# Practice and Exploration of Composite Space Design for Senior Citizens' Universities -- A Case Study of Park Spring Senior Citizens' University Renovation

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**Abstract.** According to the "2020 Wuhan Community Home Care Special Research Report" published by Hubei Provincial Bureau of Statistics Wu, the household population of Wuhan residents aged 60 and above is 1,942,500, and the market size of senior care services in Wuhan reaches 23.360 billion yuan. The increase in the proportion of the elderly population has contributed to the development of the elderly market, and the corresponding elderly institutions have been differentiated from the general education buildings in terms of space design to achieve the purpose of "learning and enjoyment for the elderly". In this paper, the design example of Park Spring Senior College is combined with the physiological and psychological characteristics of the elderly, and the three aspects of content, characteristics and composite are designed comprehensively, in order to provide some reference for similar units.

**Keywords:** University for the Aging, composite space, design strategy.

## 1. Introduction

At present, society's concern for the elderly is mainly focused on the housing needs of the elderly, but the psychological and cultural needs of the elderly have not been given enough attention, so how to build a senior college architectural space that meets the psychological needs of the elderly has become the focus of this paper's research. Through the analysis of the composition of the mental life of the elderly in China's cities and towns, it is proposed that mental health education for the elderly is an effective way to address the psychological needs of the elderly, promote their individual development, and facilitate their continued socialization. With the increasing aging of China's population, the size, scale and function of China's senior universities cannot meet the needs of their mental health education. Therefore, it is imperative to conduct research on the design of university spaces for the elderly.

## 2. Analysis of the composition of spiritual activities of urban elderly groups

Spiritual culture has an impact on the mental health of older adults, as well as on their physical and mental health. According to the data from the "Wuhan Community Home Care Special Study Report 2020", the elderly's daily life time can be divided into four parts. The first is the physiological time, viz. 34.54% of the day, or 497.4 minutes; second is continuous work, 33.6 minutes of the day, or 2.33% of the whole day; third is leisure, 721.2 minutes, or 49.99% of the total working hours of the day; fourth is household time, 13.2% of the total time, or 190.2 minutes. In short, retired seniors in urban areas have a considerable amount of free time to devote to their spiritual and cultural lives.

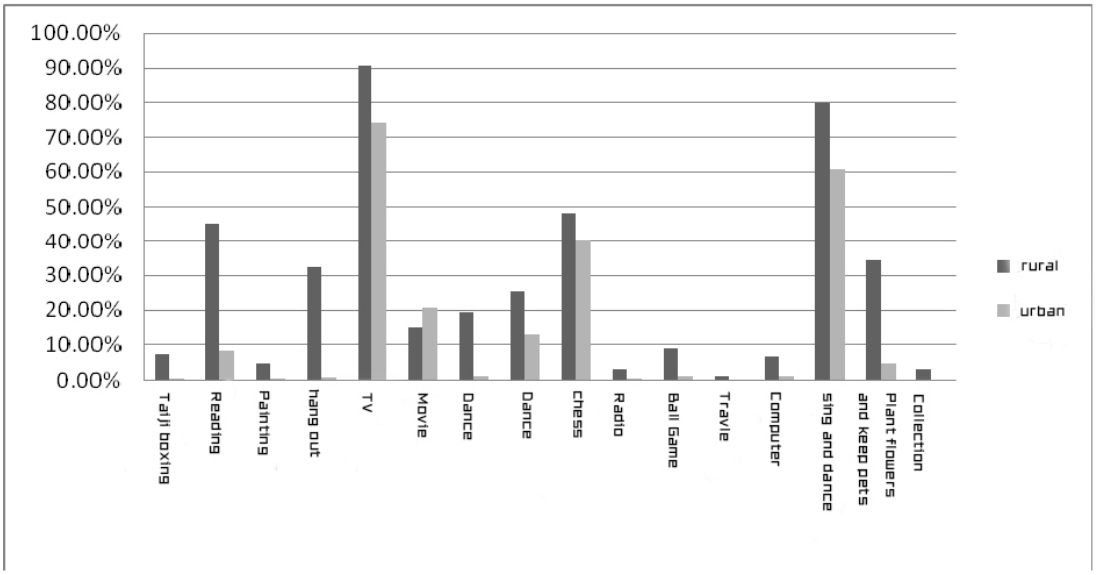


Figure 1 Activity time distribution

## 2.1 Composition of mental activities of urban elderly groups

From Figure 1, we can see that the elderly people nowadays lead a television-based lifestyle, so the negative effect of television on them cannot be ignored. According to research, the average elderly person over 60 years old, four hours and sixteen minutes a day, staring at the TV all day, lack of exercise, it is easy to induce cardiovascular disease, "three high", hemiplegia, obesity, cancer, etc.. Apart from watching TV, most of the leisure activities of the elderly are inclined to play mahjong and other entertainment items. The entertainment of the elderly is relatively single, and cultural and artistic activities such as literature, newspapers and magazines, dance, film and television, and opera are becoming more and more distant from the elderly, resulting in a serious shortage of spiritual food for the elderly and a generally low quality of leisure life. The results of many studies show that a single form of leisure not only affects the leisure effectiveness of the elderly, but also affects the life satisfaction of the elderly, and the richness of leisure activities of the retired elderly has a positive relationship with life satisfaction, and the increasing aging brings the era of leisure culture of the elderly, and leisure does not only mean a lethargic state, but also brings opportunities for self-actualization, life enrichment, fitness and spirituality to the elderly. Leisure culture can promote personal interests, such as calligraphy, painting, cooking, photography, gardening, etc. This is also more beneficial to the physical health of the elderly than television and chess moves, which not only slow down brain aging, but also help memory. Modern people have long recognized that a culture of leisure can give the elderly a sense of physical and mental stability and satisfaction, yet many of them do not have sufficient leisure concepts and skills, resulting in their "leisure but not happiness", unable to truly enjoy the leisure time after retirement.

## 2.2 Senior college education is an important way to carry the spiritual and cultural life of the elderly

Older people's universities play a very important role in the psychological and cultural life of older people, for example. We aim to cultivate students' interests, expand their leisure activity options, develop their leisure activity skills, and develop their social skills. As a result, the development and construction of senior citizen universities are receiving more and more attention from all walks of life. Xu Xingchen pointed out in his book "Exploring the design of composite spaces in senior universities" that 66% of students who studied in senior universities for more than two years made new scientific arrangements for "health activities", 78% were more regular in eating, sleeping and living; in terms of health, 66.5% of patients had less medical consultations and medication; 65% had more physical and energy growth; psychologically, 92% felt their lives were fulfilling, 90% felt they

had more happiness, 81% had more energy. In terms of health, 66.5% of patients have reduced medical visits and medication; 65% have gained physical fitness and energy; psychologically, 92% feel their lives are fulfilling, 90% feel they have more happiness, 81% have more relationships, and 90% have more friends with more people. From the above information, we can see that after entering the senior college, most of the people have positive changes in their life, physical and spiritual status, thus, senior college education becomes the main vehicle for the spiritual and mental life of the elderly.

## 3. Complexity space design related concepts

### 3.1 Compoundness space interpretation

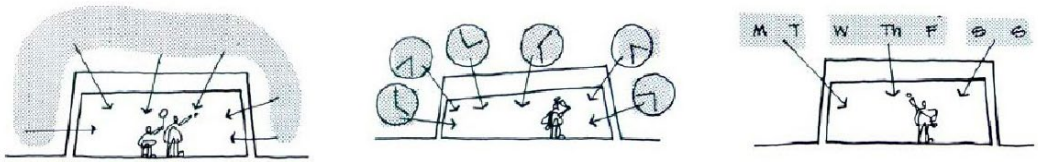


Figure 2 Composite space

Left. Multiple uses at the same time; Medium. Use at different times of the day; Right. Use on different days of the week

Source. Cong N. Study on the design of spatial multiplicity in teaching buildings of colleges and universities [D], Harbin. Harbin Institute of Technology, 2010

The composite space emphasizes the idea of multi-use of space and spatial conversion by responding to all changes. There is no essential difference between a composite space and a general space. An elastic space of any size and shape can be regarded as a composite space. Only a few special spaces, such as bathrooms and elevators, are not suitable for use as composite spaces.

For the spatial structure of this complex senior university, the authors expect to explore it from the perspective of designers and applicators.

From two aspects, the function of the space inside the building can be changed, including two internal factors.

The most basic understanding of ① is the spatial function of "elasticity". In other words, it is a form that can be used at will without any modification. The flexibility of the space function of the university for the elderly refers to a variety of activities such as learning and communication while realizing a variety of functions, so that the elderly can freely use their space according to their needs in order to adapt to the space requirements of various behavioral developments and thus be more humane.

Since the learning, interaction and leisure activities of the elderly are not as regular as those of elementary school students, the spatial design of the building must be adapted to meet the needs of various activities in today's society as well as the needs of various activities in the future in order to accommodate the "unqualified" activities.

### 3.2 Composite design of the main use room

The main room functions of the senior university are teaching, office, and administration. The teaching space can be divided into two parts: one is a general classroom for writing, literature, literary, and language courses; the second is a specialized classroom dedicated to some special places and equipment, such as art, calligraphy, dance, computers, electronic piano, and table tennis. The administrative office includes the leadership office, faculty office, finance office, and copy room. This thesis focuses on the design of the teaching site. Classrooms must be designed to meet the following conditions.

### 3.3 Natural light

Classrooms in senior colleges should be predominantly natural light, supplemented by artificial lighting. However, artificial lighting does not replace the benefits of natural light. (1) human eyes have a better ability to recognize in the natural environment, are more comfortable in the natural environment, and are less prone to visual fatigue; (2) relevant studies show that the full spectrum of solar radiation is an important factor in meeting people's physiological and psychological comfort, which helps reduce energy consumption and protect the environment; according to the International Lighting Association, about 200 billion kWh of electricity is used annually in artificial lighting According to the International Lighting Association, about 200 billion kWh of electricity is used in artificial lighting every year, and the generation of this electricity will consume one billion tons of carbon dioxide and 10 million tons of harmful gases such as sulfur dioxide, thus creating higher energy efficiency in the light environment. It can be seen that natural light plays a very important role in regulating human physiological and psychological functions, saving energy and protecting the environment. The senior college is taught from 9:00 a.m. to 4:00 p.m., when the sun is at its best and natural light is best used.

### 3.4 Floor plan should meet the elderly activity space characteristics and teaching function requirements

Classroom size, shape, and dimensions should be reasonable for teaching activities and furniture and equipment, and access to the school for elderly people in wheelchairs needs to be considered. Combined with the "Building Design Code for the Elderly" JGJ122-99 and GB50763-2012 "Accessible Design Code", the following requirements are put forward for the layout of the classrooms of the university for the elderly. 1.Determine reasonable row spacing according to different working surface sizes; 2.The angle between the front seat and the far end of the blackboard shall not be less than 30 degrees; 3.The spacing between the front of the first row of desks and the blackboard shall not be less than 2000 mm, and the spacing between the back row and the blackboard shall not exceed 8500 mm; 4.The classroom shall have a longitudinal aisle of no less than 600 mm, with each seat directly accessible from the aisle and a minimum of 800 mm of wheelchair access; 5.Dance room should have at least one up to 2100 mm illuminated mirror, other interior walls should have more than 900 mm liftable handle.

## 4. Development status and countermeasures of Park Springs Senior Academy

Through the on-site research of this case, we found many problems, and combined with the above, we adopted the "right medicine" approach to solve these problems and finally achieve harmony in view of the characteristics of the complex space of the university and the psycho-physiological characteristics of the elderly.

### 4.1 Inappropriate functional settings of educational places

The investigation of indoor teaching environment shows that the design of space function in teaching environment is very unreasonable. As can be seen in Figure 3- A, this classroom is a separate, temporary classroom made of a metal room to the left of the main building, creating a dark, confined, and poorly ventilated feeling that is likely to interfere with the students' normal learning if the weather is bad. As can be seen from Figure 3- B, the large classroom located on the second floor of the main building, although the overall space is naturally well-lit, the whole space appears too narrow due to the overcrowded position of the tables and chairs, and the width of the corridor and the spacing between the last row and the blackboard fail to meet the Accessible Design Code of GB50763-2012 of the Building Design Code for the Elderly, causing great inconvenience to the elderly students. As shown in Figure 3- C, in the cloister on the first floor of the main building, the walls are stacked with all the honors from the establishment of the school to the present. This kind of exhibition not only

destroys the beauty of the school, but also reduces the sense of accomplishment for the elderly to obtain honors and the enthusiasm of the elderly to participate in activities.

Figure 3 Current status of the university for the elderly

### 4.2 The function of the educational place is too single

In the examination of the indoor teaching environment, it was found that the function of space in the teaching environment was too homogeneous. As shown in Figures 3-a and 3-b, the teaching activities in the classroom are only limited to traditional teacher teaching, which is very single in function, and the development of other teaching activities is basically impossible, and the lack of multimedia intelligent equipment and linked teaching mode also to a certain extent gives a big discount to the quality of teaching. As shown in Figure 3-d, the performance stage of the indoor studio, the width is only about 5m, but the depth of the seating area is 39.5m, the width of this setting makes the studio only conductive function and no performance function, and for the opening of the senior college, the importance of the cultural performance is much greater than the political preaching.

## 5. Research on design renewal strategy of Baiquan University for the aged

### 5.1 Optimal spatial scale

According to the classroom floor plan design needs described earlier, it can be seen from the chart that the small classroom layout of the senior college is generally reasonable, which means that the openings in the small classrooms are of appropriate size, while the large classrooms are designed to ensure that the spacing between the trailing edge of the last row of tables and the blackboard in the classroom does not exceed 8.5 meters, which would result in a great deal of waste and too large an area per person, which indicates that the large classrooms openings are not very reasonable.

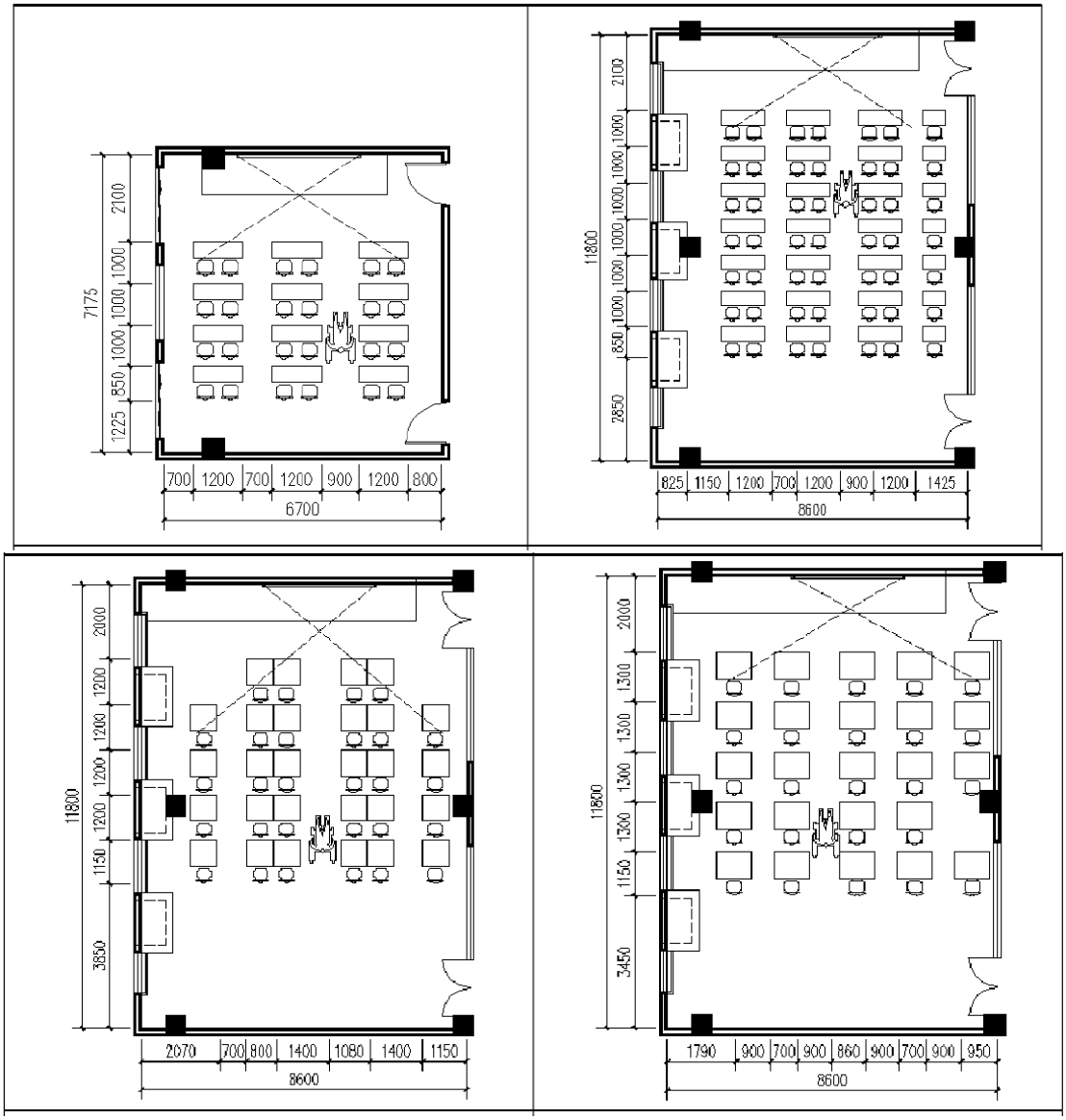


Fig. 4 Classroom plan of senior college

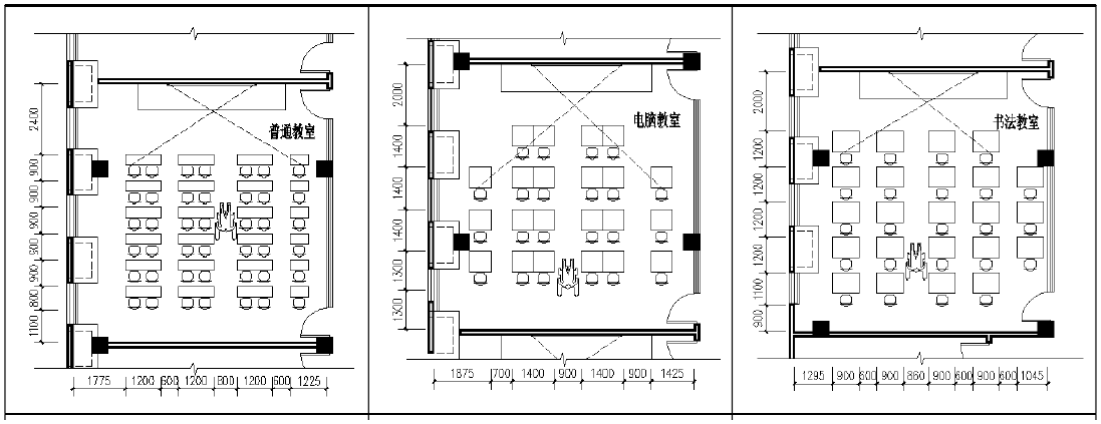


Figure 5 Optimized classroom floor plan

In order to save the use of space, reduce the open area of the large classroom and not change the column structure, the floor plan of the large classroom was optimized by dividing the original 3 classrooms into 4. Through the analysis of Figure 4 and 5, it is found that the optimized classroom area per capita is reduced by 0.26㎡ on average compared with the optimized one, the computer classroom area per capita is reduced by 0.2㎡ after optimization, and the calligraphy classroom area

per capita is reduced by 0.9㎡ after optimization, which shows that the optimized classroom floor plan is more economical and reasonable.

### 5.2 Optimize space function

With the progress of social technology, multimedia equipment gradually into people's production and lifestyle, the function of many spaces has begun to change in diversity, on the basis of the original began to fall out of other functions. For example, in this case, the author divided part of the original theater space into a performing arts area (Figure 6), where the elderly can learn vocal music, rehearse performances, and at the same time when the need to rehearse dance can also be folded up, the whole space will become a spacious dance hall, while in the layout of space, we will be placed in the side of the dance hall, when the studio performance activities, it will become a backstage area. When there is a performance in the studio, it will be transformed into a backstage area. For the renovation of the studio (Figure 7), our design focuses on reconstructing the spatial scale of the performance area and the viewing area, giving the performance area its original function of performing arts, and becoming a composite space integrating performance, preaching and exhibition.

Temporary classrooms, such as the temporary classrooms at Park Springs Senior College examined above, are not supposed to be present, and the classrooms in the main building are not rich enough in functionality, firstly, in the initial design plan, composite interaction spaces are used throughout the classroom design. The author positioned the overall color of the classroom in line with the aesthetics of the elderly in the warm colors of the original wood (Figure 8), the function of a classroom in accordance with the needs of the curriculum in the use of different students arbitrary changes, while the front of the classroom are equipped with multimedia equipment, in the course of the curriculum can be added as needed to expand the curriculum, no matter what function can be carried out to meet the basic standards of the future composite space. The basic standard of the future composite space is that whatever functions can be carried out can be met.

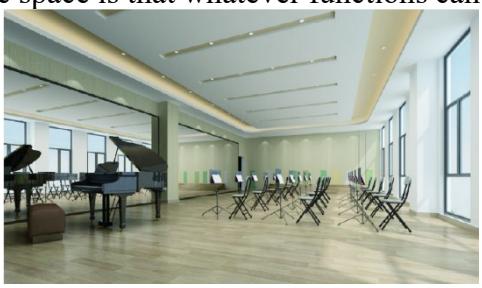

Figure 6 Performing Arts Area Design Figure 7 Studio Design

Figure 7 Classroom space design

## 6. Conclusion

With the rapid development of population aging, the concern of the community for the elderly is becoming more and more significant. While paying attention to the material needs of the elderly, the spiritual and social needs of the elderly should not be underestimated. In view of the spiritual needs of the elderly, this paper believes that the university will be an important place for the elderly to "age in spirit". At the same time, in the design practice of the university for the elderly, the author takes the problem as the guide, puts the design focus on the composite space transformation design,

combines the composite function and the scale reconstruction, tries to design the interior space that meets the functional needs of the elderly, and really achieves "old people have fun" and "old people have learning ".

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