited, with a predominant focus on hobbies such as bird-walking and Tai Chi, exhibiting some exclusivity. The diverse range of activities among older adults contributes to stereotypes and misconceptions held by younger generations. Objective observations of the social and entertainment activities of older adults have provided profound insights into their needs.

In terms of intergenerational interaction and relationships, older residents significantly outnumber younger individuals within these communities, as most young people reside in newer communities and seldom return to the old ones. Enhancing the appeal of old communities to attract young people poses a challenge. The leisure spaces occupied by older adults often encroach upon parking spaces, affecting the parking needs of the younger generation. Additionally, considering the role of older adults in caring for children, it is worth exploring innovative approaches that integrate fitness equipment and other recreational activities to foster intergenerational integration.

3.4.2. Issues with Public Facilities in Old Communities

High building density, aging structures, and small housing units characterize the old communities. The limited open spaces result in fragmented and dispersed recreational areas. Although some supporting facilities are available, they are aging and poorly maintained. As a result, residents often choose to visit parks and squares outside the communities for leisure activities.

- Limited and outdated facility functionality: Existing public facilities have limited functions that cater primarily to the needs of young people (e.g., swing, horizontal bars), making it challenging to meet the demands of both older adults and young individuals. As the community's diverse service needs increase, outdated and nonupdated facility functionalities fail to provide effective services.
- Dispersed facility layout and inconvenience for older adults and young: Older individuals face difficulties in independent mobility due to the scattered layout of service facilities in old communities. Managing community affairs and daily activities requires significant time and effort for older adults. Therefore, dispersed community facilities struggle to attract broader participation from older adults and young individuals.
- Other aspects: In terms of public laundry and planting, some residents choose to dry clothes and bedding within the communities, resulting in a somewhat chaotic environment. Additionally, there is a phenomenon of planting in public areas, which

will be further studied in subsequent interviews. Older adults have a habit of collecting waste, stemming from their thrifty and economical nature. This behavior can be further explored from the perspective of creating intergenerational spaces that promote recycling and reuse.

In summary, the majority of middle-aged and older individuals engage in relatively static outdoor activities with fixed locations. Old residential communities have relatively weak infrastructure and limited intergenerational interactions, presenting research value and potential. Old communities belong to the middle-to-lower-end category, and residents' lifestyles exhibit a blend of tradition and modernity.

4. Research Method: Semistructured Interview Study

We conducted three sets of interviews in different old communities, with different focuses on each set. Specifically, the first set focused on the participation of older adults in community activities, with a total of 10 interviewees including older adults, young people, and community workers. The second set focused on intergenerational interaction and neighborly relationships from the perspective of older adults, with 6 interviewees. The third set focused on the evaluation of intergenerational relationships in the community from the perspective of young people.

4.1. Semistructured Interview

A semistructured interview is a qualitative method of inquiry that combines a predetermined set of open questions to prompt further discussion [36]. The open-ended nature of the interview made it possible to reveal tacit knowledge, which was about their own living habits in which the older adults themselves were not consciously aware [37]. Target people are interviewed in their own environments, and therefore, the analysis data are more realistic than laboratory data. Interview transcripts and notes recorded during interviews were analyzed. Grounded theory techniques [38] were adopted to analyze the data, to allow themes to emerge from them in a bottom-up manner. The framework and logic of the interview is shown in Table 3.

Table 3. Framework and logic of the interview.

Understanding Information	“Residential Situation” —exploring the demographic characteristics, household composition, and intergenerational relationships in the community
Exploring User Habits	“Daily Life in the Community” —investigating time allocation, activities, and environmental descriptions in public spaces
Unveiling User Preferences	“Preferences toward Community Facilities” —factors influencing facility experience, preferences, and related spontaneous behaviors
Uncovering User Expectations	“Experiences and Reflections” —intergenerational communication expectations and areas for community facility optimization
Seeking Additional Inspiration	“Brainstorm” —respondents' aspirations and imaginations for ideal community facilities and intergenerational relationships

4.2. Group 1: Emphasis on Community Activity Participation

4.2.1. Participants

Participants. As this group focuses on the participation of older individuals in community activities, the interviewees consisted of both older individuals and community staff members. Their interviews were initially recorded and later transcribed into written text. A total of 10 interviews were conducted, including 7 older individuals, 1 young person, and 2 community staff members. These interviewees, denoted as group one, were

recruited through random recommendations by community managers. Table 4 provides demographic information about the group one interviewees.

Table 4. Demographic information of the group one participants.

P1	Basic Information. Age: 88, gender: male, current residence: Yangming Road Community. Lives with spouse. A local resident with experience in African aid projects. Since retiring in 1988, he has been living in this city with his spouse. Limited mobility due to wheelchair use hinders his outdoor activities. His son resides in Hangzhou but cannot visit due to the pandemic. He desires to live with his son, but his mobility issues prevent him from traveling. Furthermore, his spouse's fall has made daily communication difficult
P2	Basic Information. Age: 70, gender: female, current residence: Zhou's Former Residence, Nanchang Street. Lives with spouse. She is a local resident who has retired. Her usual activities include taking walks, shopping, and walking her dog. She enjoys reading and does not participate in square dancing. She does not play mahjong or engage in community activities. She takes care of her spouse's daily needs at home and goes out regularly to buy groceries. Overall, her life is fulfilling.
P3	Basic Information. Age: 65, gender: female, current residence: Yangming Road Community. Lives with spouse. Originally from another city, she moved with her family here eight years ago. She used to be involved in business and enjoyed a leisurely life, occasionally spending time with her children. Her daily activities include knitting scarves, reading, playing the electronic keyboard, attending gatherings, and participating in square dancing. She has a religious belief and actively engages in church meetings and sanitation work, making many friends.
P4	Basic Information. Age: 76, gender: female, current residence: Yangming Road Community. Lives with spouse. She has been a long-term resident of Wuxi and has been retired for more than twenty years. She lives surrounded by a group of older neighbors and spends her days shopping and taking walks with a few close neighbor friends. However, in recent years, some neighbors with mobility issues no longer go to distant parks. She and her close friends often organize community activities.
P5	Basic Information. Age: 68, gender: male, current residence: Near Taosha Lane. Lives with spouse. He is enthusiastic about sports, particularly Tai Chi, which he practices whenever he has free time. He does his morning exercises in the park every day. He has been practicing martial arts for fifty years, resulting in calluses on his hands. He also enjoys playing basketball, usually taking the position of a guard. Occasionally, after a nap, he goes to the park to find chess partners, although he tends to lose, so he does not participate frequently. He is a tobacco and alcohol enthusiast and enjoys having a drink in the evening.
P6	Basic Information. Age: 73, gender: male, current residence: Near Taosha Lane. Lives with spouse. A local resident with a relatively stable job, his children have matured, leading to less communication and living separately. He usually comes out to walk his birds for about an hour and chats with people. He used to play chess with others. He has a strong sense of identification with Wuxi. He participates in the bird-walking association and competes in the Jiangsu, Zhejiang, and Shanghai regions. New members join, ensuring a transition between the old and the new.
P7	Basic Information. Age: around 70, gender: female, current residence: Nanyang Garden. Lives with spouse. A local resident living with her spouse, she has raised and rescued dogs. Her children do not live with her. She goes out every day to walk her dog along with other dog owners. At home, she pays attention to the daily activities of her dog, including mischief, and enjoys sharing her dog-raising experiences with passersby, treating the dog as her own child.
P8	Basic Information. Age: 35, gender: female, current residence: Liangxi District. Lives with spouse and son. A "new resident" of the city, she, along with her husband and son, currently reside separately with their older parents. Her main form of entertainment is going out with friends. She regularly takes her child out to play and participates in community activities during holidays, such as making rice dumplings during the Dragon Boat Festival and watching movies and eating mooncakes during the Mid-Autumn Festival.
P9	A community staff member, 40 years old, and a local resident.
P10	A community staff member, 50 years old, responsible for livelihood matters.

4.2.2. Interview Topics

Interview questions for older adults covered the following aspects:

- **Basic Information:** Age, hometown, duration of residence in the current city, living arrangements, and employment status;
- **Daily Life:** Types of leisure activities and their details;
- **Social Situation:** Regular companions for activities, coordination with others, and involvement with new companions; neighborhood committee-organized activities, including types, locations, frequency, and participation;
- **Community Activities:** Awareness and engagement in activities, evaluation of current activities, and interest in peer-organized activities;
- **Future Aspirations:** Emotional needs after retirement, thoughts on relocating from the current community, initiating a new social life, and considering community committee activities for social fulfillment.

Interview questions for young people/community workers covered the following aspects:

- **Background Information of Community Residents:** Age, hometown, and average salary level/educational background;
- **Basic Information about Community Activities:** Personnel responsible for planning activities, their roles, past organized activities, unique community-specific activities, venue and frequency, methods of notification, registration channels, and participation. Involvement of community residents and volunteers in the planning process and its benefits.

4.2.3. Interview Results

1. Social Activities of Older Individuals

The level of social activity varies among different interviewees, with some individuals actively participating in various activities driven by their personal interests and hobbies. These activities have been pursued for years, allowing them to connect with like-minded individuals and expand their social circles. For instance, P7, a devoted pet lover, mentioned, *"While walking my dog, I often interact with children. Once, a child held my dog and wanted to play with it. I also have many 'dog friends' and belong to an online group for dog owners"*. P6, an avid bird enthusiast, engages in both online and offline communication and interaction with people in nearby areas. He stated, *"In the bird-keeping association, when the previous members leave, new people join. Local bird keepers gather in the vicinity, and we are like one big family"*. Similarly, P5, a basketball enthusiast, explained, *"I play as a guard position, responsible for defense"*.

The second factor contributing to increased social activity is the presence of long-term friendships. For example, in response to inquiries about regular companions, P4 stated, *"I have several close friends, and we have known each other for over thirty years"*. P5 mentioned engaging in boxing, smoking, and conversing with close friends. Additionally, religious beliefs play a role in facilitating rapid integration into the community. P3, who relocated to the city and currently resides there, stated, *"On Sundays, I go to the church, and on Saturdays, I participate in cleaning activities"*.

For interviewees with limited social activities, the primary reasons are declining physical health and mobility constraints. For instance, P1, the oldest participant in this study, mentioned staying at home without anyone to chat with or engage in activities. P1's spouse no longer plays mahjong, so they spend most of their time at home. Furthermore, the responsibility of taking care of grandchildren limits their leisure activities, as they prioritize attending to the younger generation. When asked about participation in square dancing, P4 responded, *"I used to do it, but since I started taking care of my grandson, I had to stop. Now, my focus is on taking care of him"*.

In summary, older individuals derive joy from participating in group activities, which contribute to their well-being in later life. However, advancing age and declining physical fitness pose challenges in finding suitable activities. Loneliness and isolation are prevalent issues, particularly among female older individuals who also have the additional responsibility in caring for their grandchildren, limiting their leisure pursuits. This aligns with Dantong Zhao's study, indicating that grandmothers were more prone to high-intensity

grandchild care (54.42% vs. 51.43%) with extended duration (39.24 h vs. 33.15 h) compared to grandfathers. Moreover, grandmothers experienced higher depressive symptoms than grandfathers, especially when engaged in intense caregiving [39].

Shared interests play a vital role in fostering friendships among older adults, enhancing their happiness and enriching their lives. Common interests facilitate the establishment of social connections with strangers. Nevertheless, the availability of organizations or opportunities for group activities centered on shared interests is scarce, and there is a lack of sufficient notification regarding community activities. Addressing these challenges is crucial to promote social engagement and enhance the overall well-being of the older adult population.

2. Level of Participation in Community Activities among Older Individuals

A small number of older interviewees actively engage in community activities. For instance, P4 expressed their involvement, stating, *“If the management staff gives us a call, we will go voluntarily because they are sometimes overwhelmed, and we are willing to lend a hand”*. However, the effectiveness of community-organized activities in fostering interactions is limited. One contributing factor is the lack of interest among some individuals. As mentioned by P2, *“I don’t participate much because there are currently no activities that capture my interest. I have been occupied with caregiving responsibilities due to my spouse’s recent spinal surgery”*. P7 shared a similar sentiment, stating, *“I join square dancing sessions once or twice a week, but I mainly interact with my fixed activity partners rather than the other members. Socialization is minimal”*. On the other hand, P1 believed that the community lacked engaging activities, and interactions among neighbors were limited to mere greetings. However, he expressed a longing for social and recreational engagements, desiring meaningful conversations with others. Hence, some interviewees rely on their existing social circles instead of participating in externally organized activities. For instance, P2 mentioned, *“I enjoy the company of relatives and friends, even if it’s just taking a stroll together”*. Additionally, despite P3’s willingness to participate in various activities, they are unaware of how to join them due to the lack of community notifications.

In summary, most older individuals have social needs, with some expressing a desire for self-fulfillment and a meaningful purpose in their later years to enrich their lives.

3. Introduction of Community Activities by Community Workers

Most activities in the community are organized by a group of people called community workers. They are selected by the community’s “two committees and one station” (party committee organizations, neighborhood committees, and community service stations), dedicated staff responsible for providing various public services (collaborative governance) and other welfare services to diverse groups residing within the neighborhood. We summarized the types, schedules, locations, and frequencies of community activities; the methods for promoting and notifying these activities; and some shortcomings present in current community initiatives.

Firstly, regarding the types of activities, their schedule, locations, and frequency, the community has organized various events such as dumpling making, lipstick production, speeches, and modeling contests. The community’s distinctive activities include Tai Chi. Additionally, there are also activities aligned with the “Twenty Greats” campaign. These activities are generally held during holidays, with events organized almost every week based on higher-level directives and requirements. In recent years, they have been significantly impacted by the COVID-19. Prior to COVID-19, there were two activities per week, but during COVID-19, they have been rarely organized. Large-scale events take place in cultural auditoriums and nearby schools, while smaller activities are held within the community.

Secondly, the methods of promoting and notifying activities mostly involve online WeChat groups, and face-to-face notifications are given to residents when encountered. Invitations are extended to familiar residents who have a close relationship with the community workers, as well as enthusiastic community leaders who enjoy participating in

community activities, who are then encouraged to invite their friends. Although the approximate number of participants is usually estimated in advance, spontaneous participation is also welcomed. The community committee has dedicated staff members responsible for planning activities. While their workload is usually heavy, the pressure for activity planning is relatively low. This is due to the fact that, apart from large-scale events that require planning one or two weeks in advance, most activities can be planned just one or two days prior, without requiring excessive effort. Additionally, enthusiastic residents are invited to discuss activity planning, although the specific planning details are handled by professional staff members.

However, there are certain shortcomings in the current community activities. Firstly, the community's activities are primarily focused on fulfilling higher-level tasks and often revolve around ideological propaganda and performance-based reporting activities. The content of the activities is traditional, and not much emphasis is placed on innovation and updating the activity content.

Secondly, there are limitations in activity promotion. Since the activities have minimal participant requirements and the emphasis is on having enough participants, notifications are usually limited to acquaintances, resulting in a relatively fixed group of participants. Although community workers involve community representatives in the planning and discussion of activities, professional planning documents still require the involvement of community workers. The planners are generally from a younger generation than the participants.

Lastly, the community workers are mostly young people, and there is a generational gap between them and older adult residents. The activities they plan may not align with the interests of the older adult population, and there is limited innovation and consideration in the activity planning process.

4.3. Group 2: Intergenerational Interaction from the Perspective of Older Adults

This set focused on intergenerational interaction and neighborly relationships from the perspective of older adults, with six interviewees. Among them, there were four older people (age 60s–80s) and two young people (age 25–30s). Interviewees of this group two are recruited through random recommendations by community managers. Table 5 provides demographic information concerning the group two interviewees.

Table 5. Demographic information of the group two participants.

P1	Basic Information. Age: around 60, gender: male, residence: Qinyuan C District. Lives with spouse. He has various hobbies, including fishing, interacting with cats and dogs in the community, and engaging in neighborly interactions. Demonstrates an interest in nature and social interactions, and pursues joy and enjoyment in life. His characteristics are enthusiastic, open-minded, expressive, eager to share, and concerned about others, including stray animals. Actively participates in social interactions, adept at expressing himself, and shows care for others. Maintains a positive attitude toward interpersonal relationships and social issues within the community.
P2	Basic Information. Age: around 60, gender: female, residence: Qinyuan C District. Lives with spouse. Her daily activities involve assisting children by providing childcare, various household chores such as grocery shopping, cooking, cleaning, and engaging in exercise and fitness activities. She shows concern for family needs and highlights a focus on health and physical activity. She desires a more vibrant and colorful life, concerned with and nurturing the growth of children. She engages in conversations and social activities with other older neighbors who also care for children, providing social support and emotional fulfillment.
P3	Basic Information. Age: around 80, gender: female, residence: Nanyang New Village. Lives alone. She has simple and amiable demeanor, calm and gentle exercise routine. She has a lower desire for trying new activities and tends to prefer a simple and repetitive, yet leisurely and comfortable, old-age lifestyle.

Table 5. Cont.

P4	Basic Information. Age: around 60, gender: female, residence: Nanyang New Village, in an old house from 40 years ago. She runs a barber shop within the community, combining business and residential space. She engages in vegetable gardening within the community. She is warm and hospitable, and highly cooperative in the interview.
P5	Basic Information. Age: around 30. Lives with spouse. She is fashionably dressed, appears to be a young mother, but shows relatively low proactive communication.
P6	Basic Information. Age: 25–27, residence: Qinyuan C District. Lives with spouse. Her daily activities is work during the week, often stays at home on weekends, takes walks in the square, and engages in exercise. She is warm and friendly, homebody, office worker, has a habit of exercising, and shows an interest in new things.

4.3.1. Interview Topics and participants

Interview questions cover the following aspects:

- **Basic Information:** Age, gender, place of residence, etc.;
- **Daily Routine:** Understanding the interviewee’s daily schedule, dietary habits, and sleep patterns;
- **Leisure Activities and Favorite Places:** Inquiring about the interviewee’s leisure activities and frequented places, such as reading, exercising, or socializing in parks, libraries, or community centers;
- **Communication with Younger People and Views on Younger People:** Exploring the interviewee’s interactions with younger individuals, including family and social relationships; understanding their attitudes and perceptions toward the younger generation’s perspectives, values, and cultural differences;
- **Additional Information:** Allowing the interviewee to share any other relevant details, including personal interests, hobbies, beliefs, or religious activities related to the topic.

4.3.2. Interview Results

1. Lifestyle of Older Adults

The daily lives of most interviewees revolve around their hobbies. For example, P3 is passionate about senior colleges and believes that the lives of older adults can be more colorful, such as participating in senior colleges and other community activities, but they require more support and development opportunities. She mentioned, “*Senior colleges teach everything, like painting, photography, and so much more*”. However, apart from senior colleges, there is limited development at the community level.

Nevertheless, similar to previous interview results, some older adults’ time schedules and freedom are restricted by factors such as taking care of grandchildren. P2 needs to look after her grandson, and she said, “*I only have time for myself when the child goes to school. Then I can take a walk and have some fun*”. Although P2 fills her daily life by taking care of her grandson and household chores, she also engages in basic fitness activities to maintain her physical health. She expressed, “*I usually do exercises. Dancing is too difficult, so exercises are more suitable*”.

In conclusion, the lifestyle and hobbies of older adults mentioned in the interviews include fishing, exercising, socializing, and neighborly interactions. These activities indicate a strong interest and demand among older adults for a diverse and vibrant life. Moreover, these activities contribute to their health, happiness, and vitality.

2. Neighborhood Relations and Social Interactions

Almost all interviewees believe that communication among neighbors can promote friendly and harmonious relationships within the community. Specifically, P1 fosters interaction and communication among community residents by sharing the small fish they catch, creating a positive cycle that enhances neighborly relationships and contributes to a more compassionate and harmonious community ecosystem. He usually goes fishing at

the branch of the Grand Canal near the community and fishes almost every day. P1 stated, *"I give the small fish I catch to older adults residents on the ground floor of the community, and when they are cooked, I feed them to the stray cats in the community"*. P2, while taking care of children, engages in conversations with other neighbors who are also caring for children. *"Chatting with other older neighbors who take care of children"* is one form of neighborhood relationships. These examples demonstrate that older adults have close neighborhood relationships and a culture of mutual support within the community. These interactions not only help alleviate loneliness and stress among older adults but also contribute to a more harmonious community.

3. Intergenerational Relationships

P3 expressed that older adults do not live with their children, making it difficult for them to interact with young people and resulting in a sense of loneliness in their lives. However, because young people are busy with work, they have limited opportunities to engage with older adults. It can be observed that older adults have certain expectations and understanding toward young people, and they hope to have more communication and interaction with them. P3 stated, *"This is an old residential area where mostly older adults live. Young people usually move out"*. P4, a young person, mentioned: *"It's rare to come into contact with older adults, mainly because everyone is working on weekdays. Young people, well, actually prefer staying at home during their leisure time. There aren't many attractive places in the neighborhood either"*. Regarding the perception of young people by older adults, P1 believes that young people are more restless and lack patience. Their fast-paced lifestyle is not conducive to activities like fishing, which is one reason why young people are not inclined to go fishing. He stated, *"There are very few young people who come fishing. Mainly because young people nowadays lack patience. They think fishing is not as entertaining as using smartphones"*. In conclusion, young people rarely reside in older residential areas, and visits from their children typically occur only on weekends. As a result, there is limited interaction between older adults and young people. Some older adults, due to living apart from their children, lack opportunities to connect with young people.

4. Community Environment and Public Facilities Development

During the observation, it was noted that the buildings in the community were old, dull, and lacked color, forming a stark contrast to the adjacent prosperous buildings. The entire community lacked vitality. For example, P5 mentioned, *"The residential buildings were constructed in 1979, it has been over forty years, and renovation is difficult"*. The existing facilities in the community are relatively limited, with low appeal to young people. P4 stated, *"There are generally no facilities specifically designed for young people and older adults in the community. It mostly consists of traditional and ordinary fitness equipment"*.

There are few spaces where older adults and young people can coexist. Furthermore, their daily routines and schedules differ, resulting in limited interaction. The community environment and development of public facilities are also topics of concern for older adults.

4.4. Group 3: Intergenerational Relationships from the Perspective of Young People

4.4.1. Interview Participants and Topics

This group focused on intergenerational interaction and neighborly relationships from the perspective of the young. Due to the long-term disrepair of old residential areas, the government often conducts periodic renovations in these areas. Specifically, this involves reinforcing building structures, improving infrastructure, enhancing environmental cleanliness, and optimizing public spaces.

The group focuses on public facilities and renovations in old residential communities and conducts random street interviews; hence, no detailed background information on the interviewees was collected. A total of 10 participants were involved, comprising 5 older adults (aged 60–80s) and 5 young individuals (aged 20–30s). Interviewees of group three are those obtained through random street interviews. The purpose of the

interviews is to understand residents' true living experiences and deduce the improvements they need in terms of public facilities in the community (Figure 5).



Figure 5. Interviewees of this group are from *Jincheng* New Village, which is situated in the urban–rural fringe and was established in the 1980s as an old residential area; during the research, this community was undergoing renovation due to aging infrastructure.

Interview Questions are as follows:

- **Opinion on community renovations:** What are your thoughts on the current construction and renovations in the community? Do you support the renovation plans or have any suggestions?
- **Drying clothes and bedding in the community:** Do you often choose to dry your clothes and bedding in the community? Why do you prefer to dry them in the community? How would you evaluate the drying facilities provided in the community?
- **Community leisure walks:** Do you have a habit of taking leisure walks within the community? Are you satisfied with the community's environment and facilities?
- **Preferences and dissatisfactions in the community:** What do you like or dislike about the community? What are your expectations or suggestions for improvement?

4.4.2. Interview Results with Older Adults

1. **Opinion on the respondents' lives and their assessment of community.** The majority of the interviewees expressed overall satisfaction, particularly with the convenience of shopping and grocery shopping due to proximity. For instance, P1 mentioned concerns about buying groceries alone due to navigation difficulties, especially during periods of lockdown when they had to take longer routes to find food. However, overall, the purchase of daily necessities was relatively convenient.

Additionally, some individuals raised complaints about old residential communities. One issue mentioned was problems with community management. P4 mentioned difficulties in expressing opinions that were not being addressed by the community. P3 stated, *"I believe they should have a more thorough understanding of residents' living issues and make efforts to resolve these problems"*.

Another concern was the safety of facilities. For example, P3 mentioned safety issues in the corridors, especially during rainy or snowy weather. Furthermore, some pet enthusiasts expressed concerns about pet-related issues in the community. P5 stated, *"I keep pets to prevent dementia, force myself to exercise, and pass the time; otherwise, I would just be sitting at home"*. However, the community lacks convenient public facilities related to pet ownership. As P5 mentioned, *"There are no convenient public facilities for pet-related activities, and it's annoying when dogs defecate everywhere"*.

Overall, although most interviewees were satisfied with their lives in old residential communities, there are areas that require improvement, such as community management, facility safety, and pet-related facilities and regulations.

2. Evaluation of residents regarding the renovation of old residential communities.

Some interviewees expressed positive feedback. P1, who had a strong emotional connection to the community, provided a highly positive evaluation, stating, *“I am very happy to see this transformation in our old village. It demonstrates the care of the country and the government towards us”*.

P2 believed that the community had made significant improvements that brought joy, stating, *“The community has repaired some problematic areas”*. P4 mentioned the excellent relationships among neighbors and their excitement for the future construction of new activity rooms. However, there were also some interviewees who expressed dissatisfaction and concerns about the community’s renovations. For instance, P3 felt that the renovation project did not truly address the existing issues in their daily lives and was merely superficial, failing to address feedback problems. P4 pointed out long-standing infrastructure issues that remained unresolved, which was a source of dissatisfaction for them.

4.4.3. Interview Results with the Young

1. **Community environmental and facility issues:** The majority of interviewees expressed dissatisfaction, primarily due to ongoing renovations in the community. For instance, P2, a vegetable and fruit store owner, described the community environment as terrible, stating that the ongoing renovations have created a polluted and poorly landscaped environment. Similarly, P3, a young female university student, mentioned that the renovated roads in the community were often uneven, making it inconvenient to walk. P5 mentioned the high frequency of community renovations, ranging from burying water pipes and electrical wires to landscape changes.

In addition to renovation concerns, pet-related issues were also a source of dissatisfaction among the interviewees. Firstly, the danger posed by unleashed pets was highlighted by P3, who expressed fear of encountering unleashed large dogs. Secondly, the problem of pet waste was mentioned, with P5 noting that some pet owners did not have the habit of cleaning up after their pets in public areas, and some individuals disregarded leash regulations. However, P1, due to having previously owned a pet, had a higher tolerance for these issues.

2. **Community public laundry and planting issues:** The community faces an evident problem concerning public laundry facilities, and interviewees hold different opinions on this matter. P1, a young woman, does not have strong views on laundry issues. She believes that there is a lack of privacy when drying clothes in the community, and sometimes clothes may be blown off the balcony by the wind, but she does not consider it to be a significant concern. On the other hand, P2 believes that laundry involves privacy and prefers to dry clothes in a small courtyard. P5 prefers to dry clothes on their own balcony, as it provides more privacy, while pointing out that public drying in the community is not aesthetically pleasing.

Regarding community planting, P1, P3, and P5 enjoy having plants in their balconies, study rooms, and living rooms. However, if the community had designated planting areas, they feel that it would lack the same level of enjoyment. In contrast, P4, a male homeowner in his thirties, plants flowers and plants on his own balcony and mentions that older residents in the community like to grow some onions and vegetables.

3. **Intergenerational interaction issues.** There is limited communication and interaction between young people and neighbors, as mentioned by P3: *“I rarely interact with neighbors; when we come across each other, we just nod and greet each other”*. P1 believes that playing within the community is not as enjoyable as going out because there is a lack of playmates in the community. Secondly, regarding young people’s perspective

on activities involving older adults, young individuals do not actively participate in older adults' activities in the public square or utilize the common facilities frequently. However, they enjoy observing these activities and find them interesting, as it adds variety to their lives.

Furthermore, some young people have concerns about the allocation of community resources, which they perceive as being overly biased toward older adults. For example, P4 believes that after the community underwent age-friendly renovations, there is an excessive allocation of activity areas for older adults, resulting in a significant reduction in parking spaces. P5 mentions that parking spaces cannot meet the needs of all residents, and some older adults gather together, bringing chairs and making it difficult to park. However, some young people are more tolerant, such as P3, who states: *"I rarely engage in recreational activities in the community's leisure area because older adults gather in the pavilion to play cards, chess, and chat. As long as these activities do not disrupt our normal lives, I don't mind"*.

4. **Additional findings** indicate that older adults generally have a strong desire to express themselves and show concern for young people, being willing to engage in communication. In contrast, the number of young individuals is relatively small, and they are often in a hurry, resulting in a higher refusal rate for interviews.

5. Discussion

5.1. Categorization of Old Residential Community Populations

5.1.1. Classification of Populations in Old Residential Communities

The current mainstream classification for older adults comes from the World Health Organization, which categorizes them based on age into "older middle-aged" (preretirement, 55–64 years old), "young old" (65–74 years old), and "older old" (75–84 years old) [40]. By employing observational methods and interview techniques, the population within the community can be categorized and characterized based on the following aspects: personnel categories, characteristics, and activity locations and times (Table 6).

Table 6. Classification of populations in old residential communities.

Personnel Categories	Characteristics	Activity Locations and Times
Leisurely Older Adults	Good physical health, autonomy in daily activities, broad range of mobility, and high enthusiasm for outdoor activities	Community and nearby parks; before and after meals
Busy Older Adults with Child Care Responsibilities	Regular and busy lifestyle, with the need to go out primarily for child care purposes	Community and nearby parks; before and after meals
Older Individuals Staying at Home Due to Advanced Age	Limited mobility, often resting in bed at home, requiring assistance for daily walking; mainly engaged in home-based activities and limited outdoor activities in the vicinity	Home-based activities and limited outdoor activities in the vicinity
Working Young Adults	Busy with limited free time	Heading straight home, accompanying children to play in public areas, coming and going early and late every day
Adolescents	Fondness for outdoor activities; inclination toward curiosity; preference for peer companionship; partial ownership of pets	Engaging in vigorous outdoor activities within the community and nearby parks
Adult Children of Older Adults	Some reside in other locations and have limited time in the community	Relaxing in public areas with older adults, helping them with grocery shopping; returning once every two weeks
Property Management Personnel	Responsible for community management, event planning, etc.	Permanent residents; in charge of community management
Others: Vendors, Photography Enthusiasts, etc.	Occasional visits to the residential area	Bulletin areas, hallways

5.1.2. Intersection of Different Populations

We continue our efforts to identify the intersection among these populations and provide a more visual summary using a Venn diagram, as depicted in the figure below. The blue area represents different categories of older individuals within the old residential community, while the red area represents different categories of young individuals within the community (Figure 6).

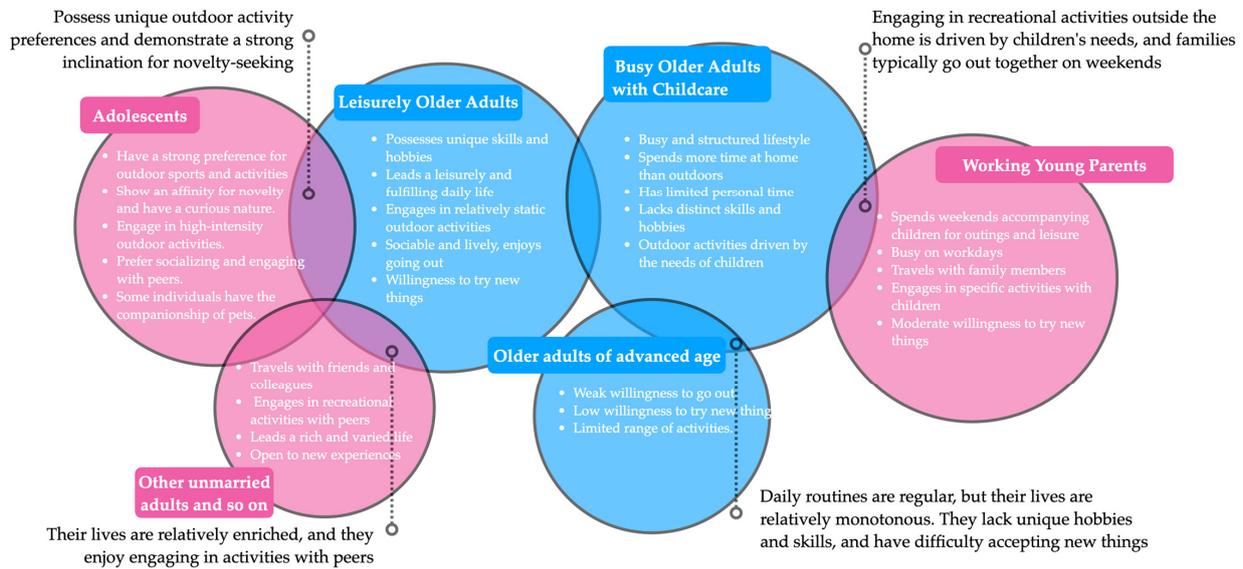


Figure 6. Intersection of different populations in old residential community system.

The keywords of user experience for both older adults and younger people are appropriate relaxation, emotional fulfillment, physical well-being, easy product recognition, enhanced social experience, and enriched life. Additionally, important experiential attributes that are unique to each group include a sense of companionship, a sense of security, and a sense of personal freedom (Figure 7).

	Independent living:	Private social interaction	Socializing through public activity						Intergenerational social interactions	
The young	Recreation Learning	Conversation Gaming	Gaming Shopping	Chitchat Learning	Community activities Exercise	Childcare Playtime				
Good user experience	Lifestyle freedom	<ul style="list-style-type: none"> • Strong sense of autonomy • Adequate relaxation • Adequate relaxation • Emotional fulfillment 	<ul style="list-style-type: none"> • Gaming satisfaction • Social experientiality • Entertainment value 		<ul style="list-style-type: none"> • Strong physical health • Easy product recognition 	<ul style="list-style-type: none"> • Social interaction experience • Diverse life • Social learning experience 	<ul style="list-style-type: none"> • Sense of security • Sense of fulfillment • Sense of companionship 			
	<ul style="list-style-type: none"> • Distance feeling • Sense of loneliness • Fatigue • Sense of loneliness • Challenges in life 	<ul style="list-style-type: none"> • Sense of loss • Lack of companionship 		<ul style="list-style-type: none"> • Decline in physical function • Impaired sensory abilities • Vulnerability to injuries • Inconvenience in usage 	<ul style="list-style-type: none"> • Impaired discernment abilities • Vulnerability to injuries • Inadequate sizing 	<ul style="list-style-type: none"> • Communication misunderstandings • Prone to fatigue 				
Baseline										
The elderly	Walking Grocery shopping	Chatting Resting	Square dancing	Playing chess Chatting	Playing mahjong	Community activities Exercising	Childcare Playtime			
Bad user experience										
		Private social interaction	Socializing through public activity						Intergenerational social interactions	

Figure 7. The keywords of user experience for both older adults and younger people.

5.2. The Current Social Situation Concerning Older Adults and Young People

5.2.1. Behavioral and Psychological Characteristics of Older Adults

In terms of behavior, older adults tend to engage in community-based activities, which exhibit a degree of randomness in terms of timing and frequency. They prefer outdoor activities and enjoy socializing and conversing with their peers. Their activity patterns are typically fixed and limited in range, and they follow regular daily routines. This finding is similar to previous research findings, where older individuals are inclined to develop habitual behavior patterns [41].

Psychologically, older adults are inclined toward social interactions but may experience a decreased sense of security. They demonstrate empathy but can also feel lonely and yearn for social care and recognition. While they have hobbies and interests, some are constrained by responsibilities such as caregiving and household chores, which impact their time management and freedom. This finding is also in line with [39]; grandmothers experienced higher depressive symptoms than grandfathers, especially when engaged in intense caregiving.

5.2.2. Social Interaction Challenges Faced by Older Adults

- **Limited Socialization.** Older adults exhibit constrained socialization patterns, primarily depending on social relationships established during their younger years, such as colleagues or neighbors in their local community. Actively seeking new friendships is infrequent unless they share specific interest groups, like dog walking or bird watching, which facilitate integration into new social circles. Social interaction is strongly influenced by familiarity, posing challenges for older adults to expand their social networks.
- **Lack of Psychological Identification.** Psychosocial identification diminishes as older adults transition into retirement. With the shift toward a leisure-centered lifestyle, there is a gradual decline in psychological identification. The sense of accomplishment, involvement, and fulfillment previously derived from work diminishes. As older adults have more available time, they actively participate in community activities, which may involve unequal contributions and rewards. In an attempt to seek social identification, they express gratitude toward community workers, finding temporary meaning in their lives.
- **High Social Costs.** Social interaction is predominantly shaped by pre-existing social circles, posing challenges for older adults who have recently relocated to be accepted by their peers. The decline in adaptability, learning ability, and physical fitness adds to the reluctance of engaging in new social encounters, thereby discouraging older adults from leaving familiar neighborhoods and joining their children in more favorable living environments.
- **Unreasonable Task-oriented Community Activities.** Community activities are frequently organized in a rigid and task-oriented manner, lacking appeal to most older adults who participate out of goodwill. The communication of community activity notifications is insufficient, with limited outreach to the community. Information dissemination channels are limited, relying heavily on word-of-mouth within existing social circles to promote events. As a result, participation in activities becomes fixed, hindering older adults' timely awareness and involvement. In other words, activities organized by administrators are often challenging to fully meet the social needs of the elderly. This aligns with previous research findings noted in the literature [42].

5.2.3. Behavioral and Psychological Characteristics of the Young

Young people's behavioral characteristics: They tend to engage in activities outside the community, with activities concentrated in the afternoon and evening. There is a noticeable increase in the variety of activities during holidays and weekends. They use electronic devices extensively and are more adaptable to smart community devices. They participate

in public community activities with a wide range and certain challenges. Apart from working days, they spend a significant amount of time at home.

Psychological characteristics of young people: They are relatively energetic and passionate, with a strong desire for knowledge. They are compassionate but easily influenced by work and life, sensitive and prone to anxiety. Many live alone and experience some degree of loneliness, yearning for comfort in their lives. Underlying reasons could be summarized as increased acceptance of multiculturalism in the new era; intensified life stress due to a fast-paced lifestyle; and inadequate and inflexible community public facilities and activities that lack sufficient appeal.

5.2.4. Intergenerational Relationships from the Perspective of the Young

Intergenerational relationships: Higher residential mobility in the community leads to weaker residential attachment. Participation in community activities within the community decreases, reducing opportunities for intergenerational interaction. There is a lack of complementary understanding between young people and older adults within the community. Public facilities in the community are mostly used by older adults, while young people use them less frequently. There is minimal overlap in leisure spaces between young and older individuals. These spaces, according to the intergenerational contact zone (ICZ) concept, serve as spatial focal points for older adults and younger generations to meet, interact, build trust and friendships, and work together to address issues of local concern. They can be found in all types of community settings including libraries, schools, parks, and multiservice community centers [17]. Therefore, the challenge lies in involving young people in community activities and promoting communication between young and older individuals. Finding common ground and shared topics between the two generations is crucial.

5.3. System Design Opportunities and Proposals

5.3.1. Ten Possible System Design Opportunities

Based on these findings, ten system design directions to enhance intergenerational interaction in old communities are proposed, as shown in Table 7.

Table 7. Ten possible system design opportunities.

Cultivating Together, Learning in Harmony	Through observation, it has been discovered that older individuals in aging communities have a penchant for cultivating plants in public spaces. By embracing the concept of "noninstitutionalized education", it is apparent that the knowledge systems of older adults diverge from those of the younger generation. Older adults possess a wealth of expertise in horticulture and related activities, while the younger population excels in utilizing electronic devices. These complementary knowledge domains provide a fertile ground for collaborative efforts, fostering a community where individuals can leverage their respective strengths and contribute to a culture of continuous learning.
Enhancing Intergenerational Communication through Stray Animals as Mediators	Older residents in the community share a common trait of being inclusive and caring toward stray animals, similar to many young people who love cats and dogs. However, there are also certain complementary differences between them, which can be harnessed to create new forms of community collaboration that integrate the cognitive and caring approaches of both generations. By using stray cats and dogs as intermediaries, which are loved by both the young and older adults, we can identify common activities that capture the interests of both age groups, thereby increasing opportunities for intergenerational communication.
Intergenerational Activity Planning Device Design	This device design facilitates engagement, registration, and active participation in community activities. It provides a platform for older individuals to actively contribute to the notification and planning of community activities, collaborating with young community staff in organizing activity venues, schedules, formats, and content. By empowering older adults in these processes, the design not only fosters a sense of achievement and positive reinforcement, but also cultivates empathy and strengthens communication between the two generational groups.

Table 7. Cont.

System Design of Community Recreational Facilities	This facility is designed to accommodate multiple configurations, each catering to the specific needs of different age groups, including young and older individuals. By incorporating several of these versatile structures within a shared space, it promotes intergenerational interactions and facilitates communication between different age groups. Furthermore, considering the habit of waste collection among older adults described in Section 3.4.2, we can design with a perspective of creating intergenerational spaces for item recycling.
Enhancing Social Interaction through Participatory Sports Spaces	Focusing primarily on the context of intergenerational interaction in public communities and parent–child engagement, this concept centers on the use of fitness equipment as a prototype to create an inclusive space that enhances physical fitness and interactive play experiences. It takes into account the unique characteristics of diverse user groups while maintaining a stable foundation.
Real-time Interactive Window Device	Taking inspiration from the climbing vine, this device covers the entire facade of a building, connecting each household window to facilitate information exchange between residents. It incorporates various mediums of communication, such as archived voice messages, physical notes, and letters, as well as the exchange of items based on the principle of gifting. For example, young individuals can use this device to greet and initiate communication with older residents, fostering meaningful interactions and dialogue.
Integrated Online and Offline Gaming Facility	Combining intelligent matchmaking through a dedicated mobile application and interactive displays, this facility leverages board games as an example to establish connections between the younger and older generations by applying commonly used smart electronic devices. By integrating an app-based intelligent matching system with large physical screens for interactive gameplay, this facility promotes engagement and interaction between the younger and older age groups, fostering intergenerational connections through popular board games
Innovative Design of Parcel Locker Systems	This innovative design focuses on community parcel lockers, integrating a mobile application to facilitate a collaborative system where young individuals assist older adults in retrieving their parcels. This arrangement not only promotes communication and interaction, but also provides corresponding rewards, fostering intergenerational dialogue between the two groups
Intergenerational Gift Exchange in the Community	Community interactions are enhanced through reciprocal gift-giving. The gifts take the form of handmade creations crafted by both older and young individuals, showcasing their respective interests and hobbies. These artistic creations serve as vessels for emotional expression, allowing older adults to showcase their skills and build their self-confidence

5.3.2. Three System Design Proposals

- **Interactive system design for intergenerational communication using stray animals as a medium**

By engaging in the shared activity of feeding stray animals, an interactive system is designed to enhance communication between young and older individuals within the community. The aim is to create a natural intergenerational space using stray animals as intermediaries (Figure 8).

The system consists of a touch-sensitive interactive wall, food storage unit, feeding image capture device, and guiding system. Users retrieve a food container from the storage unit, which records the animals' feeding patterns. Users can view the feeding images by tapping on corresponding modules on the interactive wall, creating a gathering space for community seniors, children, and young people, thus promoting intergenerational interaction.

- (1) Guiding system: Utilizing infrared detection technology, the "cat" follows individuals and leads them to the main installation, drawing their attention and increasing the likelihood of usage.
- (2) Food storage unit: Contains food and water supply, allowing users to retrieve the food container and record the animals' feeding patterns, which are then transmitted to the interactive wall.
- (3) Feeding image capture device: The food container has separate compartments for food and water, and a mini camera captures the feeding process. It is placed on a magnetic disk at the designated feeding point, allowing easy unlocking and usage.

- (4) Interactive wall: Users can interact with the wall by gently tapping the imaging modules, displaying the corresponding feeding images of stray animals. The displayed clips fade after playback and can be viewed again by tapping. This simple and fun interaction method caters to the ease of use for older adults while attracting young people and children to “tap and explore”.

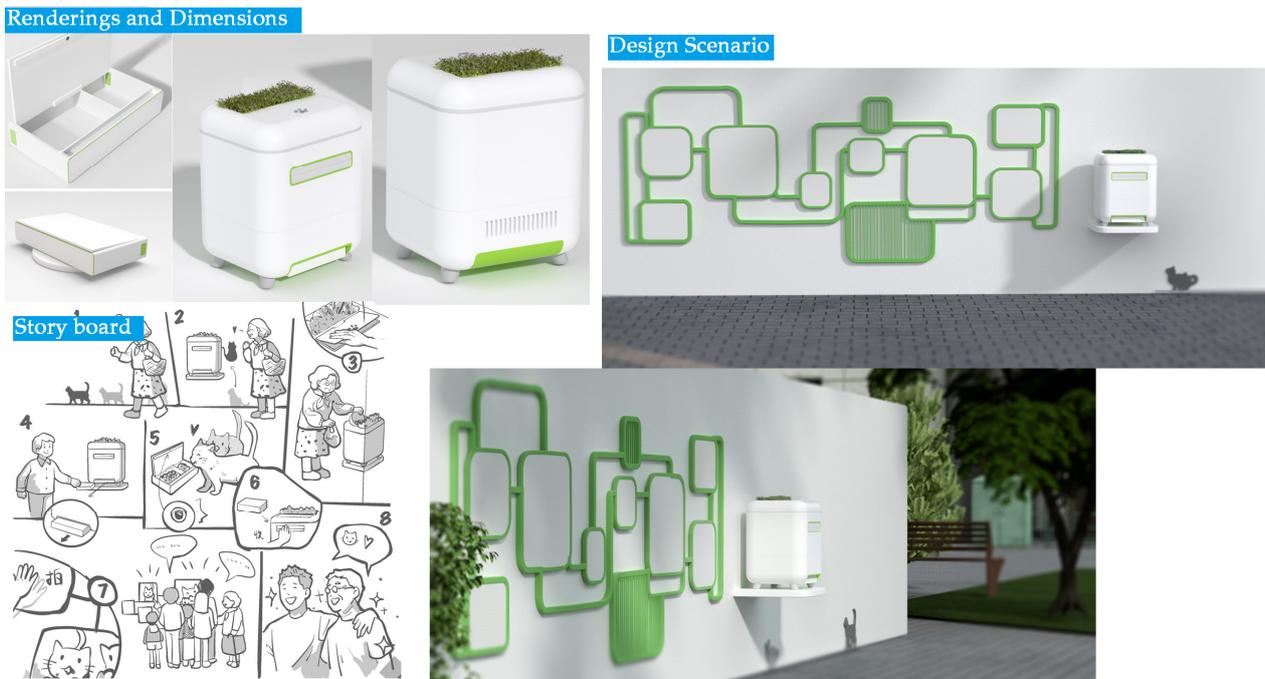


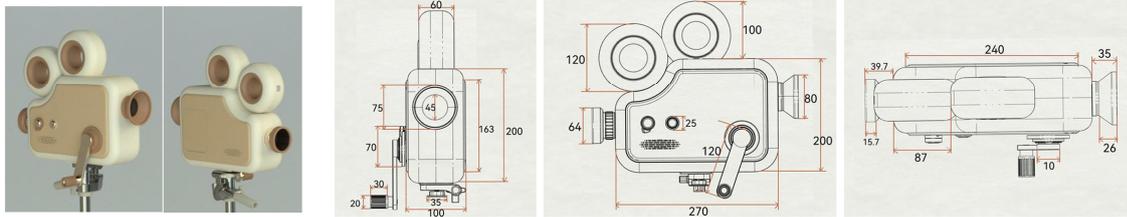
Figure 8. Interactive system design for intergenerational communication using stray animals as a medium.

In summary, this interactive system design aims to bridge the online group chat conversations among young people about stray animals to an offline setting, involving older adults who are less adept at online platforms. By using stray animals as a medium, both age groups have the opportunity to gather and interact, fostering collisions and communication between the two communities.

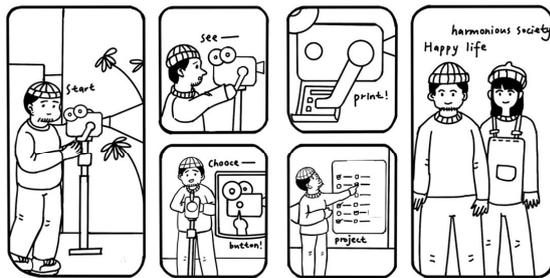
- **System design of a community activity planning device for older adults and community workers**

The design of the community activity system for older adults and community workers includes activities organized by the community system and self-planned activities. The appearance of the device is anchored in “memories” and takes inspiration from the design of old-fashioned movie projectors that correspond to the interactive nature of the device. The design incorporates symbolic elements extracted from the movie projector and combines them with the device’s functionality. The retro feel of the device, from its design, color, material, and interaction forms, creates a sense of nostalgia that encourages older adults to approach and use it, rather than perceiving it as a cold object (Figure 9).

Renderings and Dimensions



Story board



Design Scenario



Figure 9. System design of community activity planning device for older adults and community workers.

Notification and planning of community system activities: Collaboration with community workers helps them better accomplish their task, which fosters mutual assistance and understanding between older adults and young community workers. By combining the pressure of community tasks with activities that cater to the hobbies of older adults, a virtuous cycle is created.

Engage older adults in activity planning through age-friendly interactions. This can be accomplished by designing activities that genuinely interest older adults, while community workers can provide assistance in the preparation phase and offer teaching and maintenance of related equipment, enriching the community life experience.

Social barriers within the community can be broken down through notification devices in public spaces. Every interested older person can receive help in accessing information about activities, thus encouraging their participation. A wider range of activity information can be provided to broaden the social channels for older adults and enhance their sense of belonging in unfamiliar environments. The attention of young people can be attracted through this device, initiating communication between the young and older adults and challenging stereotypes young people may have about older adults.

- #### System Design for a Community Public Interactive Seat that Creates a Time-Crossing Environment

Through research, it is observed that during the day, older adults often sit on benches to rest and chat, while young people mostly return to the community in the evening and occasionally sit on the benches for a break (Figure 10).

This system design adds attachments to the bench, including three modules: a camera, a projector, and a printer. During the day, the camera records the shadows of older adults sitting and resting. In the evening, when young people sit on the bench, the artistically processed shadows of older adults are projected in front of them, intertwining with their own shadows, enabling time-crossing interaction. The camera also captures photos of the interaction. During the day, older adults can press the print button on the armrest of the seat to receive a random photo from the previous evening.



Figure 10. System design for a community public interactive seat that creating a time-crossing environment.

In addition, warm white light is used for auxiliary lighting in front of the bench at night. The duration of older adults' rest on the bench during the day affects the intensity of the warm white light. The longer the resting time is, the stronger the light.

In summary, the bench serves as a bridge for interaction between older adults and young people at different times. The warm white light for nighttime illumination is determined by the duration of older adults' rest in the morning, providing a sense of warmth across time for young people. When young people sit down, the shadows of older adults are projected, invisibly bringing a sense of companionship and social connection.

6. Conclusions, Limitation, and Future Work

The old residential community lacks adequate infrastructure and has a relatively low standard of living. The community primarily consists of three population groups: older adults, young adults, and children. The proportion of older individuals is higher compared to regular neighborhoods. The community environment is characterized by tranquility and a slow pace of life. Intergenerational social interaction is a vital form of socialization within the community.

In this study, we commence by employing a combination of observational techniques and interviews. This dual approach facilitates a comprehensive analysis of individuals' behaviors and interactions within the studied communities. Through systematic categorization, we discern various types of individuals along with their corresponding characteristics, subsequently unveiling key intersections that exist among these distinct groups. The study delves into the sociocultural landscape concerning both older adults and young individuals, illuminating their behavioral traits and the challenges they encounter within their social interactions. Synthesizing the insights gathered, we distill a set of ten distinct directions for the design of systems aimed at enhancing intergenerational interactions. Within these directions, three are further elaborated in considerable detail.

There are limitations as well. First is the relatively restricted scope of participants subjected to interviews. This constraint arises from the practicalities of data collection, as the number of individuals engaged in the study is confined to a finite range. Consequently, the findings drawn from this study should be interpreted within the context of this limitation, acknowledging that the outcomes may not encompass the full spectrum of perspectives and experiences that a larger participant pool could have provided. Despite this limitation,

the study seeks to contribute valuable insights to the existing body of knowledge in its selected domain. Second, discerning whether the interview outcomes accurately represent a minority viewpoint, a limited set of participants, or if the data become extensively repetitive during the course of interviews presents a challenging task.

In terms of future work, the proposed system design proposals will be further developed into functional prototypes and tested in real-world settings. Field experiments will be conducted to validate the system design proposals through design interventions.

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