

Functional Design of Elderly Activity Center of Urban Community Under the Behavioral Needs of Low-age Elders - Taking Kuitun City as an Example

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Received: 29 April 2025; Accepted: 17 May 2025; Published: 3 June 2025

Abstract:

Based on the background of population aging in Kuitun City, functional spaces of architecture can be set up starting from the behavioral needs of low-age elders. First, obtained the activities that low-age elders like most and engage in frequently through social surveys. Next, the Maslow's Theory of Hierarchy of Needs was used to analyze the essence of the behavioral needs of the low-age elders. Last, based on these behavioral needs, the functional spaces for elderly activity center of urban community were deduced. The research provides a reference for functional design of similar buildings in Kuitun City.

Keywords:

Low-age Elders, Behavioral Needs, Elderly Activity Center of Urban Community, Architectural Function, Kuitun City

1. Introduction

As China's economy rapidly develops, the phenomenon of population aging has emerged. Kuitun City in Xinjiang is not an exception. Kuitun City ranked among the top 100 county-level cities in China for comprehensive well-off index in 2018 and was one of the top 100 counties and cities in western China in 2019. The GDP in Kuitun City was 30.571 billion RMB in 2024. By 2025, the urban population of Kuitun City is over 160000 with over 26000 people aged 60 or older, accounting for 16% of the urban population. Kuitun City has clearly entered an aging society. [1]

In view of the aging population, the Kuitun municipal government has planned to provide home care for 90% of the elderly, community care for 7% of the elderly and institutional care for 3% of the elderly in accordance with the "14th Five-Year National Plan for the Development of Aging Cause and System of Elderly Care Service", so as to continuously improve the guarantee of elderly care services. [2]

2. Significance and Purpose of the Study

By 2025, there are 9 nursing homes and 9 day-care centers in Kuitun City, but no community-based elderly care facilities. This falls short of the goal of “community care for 7% of the elderly”. Many low-age elders with normal cognitive abilities and good physical health are well-suited for the activities offered by elderly activity centers. Additionally, the local area has economic resources to develop the infrastructure for the elders.

Therefore, taking Kuitun City as an example, starting from the behavioral needs of the low-age elders, exploring the functional spaces of elderly activity center of urban community to adapt to the social and economic development of Kuitun, serve the elderly group.

3. The Related Concepts and Theory

3.1. *The concept of low-age elders*

According to relevant laws and regulations of China, the group aged 60 years or older is identified as the elderly. This group can be further divided into low-age elderly ($60 \leq \text{age} < 70$), middle-age elderly ($70 \leq \text{age} < 80$), and high-age elderly ($\text{age} \geq 80$) based on their specific ages. [3,4]

Characteristics of low-age elders: Most of them have normal cognitive abilities and good physical health, they generally do not need special care. This group has a relatively short retirement period, many of them are unwilling to be lonely and have a strong desire for re-employment. They can contribute their remaining energy to their families and the society, also can cultivate their own interests and hobbies. [4]

3.2. *The concept of elderly activity center of urban community*

The elderly activity center is a building which provides functions such as continuing education, cultural dissemination, leisure and entertainment, physical fitness, social interaction, and social service for the elders. Elderly activity centers of urban community generally serve only their own neighborhoods. Compared to large urban elderly activity centers, they have smaller floor areas and simpler functions, but they still include the most basic core functions. [5]

3.3. *The Maslow's Theory of Hierarchy of Needs*

The Maslow's Theory of Hierarchy of Needs, proposed by American psychologist Abraham Maslow. He categorized human needs into five levels: physiological needs, safety needs, social needs (love and belonging needs), esteem needs, self-actualization needs, which are stacked in a pyramid structure, reflecting the hierarchical development of human needs from lower to higher levels (Figure 1). Only after the lower-level needs are met will people better pursue the higher-level needs, progressing step by step.[6]

The Maslow's Theory of Hierarchy of Needs provides an important theoretical basis for analyzing the behavioral needs of low-age elders. According to the Maslow's Theory of Hierarchy of Needs, the behaviors of low-age elders in the preliminary survey can be analyzed and the demand levels can be summarized one by one, so as to prepare for the subsequent function design of architecture.

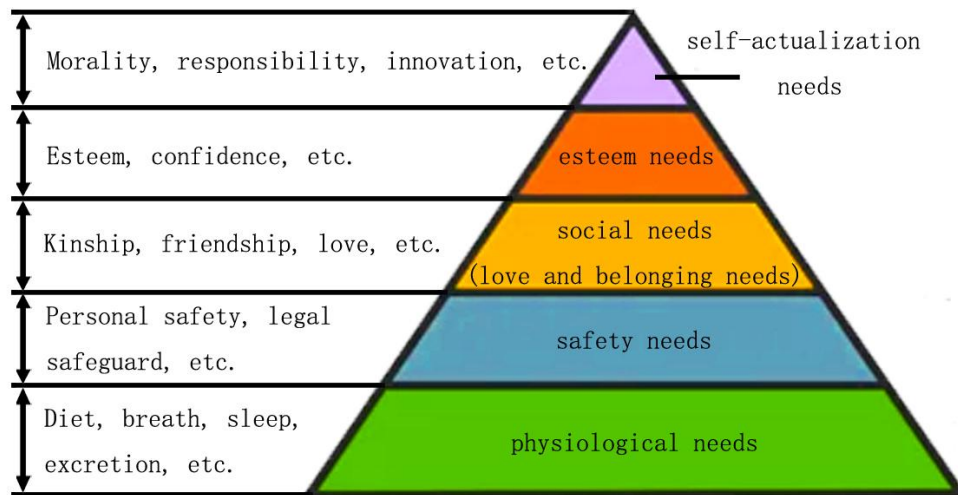


Figure 1. Maslow's hierarchy of needs.

4. Investigation of Behavioral Needs of Low-age Elders

4.1. Design of survey contents

According to lots of studies, the core attributes of elderly activity center of urban community include continuing learning, cultural dissemination, leisure and entertainment, physical fitness, social interaction, and social service. [5] The survey contents on the behavioral needs of low-age elders should be set based on the core attributes of the building. Classify and summarize the specific actions involved in the core attributes of such buildings (Table 1).

Table 1. Actions involved in the core attributes of architecture.

Core attributes	The specific actions involved
Learning and culture	Writing calligraphy, painting, Chinese paper cutting, making sculptures, taking photographs, doing embroideries, gardening, reading, etc.
Leisure and entertainment	Watching videos, playing cards, playing chess, playing mahjong, playing video games, etc.
Physical fitness	Walking, running, square dancing, shadowboxing, etc.
Social interaction	Using WeChat or QQ, face-to-face chatting, etc.
Social service	Participating in community activities, volunteering, etc.

Based on Table 1, a survey questionnaire was designed: a total of 21 activities were summarized, with four options for frequency after each activity: often, sometimes, occasionally, never, for respondents to choose from (Table 2). Multiple selections or no selection will be considered invalid. The method of survey questionnaire is used to understand the activities that respondents enjoy.

Table 2. Questionnaire on the frequency of various behaviors of low-age elders.

Please choose the option that best fits your personal situation.				
Your age?	A. 60-70 years old	B. other	Please continue if someone who choose A .	
Do you participate in the following activities?				
writing calligraphy	often	sometimes	occasionally	never
painting	often	sometimes	occasionally	never
Chinese paper	often	sometimes	occasionally	never

cutting				
making sculptures	often	sometimes	occasionally	never
taking photographs	often	sometimes	occasionally	never
doing embroideries	often	sometimes	occasionally	never
gardening	often	sometimes	occasionally	never
reading	often	sometimes	occasionally	never
watching videos	often	sometimes	occasionally	never
playing cards	often	sometimes	occasionally	never
playing chess	often	sometimes	occasionally	never
playing mahjong	often	sometimes	occasionally	never
playing video games	often	sometimes	occasionally	never
walking	often	sometimes	occasionally	never
running	often	sometimes	occasionally	never
square dancing	often	sometimes	occasionally	never
shadowboxing	often	sometimes	occasionally	never
using WeChat or QQ	often	sometimes	occasionally	never
face-to-face chatting	often	sometimes	occasionally	never
participating in community activities	often	sometimes	occasionally	never
volunteering	often	sometimes	occasionally	never
Thank you for your participation!				

Considering the objectivity of the survey questionnaire, it cannot fully cover the daily activities of low-age elders. Therefore, it is necessary to add the interview with strong subjectivity and unlimited answers as a supplement to the questionnaire. The combined methods of survey questionnaire and interview yield more comprehensive results compared to using either method alone. [7]

The questions of interview were designed to ask in a conversational manner, in order to obtain the activities that low-age elders like most, with no limit on the number of contents (Table 3). Unclear answers, irrelevant answers or no answer will be considered invalid. The results will be organized and analyzed.

The two methods of investigation can be compared: if there is no contradiction between the results of various activities that low-age elders enjoy obtained by questionnaire and interview, it shows that both two methods are effective.

Table 3. Summary of questions of interview.

1. What is your age? (Please continue if someone whose answer between 60-70 .)
2. What are your favorite activities of learning and cultural?
3. What are your favorite activities of leisure and entertainment?
4. What are your favorite activities of physical fitness?
5. What are your favorite activities of social interaction?
6. What are your favorite activities of social service?

4.2. Statistical analysis of the survey results

To ensure the universality of the survey subjects, 140 low-age elderly individuals will be selected from 7 communities across 5 sub-districts in Kuitun City. Among them, 4 communities will be selected from 2 larger sub-districts, 3 communities will be selected from 3 smaller sub-districts. Each community will have 20 low-age elderly individuals sampled. These 7 communities should be as evenly distributed as possible throughout the urban area of Kuitun City. To protect residents' privacy, the

survey will be conducted anonymously without revealing the names of the sub-districts and communities.

A total of 140 survey questionnaires were distributed, with 100 deemed valid. The “often” or “sometimes” is defined as high frequency, the “occasionally” or “never” is defined as low frequency. The 100 valid questionnaires were collected and statistically analyzed to determine the proportion of respondents engaging in various high-frequency activities (Figure 2). For example, the proportion of respondents who engage in playing chess as a high-frequency activity is 43%, meaning that among the 100 valid questionnaires, 43 respondents selected “often” or “sometimes” for the this activity, accounting for 43%. The same applies to other activities.

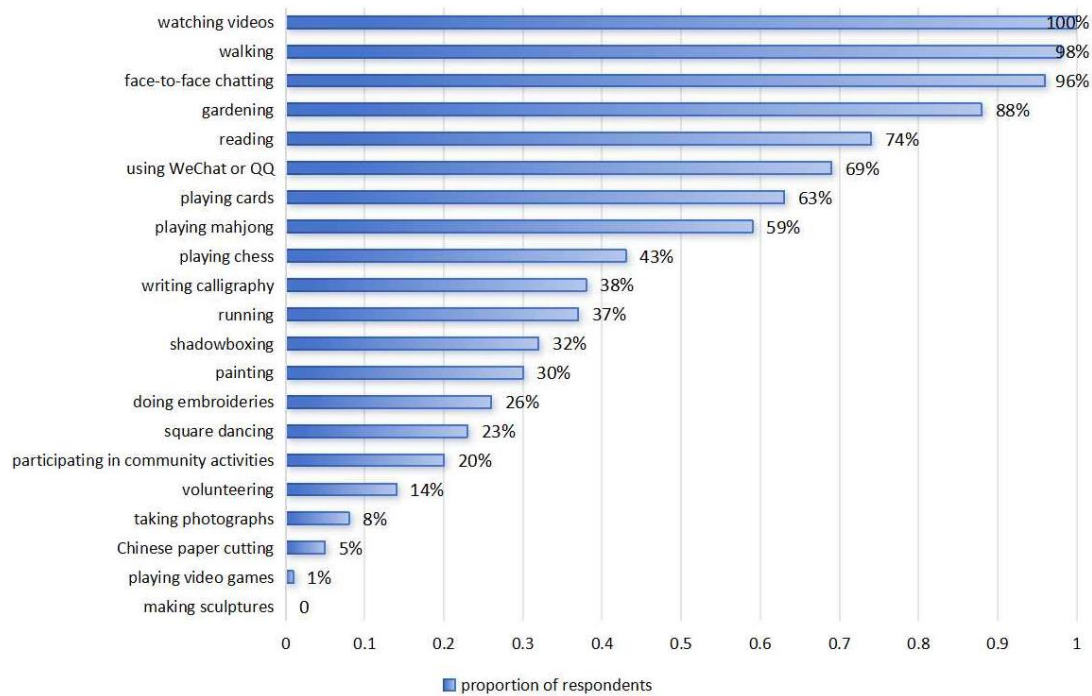


Figure 2. The proportion of respondents who engage in each activity at high frequency.

Drawing on the experience of selecting survey respondents, the interviewees were chosen from effective survey subjects. All 100 interviews were successful. The proportion of interviewees who like various activities was statistically analyzed (Figure 3). For example, the proportion of interviewees who like reading is 74%, meaning that among the 100 interviewees, 74 of them said reading was one of their favorite activities, accounting for 74%. The same applies to other activities.

Activities were not mentioned in the survey questionnaire but supplemented in interviews: writing essays, collecting stamps, playing the Erhu, playing the Chinese Zither, playing the piano, traveling, singing operas, singing songs, playing gateball, doing yoga, playing table tennis, playing tennis, doing calisthenics, playing badminton, part-time working after retirement, visiting neighbors, visiting relatives. Additionally, visiting neighbors and visiting relatives naturally involve face-to-face chatting. Square dancing is a type of dancing.

Activities were mentioned in both the survey questionnaire and interviews: watching videos, walking, gardening, reading, using WeChat or QQ, playing cards, playing mahjong, playing chess, writing calligraphy, running, shadowboxing, painting, doing embroideries, participating in community activities, volunteering, taking photographs, Chinese paper cutting. Among them, the proportion of respondents who

engage in each activity at high frequency is roughly the same as the proportion of interviewees who like it the most, with no contradiction. The results show that both of the two methods of questionnaire survey and the interview are effective.

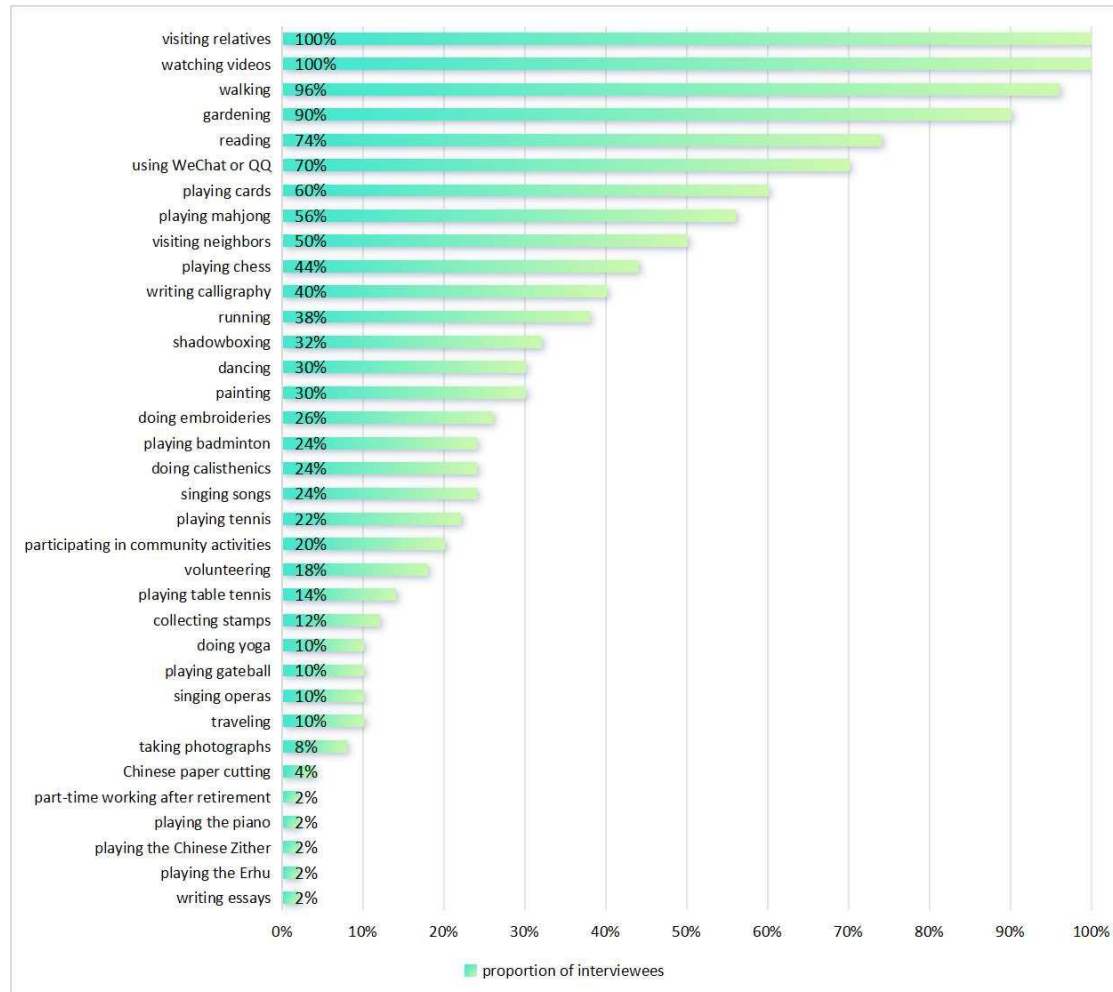


Figure 3. The proportion of interviewees who like each activity.

Based on the statistical analysis of survey questionnaires and interviews, define the popular activity: $P \geq 50\%$, define the general activity: $10\% \leq P < 50\%$, define the unpopular activity: $P < 10\%$. P = The proportion of low-age elders who enjoy in each activity. The summary shows the low-age elders' enthusiasm for each activity (Table 4). Among them, visiting neighbors, visiting relatives, face-to-face chatting can be grouped together as face-to-face chatting, square dancing and dancing can be grouped together as dancing.

Table 4. Summary of low-age elders' enthusiasm for each activity.

Popular Activities	watching videos, walking, face-to-face chatting, gardening, reading, using WeChat or QQ, playing cards, playing mahjong
General Activities	writing calligraphy, playing chess, shadowboxing, painting, doing embroideries, dancing, participating in community activities, volunteering, collecting stamps, singing operas, singing songs, playing gateball, doing yoga, playing table tennis, playing badminton, playing tennis, doing calisthenics, running, traveling
Unpopular Activities	taking photographs, Chinese paper cutting, playing video games, writing essays, playing the Erhu, playing the Chinese Zither, playing the piano, part-time working after retirement, making sculptures

4.3. Analysis of hierarchy of behavioral needs

Due to the fact that unpopular activities such as taking photographs, Chinese paper cutting, playing video games, writing essays, playing the Erhu, playing the Chinese Zither, playing the piano, part-time working after retirement, making sculptures, they should not be used as the basis for inferring functional spaces and should be excluded. Traveling and the core attributes of the elderly activity center are irrelevant, this activity should not be considered.

For the remaining activities, based on the Maslow’s Theory of Hierarchy of Needs, they can be categorized into behavioral levels (Table 5). There is a phenomenon that someone activity can belong to different levels of the hierarchy.

The activities of physical fitness (walking, running, dancing, shadowboxing, playing gateball, doing yoga, playing table tennis, playing badminton, playing tennis, doing calisthenics) can be beneficial to health, can cooperate with others for win-win results, and can be regarded as goals to achieve. Therefore, activities of this kind can belong to physiological needs, esteem needs or self-actualization needs.

The activities of social interaction (using WeChat or QQ, face-to-face chatting), the activities of social service (participating in community activities, volunteering), and the activities of leisure and entertainment (watching videos, playing cards, playing chess, playing mahjong, singing operas, singing songs), these three types of activities tend to involve division of labor, cooperation, communication and interaction with others. These activities are accompanied by the transmission of emotions between individuals, which is essential for activities’ sustainability. Therefore, these three types of activities can belong to social needs or esteem needs.

Additionally, achievements in areas such as playing chess, singing songs, singing operas can also fall under the category of self-actualization needs.

The activities of learning and cultural (writing calligraphy, painting, doing embroideries, gardening, reading, collecting stamps) are more inclined to self-supplement and improvement, accompanied by personal interests and innovations, which can be regarded as goals to achieve. Therefore, activities of this kind can belong to self-realization needs.

Table 5. Hierarchy of behavioral levels for each activity.

Hierarchy of needs	specific activities
Physiological needs	walking, running, dancing, shadowboxing, playing gateball, doing yoga, playing table tennis, playing badminton, playing tennis, doing calisthenics
Security needs	/
Social needs	watching videos, playing cards, playing chess, playing mahjong, singing operas, singing songs, using WeChat or QQ, face-to-face chatting, participating in community activities, volunteering
Esteem needs	watching videos, playing cards, playing chess, playing mahjong, singing operas, singing songs, using WeChat or QQ, face-to-face chatting, participating in community activities, volunteering, walking, running, dancing, shadowboxing, playing gateball, doing yoga, playing table tennis, playing badminton, playing tennis, doing calisthenics
Self-actualization needs	writing calligraphy, painting, doing embroideries, gardening, reading, collecting stamps, walking, running, dancing, shadowboxing, playing gateball, doing yoga, playing table tennis, playing badminton, playing tennis, doing calisthenics, playing chess, singing songs, singing operas

According to the analysis of hierarchy of behavioral needs, the behavioral needs of the low-age elders are spread across many levels of Maslow's hierarchy of needs, but most of them are concentrated in higher levels such as social needs, esteem needs and self-realization needs.

5. Functional Design of Elderly Activity Center of Urban Community

According to the analysis results of the hierarchy of behavioral needs, the specific activities can be transformed and deduced into functional spaces of the building (Table 6).

These functional spaces, including the calligraphy and painting room, embroidery room, horticulture room, reading room, exhibition room, cinema room, chess and card room, mahjong room, vocal studio, body room, psychological counseling room, community activity room, volunteer room, can be placed indoors as the core spaces of the building, while the playground, gateball field, table tennis field, badminton field, tennis field can be located outdoors as sports fields.

Table 6. Summary of functional spaces be deduced from activities.

Specific activities	The corresponding functional space	What role does each architectural functional space play?
Writing calligraphy, painting	Calligraphy and painting room	Teaching, practicing calligraphy and pictures.
Doing embroideries	Embroidery room	Teaching, practicing embroideries.
Gardening	Horticulture room	Exhibiting bonsai and provide a comfortable environment for plants.
Reading	Reading room	Reading and learning.
Writing calligraphy, painting, doing embroideries, collecting stamps	Exhibition room	Exhibiting calligraphy, paintings, embroideries and stamp albums.
Watching videos	Cinema room	Videos for small groups.
Playing chess, playing cards	Chess and card room	Playing chess and cards (relatively quiet).
Playing mahjong	Mahjong room	Play mahjong (relatively noisy).
Singing songs, sing opera	Vocal studio	Teaching, practicing songs and operas.
Dancing, doing yoga	Body room	Teaching, practicing dance and yoga.
Using wechat or qq, face-to-face chatting	Psychological counseling room	Psychological counseling and chatting.
Participate in community activities	Community activity room	Participate in community activities.
Volunteering	Volunteer room	Servicing for volunteers' work and rest.
Walking, running, shadowboxing, doing calisthenics	Playground	Walking, running, shadowboxing, doing calisthenics.
Playing gateball	Gateball field	Playing gateball.
Playing table tennis	Table tennis field	Playing table tennis.
Playing badminton	Badminton field	Playing badminton.
Playing tennis	Tennis field	Playing tennis.

Based on the design experiences of similar buildings, it is necessary to set up ramp, steps, lobby, corridor, stairs, elevator for architectural circulation spaces. It is also essential to establish male restroom, female restroom, accessible restroom for sanitary

spaces. For outdoor areas, except the sports fields, it is necessary to create gathering square, road, parking space for outdoor circulation areas. Set up the outdoor green spaces around the building at last. [8]

To sum up, all the functional spaces are summarized and classified for the elderly activity center of urban community (Table 7).

Table 7. Functional space design of the building.

Categories of functional spaces	Specific functional spaces	Location
Core spaces	Calligraphy and painting room, embroidery room, horticulture room, reading room, exhibition room, cinema room, chess and card room, mahjong room, vocal studio, body room, psychological counseling room, community activity room, volunteer room	Indoors
Architectural circulation spaces	Ramp, steps, lobby, corridor, stairs, elevator	
Sanitary spaces	Male restroom, female restroom, accessible restroom	
Sports fields	Playground, gateball field, table tennis field, badminton field, tennis field	Outdoors
Outdoor circulation areas	Gathering square, road, parking space	
Outdoor green spaces	/	

6. Conclusions

The study employs the approach of inferring functional spaces of architecture based on people’s needs. Through research into the behavioral needs of low-age elders, it has identified the essence of these needs: the behavioral demands of low-age elders span many levels of Maslow's hierarchy of needs, but are predominantly concentrated at higher levels such as social needs, esteem needs, and self-actualization needs. Based on these behavioral needs, the final design of the functional spaces includes: core spaces, architectural circulation spaces, sanitary spaces, sports fields, outdoor circulation areas, and outdoor green spaces. This research provides a reference for the functional design of similar buildings in Kuitun City.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

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