Ecological layout and strategies in nursing home design: designing new dining spaces for the elderly in nursing homes

Zhongpu Zhou

A Thesis Submitted in Partial Fulfillment of Requirements for
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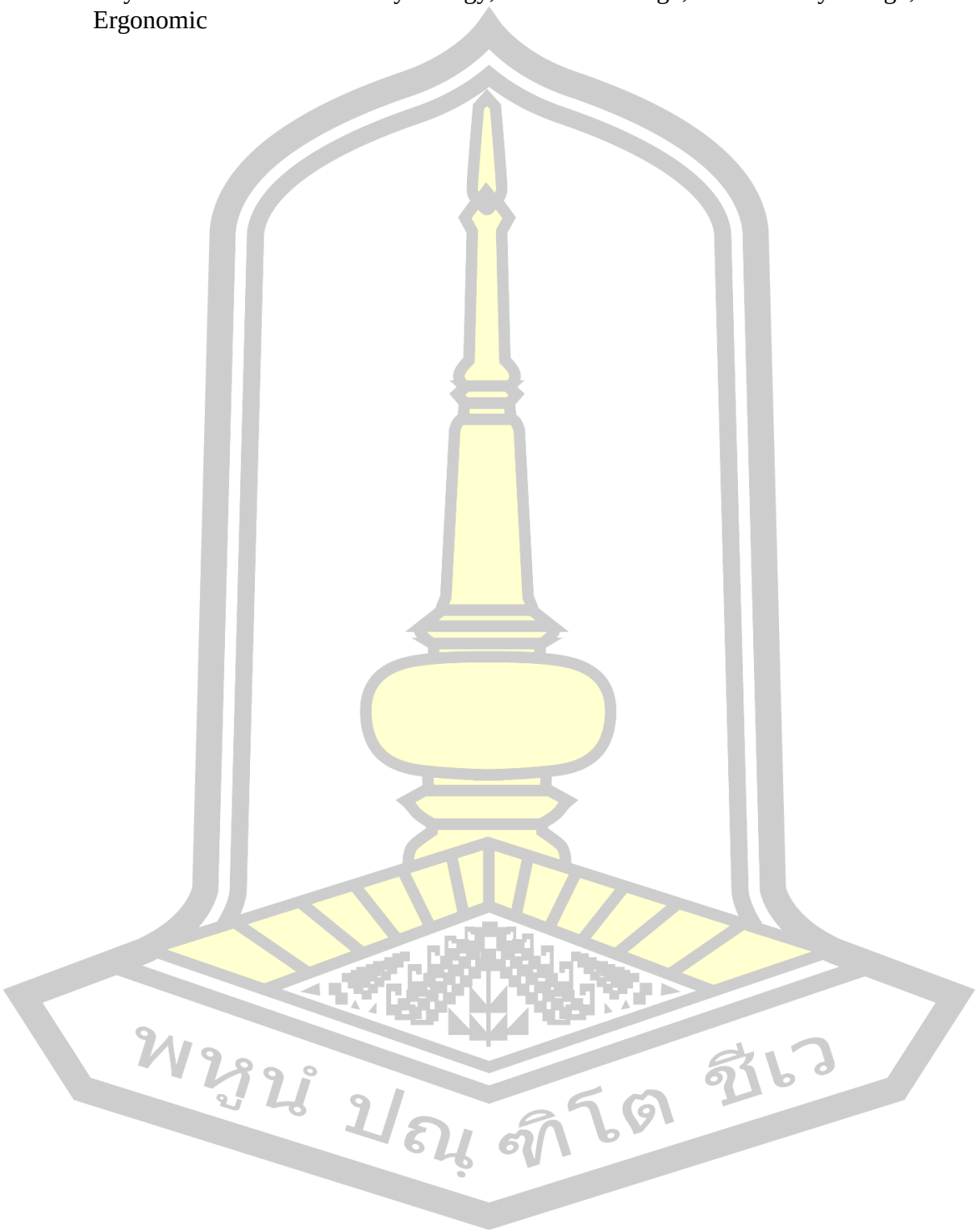
ABSTRACT

This study aims to design dining spaces in nursing homes that are suitable for elderly use. By analyzing the dietary culture of Wenzhou, the living habits and needs of the elderly, the study proposes optimized design solutions. The research is based on environmental psychology, universal design principles, and ergonomic theories, using methods such as field research, interviews, questionnaires, and spatial analysis to comprehensively understand the needs of the elderly regarding dining spaces.

In Wenzhou, the dietary culture positively affects the social and psychological health of the elderly. Designing dining spaces that incorporate local culture can enhance the quality of life and well-being of the elderly. The results show that Wenzhou's dietary culture emphasizes family and group dining, which helps enhance social interaction among the elderly, reduce loneliness, and improve psychological health.In terms of design strategies, the research recommends adopting human-centered design principles, providing various seating options, adjusting lighting and sound systems, and using easy-to-clean materials to improve the usability of nursing home dining spaces. Additionally, the design needs to be flexible in addressing natural conditions, such as using technological means (e.g., online social platforms) to compensate for the lack of face-to-face interaction under social distancing requirements, thereby maintaining social connections and emotional exchanges among the elderly.

Through an in-depth study of Wenzhou's dietary culture, combined with environmental psychology and universal design principles, this paper proposes optimized design solutions for nursing home dining spaces. These solutions not only address the physiological needs of the elderly but also focus on their psychological needs, striving to create a safe, comfortable, and culturally rich dining environment for the elderly. The research results indicate that measures such as optimizing space layout, increasing accessibility, and using eco-friendly materials can significantly improve the dining experience and quality of life for the elderly.

Keyword : Environmental Psychology, Universal Design, Accessibility Design, Ergonomic



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Zhongpu Zhou

TABLE OF CONTENTS

Page

ABSTRACT ..... D

ACKNOWLEDGEMENTS ..... F

TABLE OF CONTENTS ..... G

LIST OF TABLES ..... J

LIST OF FIGURES ..... K

Chapter I 1

Introduction 1

1.1、Background of Research 1

1.2 Research Objectives 4

1.3 Research Questions 4

1.4. Definition of Terms 4

1.5. Research Scope 4

1.6. Research Methodology 10

(1) Content Analysis Method 10

(2) Literature Review Method 10

(3) In-depth Interview Method 10

1.6.1 Population and Groups 10

1.6.2 Research Areas 13

Data Collection 13

1.6.3.Demographic analysis data 14

1. Questionnaire Survey Methods 14

2. Sample Distribution Methods 17

3. Reliability Analysis 17

4. Validity Analysis 17

5. Variable Score Analysis 19

1.6.4 Material Analysis Data 23
1.6.5 Color Analysis Data.....23
1.6.6.Movement Line Analysis Data 23
Data Sample 23
1.6.7.Ergonomics Analysis Data 23
Data Sample 23
1.6.8. Nursing Home Dining Space Analysis Data 25
Data Analysis 25
1.7、Concept, Theory and Conceptual framework.....27
1.8. Chapter Structure 30
1.9 Benefits of Research 31
Chapter II.....33
Literature related to nursing home design and nursing home dining space design 33
2.1 Design features of nursing home dining space 33
2.2 The development and evolution demands of elderly care spaces.....37
2.3 Combining the design of senior care space with environmental psychology....41
2.4 Ergonomic principles for the design of catering spaces in nursing homes.....43
2.5 Conclusion 46
Chapter III.....50
Design Data Analysis.....50
3.1 The combination of nursing home dining space design and Yueqing food culture 50
3.2 Combination of Elderly Care Facility Dining Space Design and Barrier-Free Design.....52
3.3 Integration of Elderly Care Facility Dining Space Design and Environmental Psychology 56
3.4 Emotion Template Design Based on Data.....59
3.4.1 Emotion Template Design Based on Cultural Aspects 59
3.5 Marketing Data and Consumer Behavior demand analysis.....64
3.6 Conclusion 67

3.7 Application of cultural design elements 69
Chapter IV 74
Design and application of catering space in nursing homes under modern background 74
4.1 Flat concept design 74
- Users (elderly residents) 82
4.4 Final model based on survey recommendations 86
4.5 Customer Satisfaction Survey.....122
4.6 Conclusion 124
Chapter V 126
Conclusion 126
5.1 Summary.....126
REFERENCES 2
References.....3
Questionnaires and data analysis 6
Questionnaire design 11
Sample Distribution 15
Reliability analysis.....16
Validity Analysis 19
Analysis of variable scores 22
Analysis of Variance.....23
BIOGRAPHY 33

LIST OF TABLES

Page

Table 1 Researchers and data 21
Table 2 Summary table of consumer behavior demand research 64
Table 3Spatial rationality survey data 83
Table 4 Feasibility survey data 84
Table 5 Comfort survey data 84
Table 6 Color Satisfaction data 84
Table 7 Post-design comprehensive satisfaction survey summary table 124
Table 8 SPSS Questionnaire result data 127
Table 9 SPSS Analysis of variable scores 131
Table 10 SPSS Analysis of Variance 134
Table 11 SPSS Analysis of Variance Results 139

LIST OF FIGURES

Page

Figure 1 Concept, Theory and....28

Figure 2 China Nursing Home Construction Code....37

Figure 3 Ergonomic principles for catering in nursing homes....43

Figure 4 Ergonomic principles for catering in nursing homes....45

Figure 5 Yueqing traditional family dinner....50

Figure 6 Yueqing traditional dinner party....51

Figure 7 Traditional ancestor worship in Yueqing....51

Figure 8 Folk colors in traditional culture....56

Figure 9 Emotion Template Design Based on Cultural Aspects....59

Figure 10 Emotion Template Design Based on Cultural Aspects....60

Figure 11 Emotion Template Design Based on Cultural Aspect materials based on cultural aspects....61

Figure 12 Emotion Template Design Based on Cultural Aspect Light based on cultural aspects....61

Figure 13 Emotion Template Design Based on Cultural Aspect color based on cultural aspects....62

Figure 14 Emotion Template Design Based on Cultural....63

Figure 15 Questionnaire analysis chart....65

Figure 16 Design element analysis and graphic extraction (mountain elements)....69

Figure 17 Design element analysis and graphic extraction (“wapai“processing elements)....70

Figure 18 Design element analysis and graphic extraction (behavioral movement line analysis)....71

Figure 19 Design element analysis and graphic extraction (behavioral movement line analysis)....72

Figure 20 Design element analysis and graphic extraction (furniture and soft decoration)....72

Figure 21 Design element analysis and graphic extraction (Display)....73

Figure 22 floor plan.....74
Figure 23 Functional analysis chart 74
Figure 24 Functional analysis chart 75
Figure 25 Schematic analysis.....78
Figure 26 Schematic analysis.....78
Figure 27 Schematic analysis.....79
Figure 28 Schematic analysis.....79
Figure 29 Schematic analysis.....80
Figure 30 Schematic analysis.....80
Figure 31Schematic analysis.....81
Figure 32 Satisfaction assessment.....82
Figure 33 Design renderings (front door) 86
Figure 34 Final renderings of the Lobby 87
Figure 35 Final renderings of the Multifunctional roadshow area.....88
Figure 36 Final renderings of the Afternoon tea area 89
Figure 37 Final renderings of the Afternoon tea area 89
Figure 38 Final renderings of the Afternoon tea area 90
Figure 39 First floor floor plan 91
Figure 40 Lighting positioning and layout diagram.....92
Figure 41 Facade construction drawings 94
Figure 42 Elevation construction drawing (furniture dimensions) 95
Figure 43 Elevation construction drawing (furniture dimensions) 95
Figure 44 Facade construction drawings 96
Figure 45 Facade construction drawings 97
Figure 46 Elevation construction drawing (restroom dimensions).....99
Figure 47 Facade construction drawings 100
Figure 48 Process node proofing diagram 101
Figure 49 Final renderings of theelevator 102
Figure 50 Final renderings of reception.....103

Figure 51 Final renderings of the Dining area 104
Figure 52 Final renderings of the Dining area 105
Figure 53 Final renderings of the Dining area 106
Figure 54 Plane analysis diagram 107
Figure 55 Facade construction drawings（Public area） 108
Figure 56 Facade construction drawings（Lamp placement and location） 110
Figure 57 Facade construction drawings（Lamp placement and location） 111
Figure 58 construction drawing (restroom dimensions) 112
Figure 59 construction drawing (restroom dimensions) 113
Figure 60 Furniture construction technology and node drawings.....113
Figure 61 Final renderings of the Dining area 116
Figure 62 Final renderings of the Aisle room area 116
Figure 63 Final renderings of the Dining area 117
Figure 64 Final renderings of the Dining area 117
Figure 65 Material list.....119
Figure 66 Furniture soft furnishing material list.....120
Figure 67 Decorative painting series 121
Figure 68 Expand installation products 122
Figure 69Analytical data system from IBM SPSS 141

Chapter I

Introduction

1.1、Background of Research

1.1.1 Characteristics of Wenzho's catering culture

In regions like Wenzhou, dining is not only a process of nutritional intake but also an important platform for cultural inheritance and social interaction. The clan-based lifestyle and dining culture deeply influence the daily lives of local residents. As one of the most crucial aspects of social interaction and daily life in China, dining is vividly manifested in Wenzhou. Various dining rituals are brought about by different festivals, behaviors, and purposes of dining. Therefore, the design of nursing home dining spaces should fully consider these cultural characteristics and social functions to promote social interaction and cultural sharing among the elderly. This design could consider incorporating dining elements and decorations characteristic of the Wenzhou region, creating an environment that is both familiar and comfortable, allowing the elderly to feel the warmth and sense of belonging of home.Moreover, this project is located in Yueqing County, Wenzhou City, Zhejiang Province. Wenzhou, located in the southeast of Zhejiang Province and adjacent to the East China Sea, is a county-level city under the jurisdiction of Wenzhou City. Yueqing, situated on the southern wing of the Yangtze River Delta Economic Zone, boasts a unique geographical location and rich cultural background, forming its distinctive advantages as a retirement destination.

But Current Situation Despite such advantageous geographical conditions, many nursing homes have not fully utilized these natural benefits in their design. For instance, some dining spaces in nursing homes are enclosed, lacking natural light and scenic views, making it impossible for the elderly to enjoy the mental and physical pleasure that nature brings during meals. Moreover, insufficient indoor greenery affects air quality and visual appeal, thus impacting the overall dining experience and health of the elderly.

So As Design Solution: This study suggests that the design of dining spaces in nursing homes should fully leverage Yueqing's geographical advantages. For example, large windows can be incorporated to bring in ample natural light and allow the elderly to enjoy external natural scenery while dining. Additionally, indoor green walls or small indoor gardens can be arranged to improve air quality and enhance visual aesthetics. An open layout can also promote air circulation, creating a comfortable and natural dining environment. Furthermore, outdoor dining areas can be set up so that the elderly can enjoy the pleasure of outdoor dining when the weather is good.

1.1.2 Geographical advantages of Wenzhou Yueqing

1. Mild Maritime Climate: Yueqing has a subtropical monsoon climate, characterized by distinct seasons, abundant rainfall, and a mild and humid climate. These climatic conditions are very beneficial for the health of the elderly, especially those suffering from respiratory diseases, rheumatism, and other age-related ailments, as the mild climate can alleviate symptoms and improve the quality of life.

2. Beautiful Natural Environment: Yueqing is endowed with rich natural landscapes, such as the National Wetland Park and Yandang Mountain Scenic Area, providing a beautiful and comfortable retirement environment for the elderly. The fresh air and stunning scenery are extremely beneficial to the physical and mental health of the elderly.

3. Convenient Transportation Network: Although Yueqing maintains a relatively tranquil living environment, its transportation network is well-developed, with convenient connections to nearby major cities through Wenzhou Airport, highways, and railways. This provides convenient travel conditions for the elderly and facilitates visits from children and relatives.

The Current Situation Although Yueqing has excellent natural conditions, many nursing homes do not fully utilize these geographical advantages to design dining spaces that meet the health needs of the elderly. For example, some nursing homes have enclosed dining spaces that lack natural light and scenic views, preventing the elderly from enjoying the mental and physical benefits of nature during meals. Additionally, the lack of indoor greenery negatively affects air quality and visual aesthetics, impacting the overall dining experience and health of the elderly.

So as the design solution is suggested that the design of dining spaces in nursing homes should incorporate large windows to bring in natural light and provide views of the outdoors. Setting up indoor gardens or green walls can create a dining environment filled with natural elements. This not only improves the psychological health of the elderly but also enhances the overall dining experience through visual and olfactory pleasures. Through these design strategies, the research aims to improve the dining experience and overall quality of life for the elderly in nursing homes. By combining local cultural elements with modern design principles, the study not only addresses the physiological needs of the elderly but also focuses on their psychological well-being, ultimately creating a safe, comfortable, and culturally rich dining environment. This approach ensures that the dining spaces in nursing homes are not just places to eat but are integral to the residents' social and cultural lives, enhancing their happiness and sense of belonging.

1.1.3 Cultural advantages of Wenzhou Yueqing

（1）Deep-rooted Family Values and Community Culture: Yueqing retains a profound traditional culture, especially the close-knit family values and community relationships, providing a warm social environment for the elderly. In such a cultural context, the elderly can enjoy family care and community support, which is crucial for improving their life satisfaction and psychological health.

（2）Rich Folk Arts and Festival Activities: Yueqing is rich in folk arts, such as Yueqing shadow puppetry, folk dances, and various traditional festivals. These cultural activities not only enrich the spiritual and cultural life of the elderly but also provide opportunities for social participation and cultural inheritance.

（3）Healthy Dietary Culture: Yueqing boasts an abundance of seafood and mountain produce, forming a unique local cuisine. A healthy and diverse diet not only meets the taste preferences of the elderly but also helps maintain good physical health.

As the Current Situation Currently, many nursing homes fail to consider the dietary habits and cultural needs of the elderly in their dining space designs. For instance, many dining areas use single or small tables, lacking the atmosphere of

family-style dining, which can make the elderly feel lonely during meals. Additionally, traditional festival foods are often absent in nursing homes, depriving the elderly of familiar tastes and cultural ambiance during festive times.

So the Design Solution is recommended to incorporate elements of Yueqing's dietary culture into the design of dining spaces in nursing homes. For example, designing family-style round dining tables can simulate the atmosphere of traditional family gatherings, encouraging interaction and communication among the elderly. An open kitchen can allow the elderly to watch the food preparation process, increasing transparency and interaction during meals. During festivals, traditional festive foods can be provided, along with related cultural activities such as making zongzi or mooncakes, allowing the elderly to enjoy delicious food and experience the rich festive atmosphere.

1.2 Research Objectives

This study has three main research objectives:

1. To study the spatial interaction characteristics of local food consumption in Wenzhou's culinary culture.
2. To investigate the dining habits and requirements of the elderly in Wenzhou, focusing on how they use dining areas in different ways.
3. To design dining areas in nursing homes that align with local dietary preferences. The design should be suitable for both physical and psychological use.

1.3 Research Questions

3.1 What types of dietary culture influence the dining habits of the elderly in nursing homes?

- This includes the reflection of social interaction and psychological health in nursing homes, clan-style living habits, and dining rituals within the dining environment of nursing homes.

3.2 What are the current environmental conditions and situations in nursing homes?

3.3 What design strategies can effectively improve the dining environment in nursing homes to better meet the needs and expectations of the elderly?

- This involves seeking innovative design solutions, including spatial layout, lighting, acoustics, and furniture selection, to promote social interaction, cultural participation, and healthy eating among the elderly.

1.4. Definition of Terms

1.4.1 Environmental Psychology:

Definition: A discipline that studies the interactions between humans and their surrounding environments, particularly how the environment affects human behavior, emotions, and cognition.

1.4.2 Universal Design/Accessibility Design:

Definition: The design of spaces and products for use by all people, including those with disabilities or mobility impairments, in a safer manner.

1.4.3 Ergonomics:

Definition: The study of how to design work environments and tools to fit the physical and psychological characteristics of humans, enhancing efficiency and comfort.

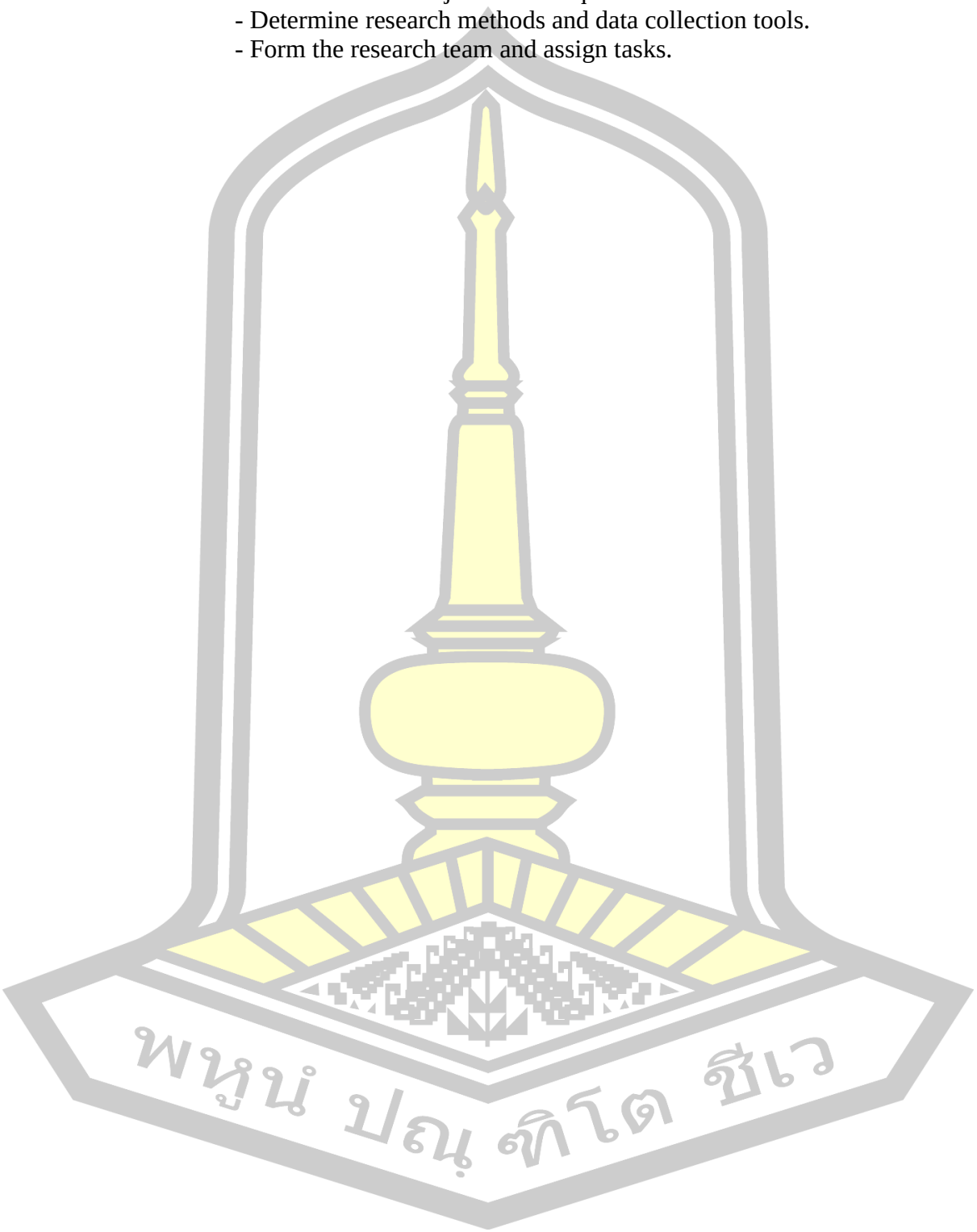
1.5. Research Scope

1.5.1 Research Area:

1. Application of environmental psychology in the dining environments of nursing homes.
2. How universal design/accessibility design influences the layout and behavior patterns of spaces. The importance of accessibility design determines the safety, standardization, and rationality of space layout.
3. The role of ergonomics in space design and how ergonomics can be well integrated into different dining groups.

1.5.2 Time:

1. Week 1 to Week 2: Project Initiation and Preparation
    - Define research objectives and questions.
    - Determine research methods and data collection tools.
    - Form the research team and assign tasks.



2. Week 3 to Week 4: Literature Review
   - Collect and review relevant academic literature and existing research findings.
   - Establish the theoretical framework and hypotheses for the study.

3. Week 5 to Week 6: Preliminary Data Collection
   - Begin field surveys, interviews, or questionnaires.
   - Collect initial data and information.
4. Week 7 to Week 8: Data Analysis
   - Conduct preliminary analysis of the collected data.
   - Identify major trends and patterns.
5. Week 9 to Week 10: Report Writing
   - Write the research report based on the data analysis results.
   - Develop preliminary design suggestions and strategies.
6. Week 11: Review and Revision
   - Review the research report and make necessary revisions.
   - Ensure the accuracy and completeness of the report.

7. Week 12: Publication and Dissemination
   - Publish the research report.

1.5.3 Another

This study aims to optimize dining spaces in Yueqing nursing homes by integrating modern design principles with traditional cultural elements, enhancing the dining experience for elderly residents and addressing their physiological and psychological needs. The research focuses on creating multifunctional dining environments that cater to the diverse needs of modern elderly care, including accessibility, comfort, social interaction, and cultural enrichment. By concentrating on these aspects, the study seeks to design dining spaces that showcase the beauty and cultural significance of Yueqing traditions while providing practical solutions for contemporary living.

The primary focus is on developing multifunctional dining areas that serve various purposes, adapting to different dining activities such as daily meals, special events, and social gatherings. The design will incorporate features that facilitate ease of movement for elderly individuals, including wheelchair-accessible tables and chairs, non-slip flooring, and adjustable seating options. Additionally, incorporating traditional Yueqing embroidery patterns or motifs into the upholstery or decorative elements will create a culturally enriched environment that resonates with the residents' heritage.

Ergonomics and accessibility are crucial components of the dining space design. The study will explore how to make dining areas comfortable and safe for elderly residents, selecting furniture that supports proper posture and reduces physical strain, ensuring all areas are easily navigable for those with mobility issues. Tables and chairs will be designed to accommodate various needs, with features such as adjustable heights, cushioned seats, and sturdy armrests. The layout will prioritize clear, unobstructed pathways to prevent accidents and enhance the overall dining experience.

Lighting plays a significant role in creating a welcoming and comfortable dining environment. The research will investigate the use of both natural and artificial lighting

to enhance the ambiance of the dining spaces. Natural light will be maximized through large windows and skylights, while artificial lighting will be strategically placed to eliminate harsh shadows and glare. Warm, soft lighting will be used to create a cozy atmosphere that encourages relaxation and social interaction. Additionally, the use of traditional Yueqing lanterns or light fixtures with cultural motifs can add a touch of local heritage to the setting.

Integrating Yueqing's rich cultural heritage into the dining space design is a key aspect of this research. This includes using traditional materials, colors, and patterns that reflect the local culture. For example, dining tables could feature intricate wood carvings inspired by Yueqing architecture, while walls could be adorned with artworks depicting local landscapes or historical scenes. The inclusion of cultural elements not only enhances the aesthetic appeal of the dining spaces but also fosters a sense of familiarity and belonging among the residents.

One of the main objectives of the dining space design is to promote social interaction and community building among the elderly residents. The layout will include communal tables and seating arrangements that encourage conversation and group activities. Additionally, the research will explore how to create spaces for cultural events, such as traditional music performances or craft workshops, which can be held in the dining area. These activities will provide opportunities for residents to engage with each other and their cultural heritage, enhancing their social well-being.

The choice of materials is crucial for both the functionality and sustainability of the dining spaces. The research will prioritize materials that are durable, easy to clean, and environmentally friendly. For instance, tables and chairs could be made from sustainably sourced wood, while non-toxic paints and finishes will be used to ensure a safe dining environment. The study will explore the use of recycled and upcycled materials to minimize the environmental impact of the design. The integration of sustainable practices supports environmental goals and creates a healthier living space for the residents.

Incorporating modern technology into the dining spaces can enhance the dining experience and provide additional support for the elderly. The study will explore the use of technologies such as automated lighting and climate control systems, which can be easily adjusted to suit the residents' preferences. Additionally, the inclusion of interactive screens or tablets at dining tables can provide entertainment and cognitive stimulation for the residents and facilitate communication with family members and caregivers.

The research methodology will include a combination of field studies, interviews, surveys, and literature reviews to gather comprehensive data on the needs and preferences of elderly residents in Yueqing nursing homes. Field studies will involve observing current dining space layouts and usage patterns, while interviews and surveys will collect feedback from residents, caregivers, and family members. Literature reviews will provide insights into best practices and design principles for elderly care facilities. This multi-faceted approach will ensure that the design solutions are well-informed and effectively address the unique requirements of the elderly population.

By carefully defining the design scope and focusing on multifunctional dining spaces, this research aims to demonstrate the potential for integrating Yueqing's cultural heritage into contemporary nursing home environments. The goal is to create dining spaces that not only meet the practical needs of elderly residents but also enhance their quality of life through culturally enriched and thoughtfully designed environments. This approach respects and preserves local traditions and contributes to the overall well-being and happiness of the residents, making Yueqing nursing homes a model for culturally sensitive and innovative elder care.

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1.6. Research Methodology

This study is a qualitative research on basic research, aiming to find academic answers. The following three main research methods are adopted:

(1) Content Analysis Method

Content analysis encompasses various methods for studying the content of spaces and does not have a unified operational procedure. It requires an in-depth understanding of different contents, facilitating the extraction of hidden meanings. It is often used to "unlock" the content of spaces. Through content analysis, the logic behind spatial construction and the connection between traditional dining culture and modern dining behavior can be better understood, allowing for the characteristics of different spaces and usage scenarios to be grasped. This serves as a reference for further exploration and inheritance of culture and spatial methods. In this study, content analysis is also used to identify the themes, emotional tendencies, and symbols used in discussions about nursing home dining spaces on internet platforms.

(2) Literature Review Method

The literature review method mainly involves collecting, organizing, analyzing, and evaluating relevant literature to explore the cultural background, development process, current status, and issues of the research subject.

(3) In-depth Interview Method

In-depth interviews are a qualitative research method that allows participants to freely express their views, feelings, and experiences through an open and flexible dialogue format. By interviewing users, the study aims to understand how they design spaces, how they understand and interpret the lives and behavior habits of the elderly, etc. This study primarily analyzes and researches users, their families, managers, caregivers, and service personnel.

1.6.1 Population and Groups

This study aims to comprehensively understand the functional requirements and design optimization of dining environments in nursing homes. By analyzing the actual needs of elderly people aged 65-90 and combining the professional opinions of elder care experts and innovative ideas of designers, the study proposes suggestions for improving the design of nursing homes.

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Elderly Population: Citizens of the People's Republic of China aged 65 and above, with a focus on those aged 90 and above.

Research Subjects:

（1） Elderly population: Aged 65-90, including healthy elderly individuals and those requiring special care.

（2）Elder care experts: Professionals in the elder care industry, such as caregivers, nursing home managers, and medical experts.

（3） Designers: Architects and interior designers focused on creating spaces suitable for the elderly.

This study targets the following sample groups, considering the project positioning and the requirements of private nursing home owners. We focus on the sample group of people aged 65-90, including the elderly, independent elderly individuals, assisted living residents, and recipients of home care services.

Summary of Overall Sample Analysis Objectives:

Population:

1. Elderly residents of nursing homes in Wenzhou - as the primary research subjects, they directly benefit from improvements in dining space design.

2. Nursing home management and caregiving staff - they have deep insights into the daily needs of the elderly and can provide insights into the operation and management of dining services.

3. Designers and architects - professionals involved in designing nursing homes or similar public spaces can provide professional design advice and case analyses.

4. Family members and visitors - frequently visiting family members and visitors can provide external perspectives through their observations and feedback on improving dining spaces.

Sample:

1. Randomly sampled elderly individuals in nursing homes - selected through random methods from various nursing homes for surveys or interviews.

2. Nursing home management and caregiving teams - representative managers and caregivers selected for in-depth interviews to understand their evaluations and improvement suggestions for existing dining services.

3. Experienced designers and architects - designers and architects who have participated in public space design projects are invited for interviews through professional associations or networks.

4. Sample group of family members and visitors - family members and visitors are randomly invited to participate in short-term surveys during their visits to nursing homes.

1.6.2 Research Areas

Primary research area: Dining spaces for elderly individuals in nursing homes.

Data Collection

To comprehensively study the design of dining spaces in nursing homes, the following simulation data analyses are conducted:

- Demographic analysis

- Material analysis

- Color analysis

- Movement line analysis

- Ergonomics analysis

- Nursing home dining space analysis

1.6.3.Demographic analysis data

1. Questionnaire Survey Methods

With the increasing aging population, nursing homes have become important living spaces for the elderly, where the environment design significantly impacts their quality of life and mental health. Among these, the dining area serves not only to meet the daily dietary needs of the elderly but also as a crucial space for their social activities and cultural life. Therefore, evaluating the satisfaction with the environmental design of nursing home dining areas is essential for enhancing the quality of services in nursing homes and improving the living experience of the elderly.

This study focuses on the multidimensional characteristics of the environmental design of nursing home dining areas. It constructs a satisfaction evaluation index system based on eight dimensions: spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomic design, and cultural integration. Through an in-depth analysis and quantitative assessment of each dimension, we aim to comprehensively and objectively reflect the elderly's subjective feelings and satisfaction with the environmental design of dining areas in nursing homes.

Firstly, spatial circulation is a key factor affecting the convenience and comfort of elderly people using the dining area. A reasonable entrance location, smooth internal circulation, complete accessibility design, and scientific functional zoning can effectively reduce the walking distance for the elderly, improve space utilization efficiency, and meet their diverse activity needs. Considering the physiological characteristics and behavioral habits of the elderly, the spatial layout of the dining area should be simple, clear, and easy to identify, avoiding overly complex or confusing designs.

Secondly, the feasibility of dining area design directly relates to the operation management and service quality of nursing homes. The design should fully consider the actual needs of nursing homes, the characteristics of the elderly, and the convenience for staff services. By segmenting different elderly groups, personalized and diverse dining environments and service content can be provided. Additionally, flexibility is an important indicator of design feasibility. As time progresses and needs change, the dining environment should have the capacity for adjustments to adapt to the dynamic development of nursing home operations.

Thirdly, comfort is a core element that affects the dining experience and emotional satisfaction of the elderly. Good lighting, fresh air quality, appropriate temperature and

humidity, and low noise environment can create a comfortable and pleasant dining atmosphere, reducing environmental stress and enhancing the mental and physical well-being of the elderly. Humanized seat design, reasonable table height, and accessible washing facilities are indispensable elements for creating a comfortable dining environment.

Color, as an important component of visual design, plays a unique role in shaping the dining atmosphere and guiding the emotions of the elderly. Reasonable color matching not only creates a good dining environment but also meets the aesthetic needs and psychological expectations of the elderly. According to color psychology theories, warm tones and low saturation colors should be prioritized to create a warm and soothing visual effect. Additionally, colors can be used to distinguish different functional areas, such as dining areas and leisure areas, enhancing space identification and interest.

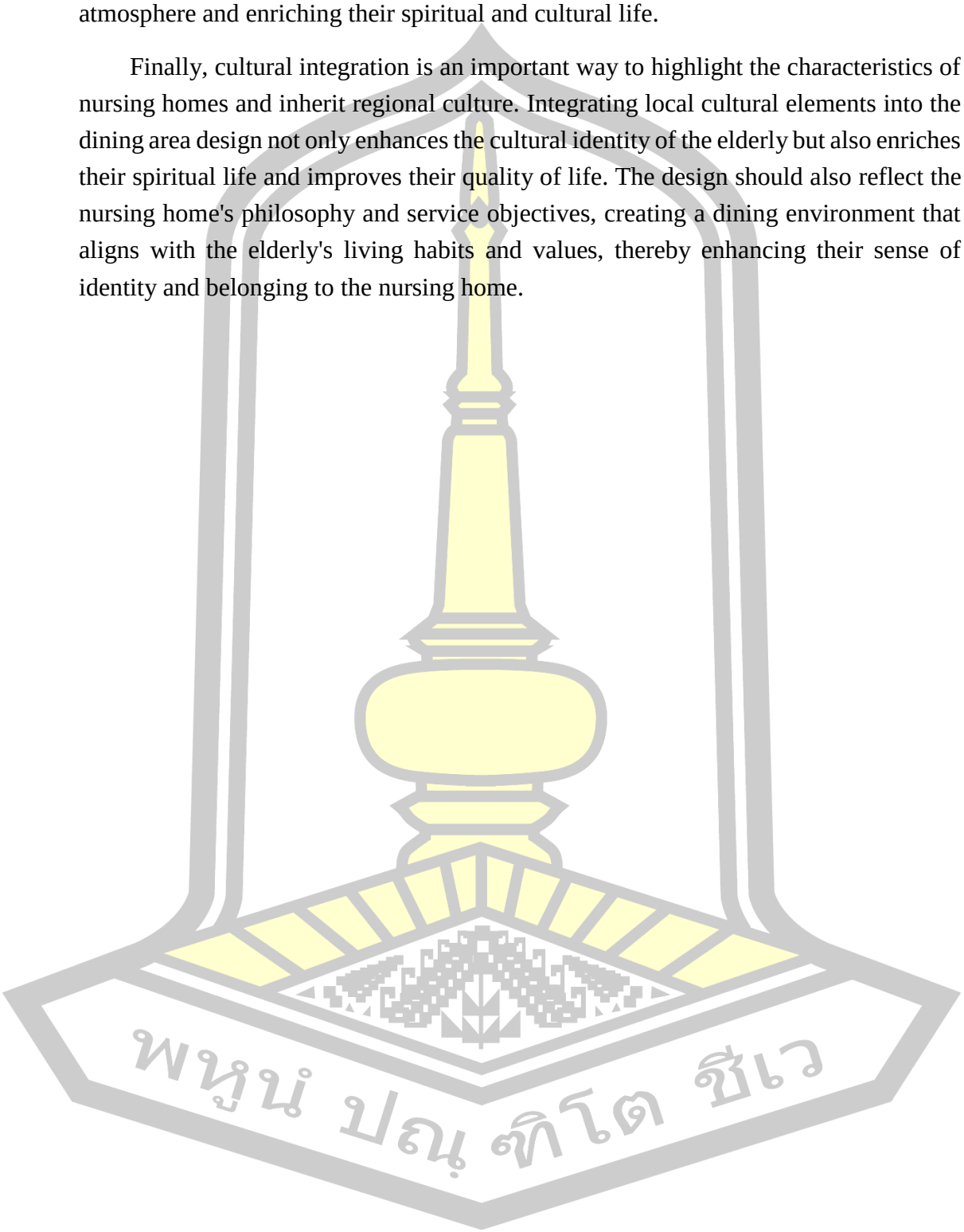
Safety is the primary principle and basic requirement of nursing home dining area design. Anti-slip and wear-resistant flooring materials, safe furniture design with rounded edges, complete fire safety facilities, and space layouts that consider the behavioral characteristics of the elderly are key measures to ensure their dining safety. The design should also consider the sensory and response capabilities of the elderly, providing intuitive and easy-to-read safety instructions and operational tips to minimize the risk of accidents.

The concept of environmental protection is a significant development direction in contemporary architectural design and applies to the environmental design of nursing home dining areas as well. Using environmentally friendly building materials, selecting energy-saving and environmentally friendly equipment, and creating natural and comfortable lighting and ventilation effects not only protect the physical and mental health of the elderly but also reduce energy consumption and achieve sustainable development. Waste classification and resource recycling in the dining area are also important measures to practice environmental protection concepts and enhance the elderly's environmental awareness.

Ergonomic design is the core essence of the environmental design of nursing home dining areas, reflecting care and respect for the elderly. By deeply studying the physiological and psychological characteristics of the elderly, personalized and diverse dining services and environments can be provided. Creating a warm and comfortable dining environment with a family-like atmosphere meets the emotional needs of the elderly and enhances their sense of belonging and happiness. The design should also

encourage interaction and communication among the elderly, fostering a good social atmosphere and enriching their spiritual and cultural life.

Finally, cultural integration is an important way to highlight the characteristics of nursing homes and inherit regional culture. Integrating local cultural elements into the dining area design not only enhances the cultural identity of the elderly but also enriches their spiritual life and improves their quality of life. The design should also reflect the nursing home's philosophy and service objectives, creating a dining environment that aligns with the elderly's living habits and values, thereby enhancing their sense of identity and belonging to the nursing home.



The satisfaction evaluation of the environmental design of nursing home dining areas is a complex systematic project involving multiple dimensions such as spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomic design, and cultural integration. This study constructs a multidimensional evaluation index system to comprehensively and objectively reflect the subjective feelings and satisfaction of the elderly with the environmental design of dining areas in nursing homes. At the same time, this study provides theoretical references and practical guidelines for the environmental design of nursing home dining areas, aiming to enhance the quality of services in nursing homes, create comfortable, safe, and dignified living environments, and effectively increase the elderly's sense of gain, happiness, and safety.

2. Sample Distribution Methods

To comprehensively understand the satisfaction evaluation of different groups regarding the environmental design of nursing home dining areas, this study adopts stratified sampling. Various stakeholders in nursing homes, including employers, residents (elderly groups), family members, management staff, healthcare personnel, architects, fire safety inspectors, and elderly care experts, are selected as survey subjects.

3. Reliability Analysis

Reliability analysis is an important method to evaluate the consistency and reliability of survey results. This study uses Cronbach's alpha coefficient to test the internal consistency of the satisfaction survey questionnaire for the environmental design of nursing home dining areas, ensuring the stability and reproducibility of the survey results. By conducting reliability analysis on eight dimensions—spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomic design, and cultural integration—we comprehensively evaluate the overall reliability and internal consistency of the questionnaire.

4. Validity Analysis

To explore the potential dimensional structure of satisfaction with the environmental design of nursing home dining areas, this study employs exploratory factor analysis. Principal component analysis is used to extract factors, and the Kaiser normalization varimax method is applied to rotate the factors to obtain a simpler and more interpretable factor structure.

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5. Variable Score Analysis

To comprehensively understand the satisfaction levels of elderly residents with various aspects of the dining area design, this study conducts an in-depth analysis of the satisfaction variables' scores. By calculating the mean and standard deviation of each dimension and item, we can analyze the satisfaction levels of the elderly with different design elements of the dining area, providing important references for optimizing design schemes and enhancing dining experiences.

序号	评估内容	评分标准	评分/Score	备注/Remarks
1	餐厅整体布局与空间分配/Overall Layout and Space Allocation	1—5分/1-5 points		
2	环境氛围（色彩、装饰）/Environmental Ambiance (Color, Decor)	1—5分/1-5 points		
3	灯光设计（自然光/人工光使用）/Lighting Design (Use of Natural/Artificial Light)	1—5分/1-5 points		
4	噪音水平/Noise Level	1—5分/1-5 points		
5	餐椅舒适度/Comfort of Dining Chairs	1—5分/1-5 points		
6	餐桌高度和尺寸/Dining Table Height and Size	1—5分/1-5 points		
7	无障碍设计的适应性（如轮椅可达性）/Adaptability of Accessible Design (e.g., Wheelchair Accessibility)	1—5分/1-5 points		
8	餐饮服务流程效率/Efficiency of Service Flow	1—5分/1-5 points		

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Data Sample

名称 Name	选项option	频数 Frequency	百分比（%) Percent	累积百分比（%) Cumulative percent
身份 identity	雇主employer	19	7.69	7.69
	住户（老年群体）Households(elderlygroup)	44	17.81	25.51
	家属family members	28	11.34	36.84
	管理服务者Management service provider	24	9.72	46.56
	医护人员medical staff	34	13.77	60.32
	建筑设计师Architectural designer	50	20.24	80.57
	消防审核员fire auditor	20	8.10	88.66
	养老类专家Elderly Care Expert	28	11.34	100.00
年龄 Age	18-30岁 years old	54	21.86	21.86
	31-45岁 years old	57	23.08	44.94
	46-60岁 years old	51	20.65	65.59
	60岁以上 years old	85	34.41	100.00
合计		247	100.0	100.0

Table 1 Researchers and data

Distribution of Respondents

Architects have the highest proportion among the respondents, accounting for 20.24%. This is related to their professionalism and sensitivity towards the design of dining environments. The second-largest group is the residents (elderly group), making up 17.81%. As the direct users and experiencers of the dining environment, the elderly's evaluations are crucial for design optimization. Medical staff and elderly care experts each account for 13.77% and 11.34%, respectively. Their professional perspectives on the dining environment can provide targeted improvement suggestions. Family members also account for 11.34%, representing the needs and expectations of the elderly's families. Management staff, fire safety inspectors, and employers have relatively lower proportions, at 9.72%, 8.10%, and 7.69% respectively, but their influence on the operation management, safety assurance, and investment decisions of the dining area is significant.

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Age Distribution

Respondents aged 60 and above have the highest proportion at 34.41%, which aligns with the characteristic of nursing homes primarily serving the elderly. Respondents aged 31-45 and 18-30 account for 23.08% and 21.86%, respectively. They are mostly staff or service providers in nursing homes, with different demands and expectations for the dining environment. Respondents aged 46-60 have a relatively lower proportion at 20.65%, but their evaluations are important for the long-term development of the nursing homes.

1.6.4 Material Analysis Data

Data Sample

Furniture Material: Tables made of oak, chairs with antislip plastic seats, easy to clean. Utensils Material: Lightweight stainless steel, antibacterial plastic handles.

Flooring Material: Antislip PVC flooring, reducing fall risk, easy for wheelchair movement.

1.6.5 Color Analysis Data

Data Sample

Main Tones: Warm beige and light blue, creating a relaxed and pleasant dining environment. Accent Colors: Light yellow and green, adding vitality to the space.

Lighting Color Temperature: Warm lighting (2700K3000K).

1.6.6.Movement Line Analysis Data

Data Sample

Main Corridor Width: At least 1.2 meters, ensuring easy passage for wheelchairs and walkers.

Buffet Layout: Ushaped layout with ample space in the middle for easy access by residents with mobility issues.

Emergency Exits: Direct access to the outdoors, designed for accessibility.

1.6.7.Ergonomics Analysis Data

Data Sample

Table Height: Standard height of 75cm, suitable for wheelchair use.

Chair Height: Chair height of 45cm, facilitating easy sitting and standing.

Handrails and Supports: Handrails installed in corridors and bathrooms at a height of 90cm.

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1.6.8. Nursing Home Dining Space Analysis Data

Data Sample

Seating Capacity: Accommodates 100 people, ensuring ample dining space.
Private Spaces: Several small compartments for family dining.
Visual Openness: Large windows for natural light and expansive views.

1. Care Home Type: Urban, Number of Residents: 142, Number of Rooms: 25, Average Room Area (sqm): 16, Public Area Area (sqm): 409, Average Age: 70, Main Material: Metal, Main Color: Cool, Circulation Rationality Score: 7, Ergonomics Adaptability Score: 7, Dining Space Area (sqm): 110.

2. Care Home Type: Urban, Number of Residents: 109, Number of Rooms: 64, Average Room Area (sqm): 17, Public Area Area (sqm): 491, Average Age: 71, Main Material: Stone, Main Color: Warm, Circulation Rationality Score: 9, Ergonomics Adaptability Score: 4, Dining Space Area (sqm): 149.

3. Care Home Type: Rural, Number of Residents: 97, Number of Rooms: 54, Average Room Area (sqm): 15, Public Area Area (sqm): 460, Average Age: 85, Main Material: Plastic, Main Color: Warm, Circulation Rationality Score: 8, Ergonomics Adaptability Score: 5, Dining Space Area (sqm): 69.

4. Care Home Type: Rural, Number of Residents: 51, Number of Rooms: 63, Average Room Area (sqm): 18, Public Area Area (sqm): 359, Average Age: 80, Main Material: Plastic, Main Color: Cool, Circulation Rationality Score: 6, Ergonomics Adaptability Score: 9, Dining Space Area (sqm): 52.

5. Care Home Type: Urban, Number of Residents: 50, Number of Rooms: 45, Average Room Area (sqm): 21, Public Area Area (sqm): 382, Average Age: 79, Main Material: Metal, Main Color: Warm, Circulation Rationality Score: 8, Ergonomics Adaptability Score: 10, Dining Space Area (sqm): 54.

Data Analysis

Analysis of Extended Simulation Data on Elderly Care Home Space Design
Analysis:

- Dining Space Area: Urban care homes generally have larger dining spaces than rural ones, likely due to a higher number of residents.
- Population Sample Analysis: With an average age range of 75-78 years, considerations for accessibility and safety in space design become crucial.
- Material Usage: Urban care homes tend to use plastics and wood, while rural homes may use more wood and metal, possibly reflecting sustainability and environmental adaptability concerns.
- Lighting Color: Urban care homes prefer warm lighting, whereas rural homes opt for cooler tones, which may be related to residents' comfort and mental health.
- Furniture Type: There is a variation in furniture choices between urban and rural care homes, possibly reflecting different aesthetic and functional needs.

These data provide a framework for considering various aspects of space design in elderly care homes. In practice, a deeper analysis would be needed, taking into account specific situations and the actual needs of the residents."To conduct data analysis for the spatial design of nursing homes, we can combine theories and practical

cases from academic literature, as well as use simulated data. This process can be divided into several steps:

Using Python for data processing and analysis, including, but not limited to:
Space Utilization Rate: Calculate the frequency and duration of use of different areas.
Residential Comfort: Estimate comfort levels based on the number of residents and space size.

Functional Area Distribution: Analyze the proportion and distribution efficiency of public and private areas.

1.6.9. Results Visualization

Use charts and graphics to display the results of data analysis, such as bar charts, pie charts.

1.6.10 Conclusions and Recommendations

Based on the results of the data analysis, we can propose optimization suggestions for the spatial design of nursing homes, such as increasing the area of public activity spaces and improving the layout of private spaces.

Through the analysis of simulated data, we can gain the following insights into the spatial design of nursing homes:

Frequency of Use Differences: The frequency of use of public areas in urban nursing homes (70% and 65%) is significantly higher than that in rural nursing homes (50% and 45%), which may reflect a higher demand for public spaces by residents of urban nursing homes.Number of Residents and Space Size: The number of residents and the area of private spaces in urban nursing homes are generally larger than those in rural nursing homes, indicating a need for better spatial planning in urban nursing homes to ensure residential comfort.Proportion of Public and Private Areas: The use of public and private areas in rural nursing homes is more balanced (50% to 50% and 45% to 55%), while urban nursing homes tend to use public areas more. This may indicate that residents in rural nursing homes prefer spending time in private areas.

1.7、Concept, Theory and Conceptual framework

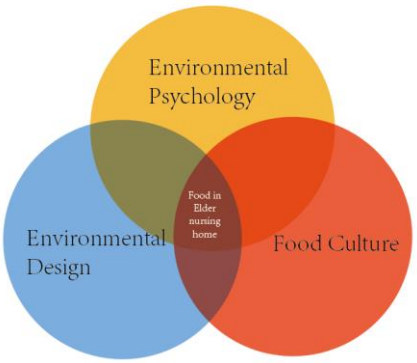
Theoretical Concepts

1. Environmental Psychology: Studies how the environment affects people's behavior and psychological state. In the design of dining spaces in nursing homes, it considers how space influences the emotions, social interactions, and dining experiences of the elderly.

2. Universal Design Principles: Designs should meet the needs of all people, regardless of age, ability, or other factors. This includes accessibility, usability, and comfort.

3. Ergonomics: Studies the relationship between people and the objects and environments they use. In dining space design, it considers the physical limitations of the elderly, such as mobility issues and hand dexterity.

Research Framework



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Conceptual framework

This presents a conceptual framework that illustrates how Yueqing culture, environmental design, and environmental psychology can be applied to the dining space design of nursing homes in Yueqing. The framework encompasses several key elements that collectively contribute to the integration of cultural elements and modern design principles, aiming to enhance the quality of life and dining experience of elderly residents.

Firstly, the culture and traditions of Yueqing form the foundation of the dining space design. Yueqing's unique cultural heritage, including traditional crafts, festivals, and local cuisine, reflects its rich cultural background. These cultural aspects serve as the basis for the design and can be embodied through decorations, colors, and materials, creating a dining environment with local characteristics.

Secondly, these cultural elements undergo a transformation and adaptation process, where they are integrated into modern design elements. This transformation includes incorporating traditional Yueqing patterns, colors, and decorative styles into the dining space design, making it culturally significant and aesthetically pleasing. This ensures that the design preserves cultural essence while meeting the functional needs of modern nursing homes.

Thirdly, the target group is identified based on their lifestyle and specific needs within the nursing home. The physiological and psychological needs, social interaction, and comfort of elderly residents are critical considerations in the design. The design must ensure that dining spaces meet the dietary needs of the elderly, providing a safe, comfortable, and convenient environment.

Fourthly, principles of environmental design and environmental psychology are applied, incorporating the transformed cultural elements into the layout and decoration of the dining space. By using reasonable spatial layout, appropriate lighting, and color coordination, the design aims to enhance the psychological comfort and dining experience of the elderly. The design should not only focus on aesthetics but also consider the behavior and psychological needs of the elderly to promote their physical and mental health.

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Finally, the conceptual framework emphasizes the role of cultural capital and environmental psychology in design. By embedding Yueqing's unique cultural elements and the findings of environmental psychology into the dining space design, the framework adds cultural value to the space and enhances the quality of life for elderly residents. The design should consider the selection and use of materials to ensure safety, durability, and environmental friendliness. Additionally, the integration of cultural elements enhances the sense of belonging and happiness among the elderly.

In summary, the conceptual framework provides a systematic approach to integrating Yueqing culture, environmental design, and environmental psychology into the dining space design of nursing homes. By transforming traditional cultural elements into design components and applying them to dining spaces that meet the needs of elderly residents, this framework offers a way to combine cultural heritage and modern design, improving the dining experience and quality of life for the elderly. This approach provides a valuable perspective on achieving the fusion of culture and modern design in nursing home environments.

1. Needs Assessment: Collecting the needs and preferences of the elderly for dining spaces through interviews, surveys, and observations.

2. Spatial Analysis: Assessing the layout, size, lighting, ventilation, and decoration of the existing dining spaces.

3. User Experience Study: Understanding the actual experiences of the elderly in dining spaces through user experience diaries, focus groups, and behavioral mapping.

4. Prototype Development of Design: Developing design prototypes for dining spaces based on collected data and theoretical concepts.

5. Prototype Testing and Evaluation: Testing design prototypes in a simulated environment, collecting feedback, and making iterative improvements.

6. Implementation and Follow-up Evaluation: Implementing the final design in nursing homes and conducting follow-up evaluations to ensure the design meets the needs of the elderly.

1.8. Chapter Structure

Chapter 1: Introduction

Chapter 2: Literature Review on Nursing Home Design and Dining Space Design

Chapter 3: Design Data Analysis

Chapter 4: Application of Nursing Home Dining Space Design in a Modern Context

Chapter 5: Conclusion

1.9 Benefits of Research

In this research, the following expected results and benefits can be anticipated:
Analyze the impact of Wenzhou's food culture on the social and psychological health of the elderly:

Cultural preservation and inheritance: By studying how Wenzhou's culinary culture, clan style living habits, and dining rituals are reflected in nursing homes, it can help nursing homes design more culturally sensitive catering services. This not only helps elderly people maintain a connection with their own culture, but also promotes cultural inheritance.

Enhanced social interaction: Wenzhou's culinary culture emphasizes the importance of family and group dining. The continuation of this dining habit can enhance social interaction among residents of nursing homes, help reduce loneliness, and improve mental health.

Psychological health promotion: Through customized diets and social activities, elderly people can experience more sense of belonging and happiness, which is beneficial for their overall psychological health.

Analyze how the restaurant design of the destination nursing home aligns with local culture:

Cultural adaptability design: Integrating the culinary characteristics of Wenzhou into the design of nursing home restaurants, such as considering spatial layout and functional properties, can create an environment that meets the physiological needs of the elderly and reflects local culture.

Combining functionality and comfort: By studying how to optimize spatial layout and design to support healthy and social eating habits, nursing homes can become places where elderly people are more willing to participate in social activities.

Enhanced user experience: Carefully designed spaces not only meet functional requirements, but also increase the comfort and satisfaction of elderly users, making their daily lives more enjoyable.

Propose an improvement plan for the environmental design of the dining area in the nursing home:

Enhanced social participation: Through improved design solutions such as better communication spaces and social corners, it can promote older adults to participate in social activities more frequently and enhance their social networks.

Enhanced cultural identity and life satisfaction: Design dining environments that reflect local culture, making elderly people feel respected and reflected in their culture, thereby enhancing cultural identity and life satisfaction.

Supporting healthy eating habits: The proposed improvement plan can also support the healthy eating habits of the elderly, helping them maintain or improve their health by providing appropriate dining choices and encouraging healthy eating patterns.

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Chapter II

Literature related to nursing home design and nursing home dining space design

2.1 Design features of nursing home dining space

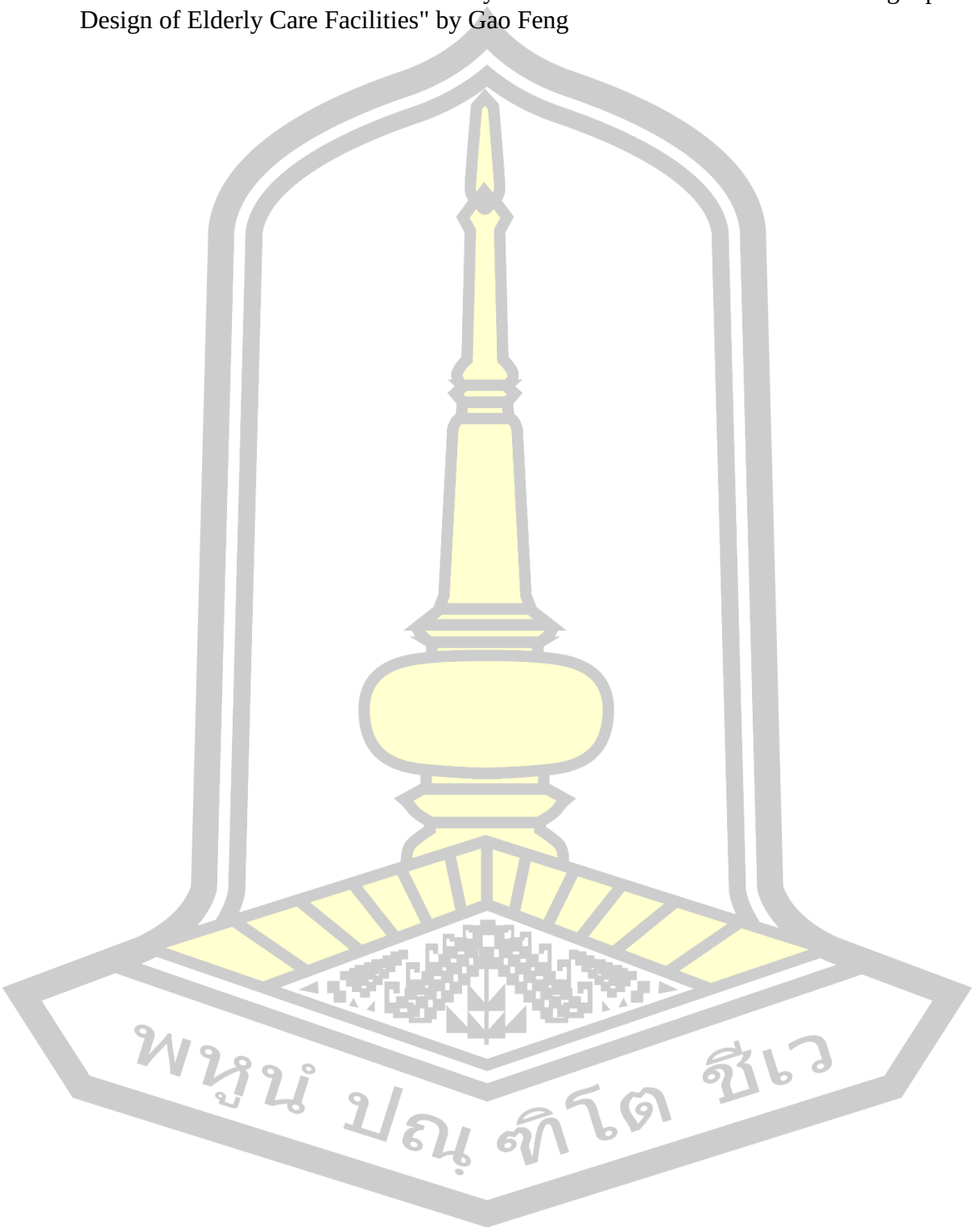
Through the collection and organization of relevant literature, it can be seen that current nursing home dining space design should focus on barrier-free facilities, ergonomic furniture, and soft lighting, use warm color tones to create a cozy atmosphere, layout conducive to interactive communication, and incorporate cultural elements to enhance a sense of belonging. The design needs to be multifunctional, easy to clean, adaptable to special needs, focus on psychological health, enhance the dining experience and quality of life for the elderly. Additionally, there is limited research from the perspectives of communication and sociology.

Discussion on the Design of Dining Space in Elderly Care Facilities by Li Ming. This literature analyzes factors such as lighting, color, furniture layout in the design of dining spaces in elderly care facilities, emphasizing the enhancement of the dining experience and psychological comfort of the elderly through optimized design. Research on the Design of Living Spaces for the Elderly by Wang Fang. The literature proposes principles for the design of living spaces for the elderly, including barrier-free design, appropriate lighting, comfortable furniture, with a special emphasis on the functional layout of dining spaces. Humanization Considerations in Elderly Care Facility Design by Zhang Wei. The article discusses humanization factors in elderly care facility design, such as a warm dining environment, convenient traffic flow, and social space settings. Application of Chinese Traditional Culture in Nursing Home Design by Chen Li. The literature explores how to integrate Chinese traditional cultural elements into nursing home design, proposing the use of traditional decorations and furniture in dining spaces to enhance the cultural identity of the elderly. Accessibility Principles in Elderly Dining Space Design by Liu Yang. The literature provides a detailed introduction to the application of accessibility design in elderly dining spaces, such as accessible pathways, non-slip floors, and ergonomic seating. The application of color psychology in the design of dining space in nursing homes" by Zhao Min analyzes the impact of color on the psychology of the elderly, suggesting that using warm and soft tones in dining spaces can enhance the dining pleasure of the elderly.

The application of age-friendly design concepts in dining spaces" by Sun Jing proposes specific methods of age-friendly design, such as using non-slip materials, adjustable height tables and chairs, and barrier-free design to enhance the safety and comfort of dining for the elderly.

A study on the functional layout of dining spaces in nursing homes" by Huang Lei discusses the functional layout of dining spaces in nursing homes, including the design of restaurant area, table and chair arrangement, and service flow line, suggesting that a reasonable layout can improve the efficiency of dining services and the dining experience of the elderly. The Aura Environment Design of Elderly Care Facility Dining Space" by Zhou Ting analyzes the impact of aura environment on elderly dining,

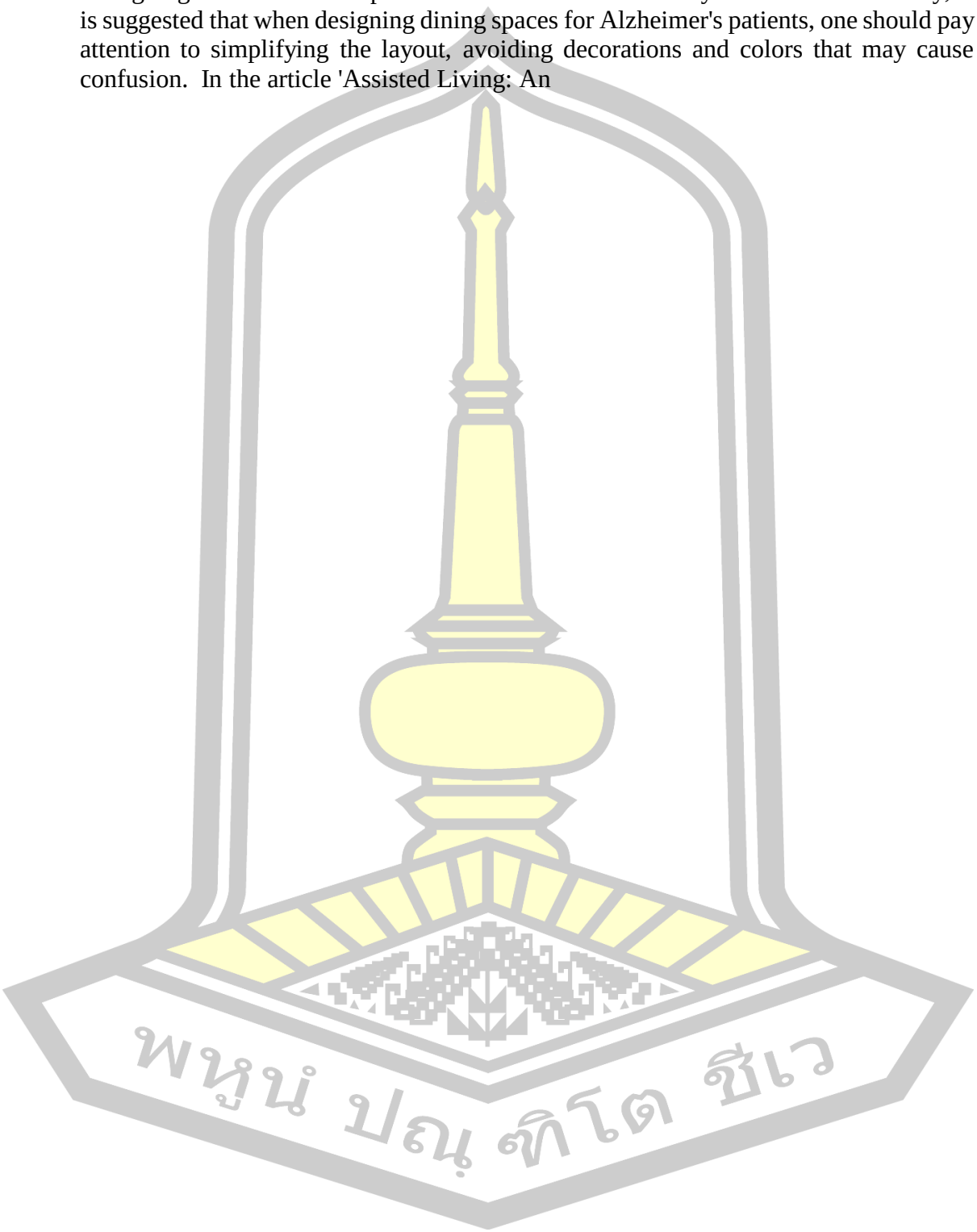
suggesting the use of natural light and appropriate artificial lighting in dining spaces to enhance visual comfort for the elderly. "Consideration of Details in Dining Space Design of Elderly Care Facilities" by Gao Feng



Starting from details, the literature suggests that attention should be paid to the height of tables and chairs, selection of tableware, and cleanliness of the environment in the design of dining spaces in elderly care facilities to ensure the safety and comfort of elderly dining. These papers provide rich theoretical and practical experience on the design of dining spaces in elderly care facilities, offering a strong reference basis for optimizing dining spaces for the elderly. For specific paragraph references, detailed reading and analysis can be done by consulting relevant literature.

In the international academic journal article 'Aging in Place: Designing, Adapting, and Enhancing the Home Environment' by Ellen D. Taira and M. C. Rowles, the importance of age-friendly design is emphasized, especially in dining spaces, where appropriate design can enhance the independence and comfort of the elderly. For example, using adjustable height tables and chairs and accessible pathways can enhance the dining experience for the elderly. "Design for Aging: Post Occupancy Evaluations" by Edward Steinfeld and Jordana Maisel This book analyzes the usage of dining spaces in elderly care facilities through post occupancy evaluations and provides design optimization recommendations. For instance, good natural lighting and appropriate color schemes can improve the psychological state and dining environment for the elderly. "Universal Design: Principles and Models" by Edward Steinfeld and Jordana Maisel This literature introduces the principles of universal design, emphasizing that all designs should meet the needs of all populations, including the elderly. In dining space design, considerations should be given to accessible design and ergonomic furniture layout. "Design for Assisted Living: Guidelines for Housing the Physically and Mentally Frail" by Victor Regnier. This literature provides guidelines for the design of assisted living facilities, particularly offering specific recommendations for dining space design for physically and mentally frail elderly individuals, such as appropriate table heights and the use of non-slip flooring materials. "Designing for Alzheimer's Disease: Strategies for Creating Better Care Environments" by Elizabeth Brawley. Addressing design strategies for Alzheimer's disease patients, the literature points out that dining spaces should avoid complex patterns and excessive decorations, using simple and clear design elements to help reduce patient confusion and anxiety. The literature discusses the concept of environmental gerontology, emphasizing the impact of the environment on the behavior and psychological state of the elderly. In dining space design, it is proposed to create an environment with a family atmosphere to enhance the sense of belonging and happiness of the elderly. The literature focuses on sustainable healthcare architecture, proposing the use of environmentally friendly materials and energy-saving equipment in the dining space of nursing homes, which can not only improve the health of the elderly but also reduce negative impacts on the environment. "The Role of the Physical Environment in Supporting Person-Centered Dining in Long-Term Care: A Comprehensive Literature Review" by Margaret L. Calkins and Lisa M. Beck Through a comprehensive literature review, the literature points out the importance of personalized dining environments, proposing design strategies including flexible spatial layouts, family-style dining areas, and interactive social spaces, aiming to enhance the dining experience and quality of life for the elderly. "Person-Centered Care for Nursing Home Residents: The Culture-Change Movement" by Paula C. Carder and Robyn Stone The literature discusses the person-centered care concept, suggesting that respect and care for the elderly should be reflected in dining

space design, encouraging social interaction and emotional communication. In the book 'Designing Interiors for People with Alzheimer's Disease' by Elizabeth C. Brawley, it is suggested that when designing dining spaces for Alzheimer's patients, one should pay attention to simplifying the layout, avoiding decorations and colors that may cause confusion. In the article 'Assisted Living: An



Insider's View' by Lori K. Panchisin, the importance of comfort and convenience in dining spaces within assisted living facilities is emphasized from an insider's perspective, along with some practical design suggestions. In the book 'Healthcare Design' by Sara Marberry, principles of healthcare facility design are introduced, with a specific discussion on how to design dining spaces suitable for the elderly in nursing homes, ensuring hygiene, safety, and comfort. "Facilities Design" by Julio M. Ottino and Stanley B. Block introduces the basic principles of facility design, suggesting that the design of dining spaces in nursing homes should consider the special needs of the elderly, such as accessible facilities and appropriate lighting design. "Evidence-Based Design for Multiple Building Types" by Sheila J. Bosch and Craig Zimring analyzes the design characteristics of different building types through empirical research methods and proposes design principles applicable to dining spaces in nursing homes. "The Green House Project: Creating Homes for People" by William H. Thomas introduces the concept of the "Green House" project, emphasizing the creation of a home-like environment in nursing home design to make the elderly feel comfortable and warm in dining spaces.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中华人民共和国国家标准 GB

P GB 50867-2013

养老设施建筑设计规范

Design code for buildings of elderly facilities

2013-09-06 发布 2014-05-01 实施

中华人民共和国住房和城乡建设部
中华人民共和国国家质量监督检验检疫总局 联合发布

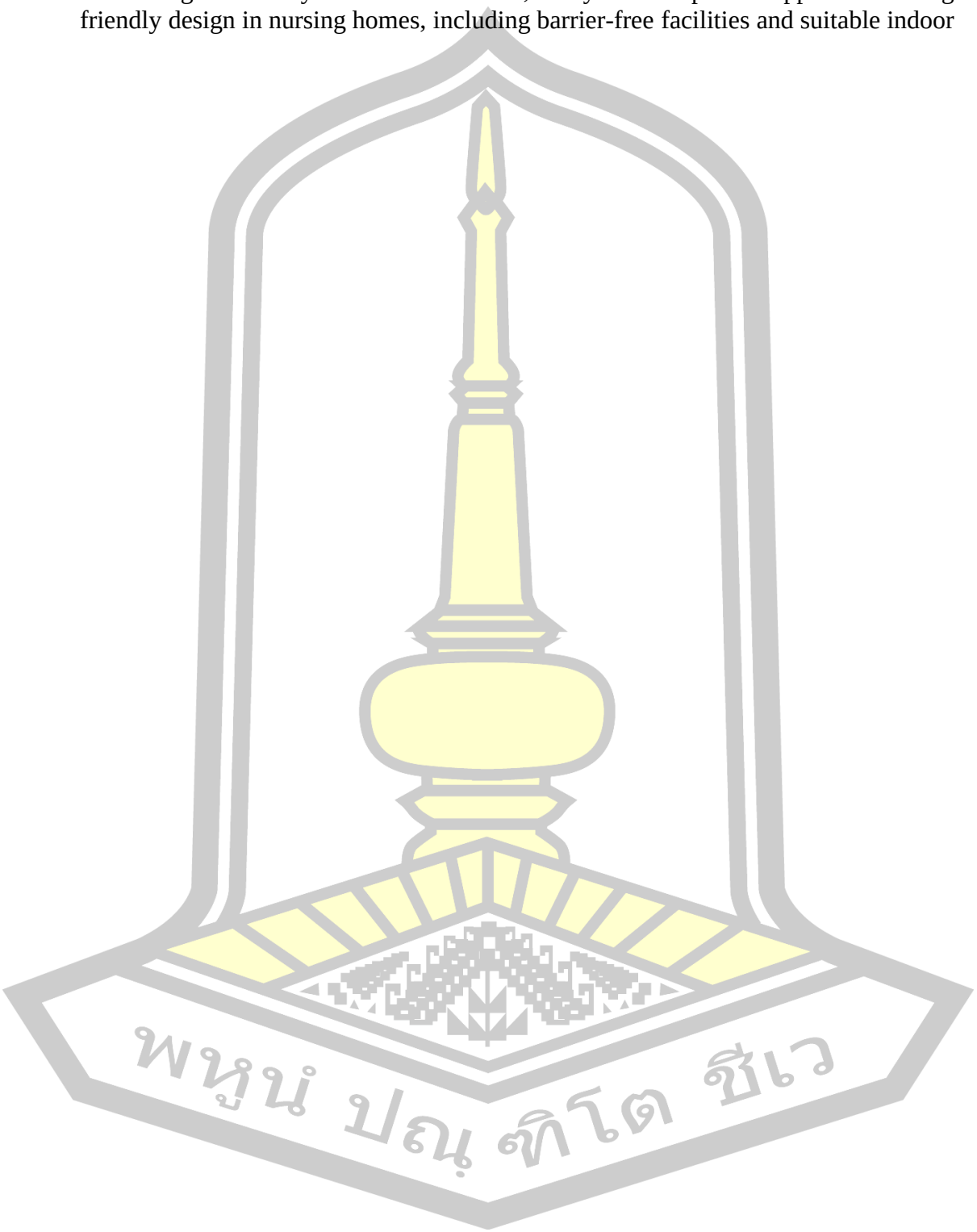
www.szelec.cc

Figure 2 China Nursing Home Construction Code

2.2 The development and evolution demands of elderly care spaces

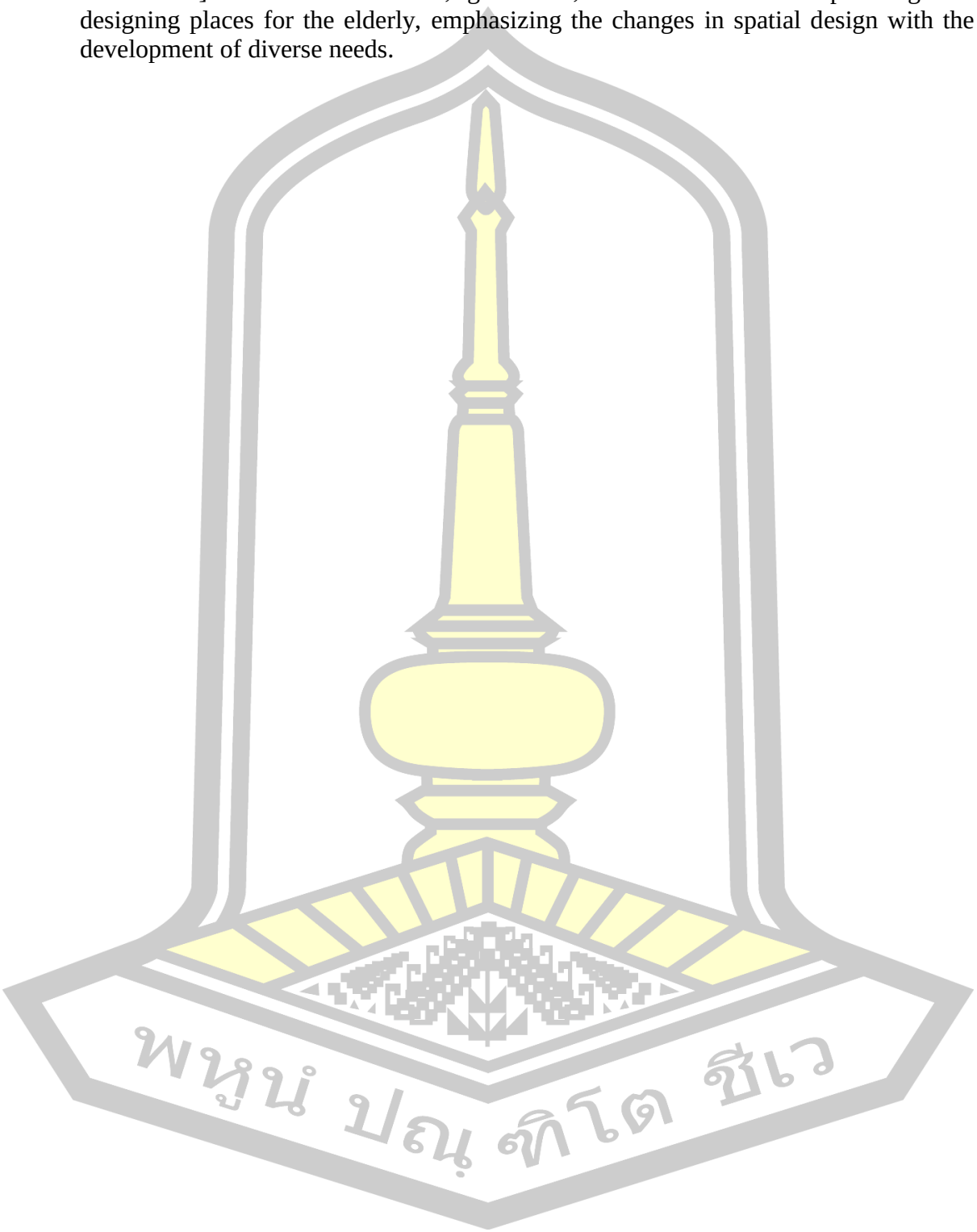
《The development and trends of elderly care space design》, Author: Li Ming 2020 This paper discusses the historical evolution and future trends of elderly care space design, emphasizing the importance of age-friendly design. 《Research on elderly care facility design based on the needs of the elderly》 Author: Wang Fang 2019 Introduction: The paper analyzes the actual needs of the elderly in nursing homes and proposes corresponding design optimization suggestions. 《The development process and modern design of elderly care facilities in China》 Author: Zhang Wei 2018 This paper reviews the development process of elderly care facilities in China and proposes improvement measures based on modern design concepts. Discussion on the Cultural Integration Design of Elderly Care Spaces by Chen Li in 2021, discusses the importance of incorporating traditional cultural elements in the design of elderly care spaces to enhance the life satisfaction of the elderly. The Application of Intelligent Technology in Elderly Care Facilities by Liu Yang in 2021, introduces examples of the application of intelligent technology in elderly care facilities, improving the quality of

life and independence of the elderly. The Application of Age-Friendly Design Concept in Nursing Homes by Zhao Min in 2020, analyzes the specific application of age-friendly design in nursing homes, including barrier-free facilities and suitable indoor



environments. The article 'Functional Requirements and Development of Elderly Care Facility Space Design' by Sun Jing in 2019 proposed the functional requirements of elderly care facility space design, including the reasonable layout of rest areas, activity areas, and medical areas. The study 'Psychological Needs of the Elderly and Design of Elderly Care Facilities' by Huang Lei in 2018 explored the psychological needs of the elderly and emphasized the importance of psychological comfort and social space in the design of elderly care facilities. The article 'Sustainable Design Strategies for Elderly Care Spaces' by Zhou Ting in 2021 discussed the application of sustainable design in elderly care spaces, including the use of green building materials and energy-saving technologies. Research on Barrier-free Design in Elderly Care Facilities by Gao Feng in 2020. The paper details the specific applications of barrier-free design in elderly care facilities, such as barrier-free pathways, non-slip floors, and wheelchair-adapted furniture. Optimization of Elderly Space Design Based on User Experience by Li Na in 2019. Through user experience surveys, the paper proposes optimization solutions for elderly space design to enhance the satisfaction of the elderly. Ecological Applications in Elderly Care Facility Design by Chen Qiang in 2018. The paper explores the application of ecological theory in the design of elderly care facilities, aiming to create a healthy and comfortable environment for the elderly. [Physica environments of assisted living: Research needs and challenges] This study explores the changing needs of consumers in elderly residential facilities, as well as the research challenges of physical and shared spaces in different elderly care environments. [Care homes: The developing ideology of a homelike place to live] The article discusses the development concept of care homes as living spaces for the elderly, and analyzes the evolution of this environment in the UK. [Placing voluntarism within evolving spaces of care in ageing rural communities] This study examines the role of volunteer services in the evolving care spaces in rural elderly communities, emphasizing the need for a deeper understanding when formulating policies on rural aging and care. [The evolution of care: a 100-year history of institutionalization of people with Alzheimer's disease] reviews the hundred-year history of care institutions for Alzheimer's patients, analyzing the changes in physical space and services as the elderly population grows. [Unveiling the evolution of eldercare facilities in rural China: Tracing the trajectory from eldercare support pattern and service to facilities for the aging population] explores the development trajectory of eldercare facilities in rural China, tracing the evolution from support patterns and services to facilities. [Knowledge Structure and Evolution of Elderly Care Services: A Visualized Analysis] through visual analysis, the article showcases the knowledge structure and evolution of elderly care services, emphasizing the rapid development of elderly care services as the elderly population grows. [The Evolution, Hotspots, and Trends in Research on Facilities of Combined Medical and Nursing Care for the Elderly] This article analyzes the current status, hotspots, and trends in research on facilities of combined medical and nursing care for the elderly, helping researchers understand the research status and development direction. [Spatialities of ageing: The co-construction and co-evolution of old age and space] This paper discusses the co-construction and co-evolution of old age and space, calling for strengthened research on the co-evolution of ageing and space in developing countries. [Historical evolution of assisted living in the United States, 1979 to the present] This article reviews the historical development of assisted living facilities in the United States since 1979, emphasizing the evolution of individual living

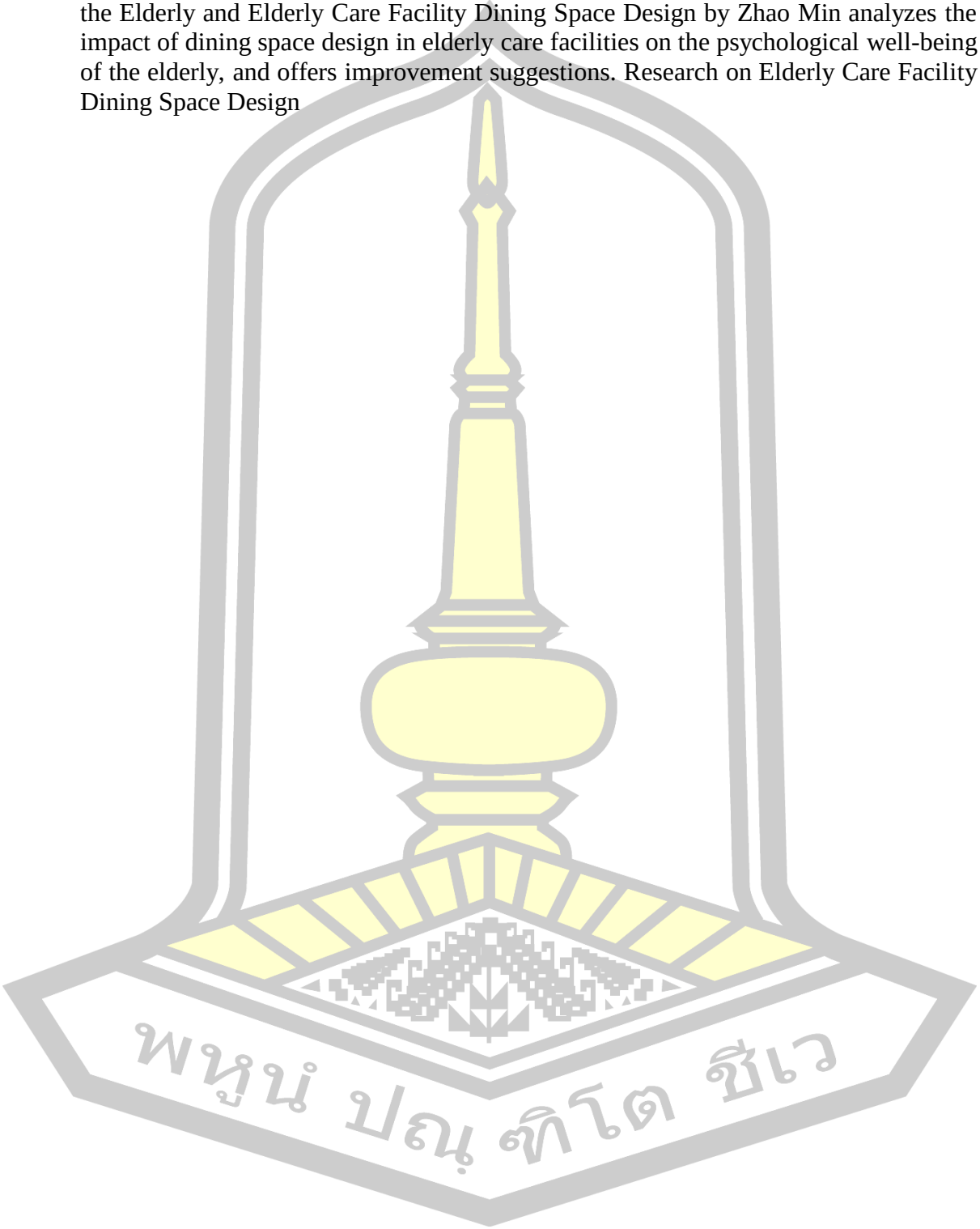
spaces and services. [Site planning and design for the elderly: Issues, guidelines, and alternatives] discusses the issues, guidelines, and alternatives for planning and designing places for the elderly, emphasizing the changes in spatial design with the development of diverse needs.



2.3 Combining the design of senior care space with environmental psychology

Study on the psychological effects of elderly care facility dining space design: Author: Li Wei discusses the impact of elderly care facility dining space design on the psychological health of the elderly, emphasizing the importance of comfort and emotional support. Optimization design of elderly care facility dining space from the perspective of environmental psychology: Author: Zhang Min optimizes the design of elderly care facility dining space through environmental psychology theory, enhancing the life satisfaction and psychological comfort of the elderly. Research on the design of dining space in nursing homes based on the needs of the elderly" Author: Wang Hua Starting from the actual needs of the elderly, design dining spaces that are more in line with their psychological and physiological characteristics to enhance the dining experience. Analysis of environmental psychology in nursing home dining spaces" Author: Zhao Ling Analyzing the application of environmental psychology in nursing home dining spaces to study the enhancement of the elderly's sense of happiness. Application of environmental psychology in the design of nursing home dining spaces" Author: Chen Liang Discussing how to effectively use environmental psychology in the design of nursing home dining spaces to enhance the psychological health of the elderly. Research on the Comfort and Psychological Health Relationship of Elderly Care Facility Dining Space by Liu Ying, exploring how the comfort of dining space affects the psychological health of the elderly and proposing design optimization suggestions. Author Sun Tao's 'Psychological Needs of the Elderly and Elderly Care Facility Dining Space Design' combines the psychological needs of the elderly and proposes a humanized design approach for elderly care facility dining spaces. Author Xu Feng's 'Elderly Care Facility Dining Space Design Based on Environmental Psychology' applies environmental psychology theories to guide the design of elderly care facility dining spaces, enhancing the quality of life for the elderly. Research on the environmental design of dining space in nursing homes and the psychological comfort of the elderly" by Yang Mei discusses the impact of environmental design on the psychological comfort of the elderly and proposes improvement solutions. The psychological foundation of dining space design in nursing homes" by Zhang Li analyzes the psychological foundation of dining space design in nursing homes and provides theoretical support for design. Design strategies for dining space in nursing homes from the perspective of environmental psychology" by Li Qiang proposes design strategies for dining space from the perspective of environmental psychology to enhance the psychological comfort of the elderly. Emotional Study on the Design of Dining Space in Elderly Care Facilities" by Zhao Feng explores the application of emotional design in the dining space of elderly care facilities to enhance the emotional satisfaction of the elderly. Study on Improving the Comfort of Dining Space in Elderly Care Facilities Based on Environmental Psychology" by Chen Gang focuses on enhancing the comfort of dining space in elderly care facilities through environmental psychology to improve the dining experience of the elderly. Consideration of Humanization in the Design of Dining Space in Elderly Care Facilities" by Wang Bin discusses the application of human-centered design in the dining space of elderly care facilities to enhance the satisfaction of the elderly. The Combination of Environmental Psychology and Elderly Care Facility Dining Space Design by Liu Lei explores the

integration of environmental psychology and design, providing suggestions for optimizing the dining space in elderly care facilities. The Psychological Well-being of the Elderly and Elderly Care Facility Dining Space Design by Zhao Min analyzes the impact of dining space design in elderly care facilities on the psychological well-being of the elderly, and offers improvement suggestions. Research on Elderly Care Facility Dining Space Design



Based on Psychological Needs by Sun Li focuses on optimizing the design of dining spaces in elderly care facilities starting from the psychological needs of the elderly. Research on the Application of Environmental Psychology in Elderly Care Facility Dining Space by Chen Wei discusses specific application cases of environmental psychology in elderly care facility dining space to enhance design quality. Psychological Impact Analysis of Elderly Care Facility Dining Space Design by Wang Hui analyzes the psychological impact of dining space design on the elderly and proposes optimized design solutions. The Role of Environmental Psychology in Elderly Care Facility Dining Space Design by Li Na explores the role and impact of environmental psychology in elderly care facility dining space design and provides design improvement suggestions.

2.4 Ergonomic principles for the design of catering spaces in nursing homes

Principles and Practices of Elderly Care Facility Dining Space Design" by Li Wei emphasizes the combination of functionality and comfort in the design of dining spaces in elderly care facilities, highlighting the importance of human-centered design to enhance the dining experience for the elderly. Elderly Care Facility Dining Space Design from the Perspective of Environmental Psychology" by Zhang Min analyzes the design of dining spaces in elderly care facilities from the perspective of environmental psychology, suggesting elements such as color, lighting, and layout to enhance the psychological comfort of the elderly. Research on Dining Space Design Based on the Needs of the Elderly" by Wang Hua studies the physiological and psychological needs of the elderly, proposing design solutions for dining spaces that are suitable for the elderly to improve satisfaction with the dining environment. "Key Elements of Elderly Care Facility Dining Space Design" by Zhao Ling.

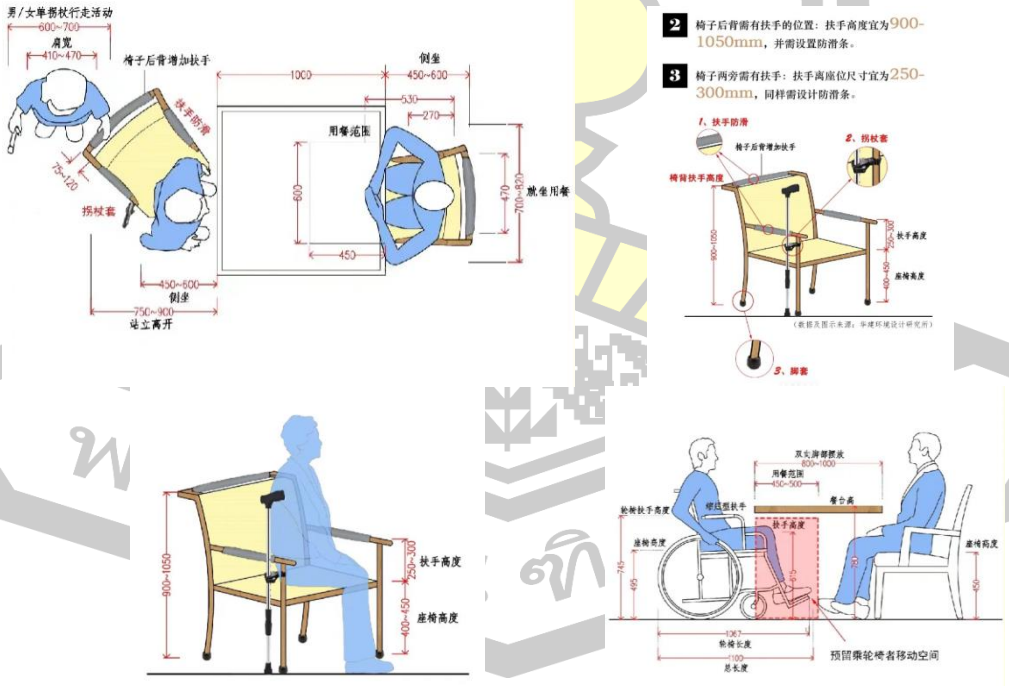
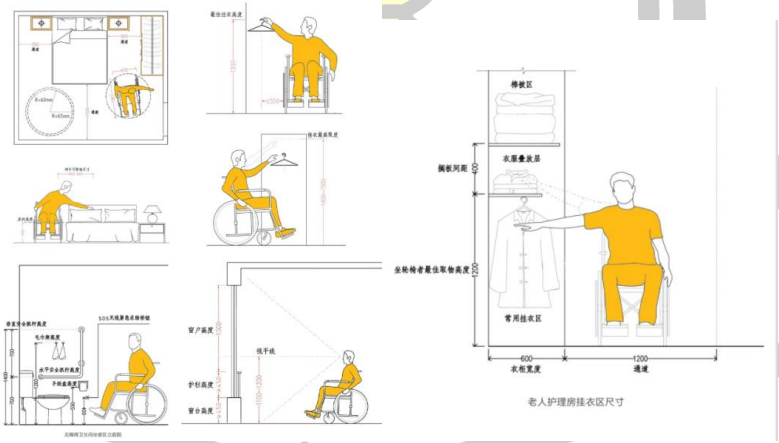


Figure 3 Ergonomic principles for catering in nursing homes

Analyzing the key elements of elderly care facility dining space design, including spatial layout, furniture selection, and decoration, providing specific design guidance. The Impact of Environmental Design on the Psychological Health of the Elderly. Author: Chen Liang explores the impact of environmental design on the psychological health of the elderly, proposing to improve the psychological state of the elderly through optimized spatial design. The Application of Comfort and Safety in Elderly Care Facility Dining Space Design. Author: Liu Ying emphasizes considering both comfort and safety in the design of elderly care facility dining spaces, ensuring the safety and comfort of the elderly during meals. The Importance of Humanized Design in Elderly Care Facility Dining Space, proposed by Sun Tao, aims to enhance the dining experience of the elderly through detailed design. Based on Environmental Psychology, Xu Feng combines theoretical principles to propose specific design strategies for elderly care facility dining spaces, aiming to improve the psychological comfort of the elderly. Exploring the Application of Color and Lighting Design in Elderly Care Facility Dining Spaces, Yang Mei's research focuses on enhancing the sense of pleasure in the space through scientific design. Functional Design of Dining Space for the Elderly" Author: Zhang Li Main Idea: Starting from functionality, explore how to design dining spaces that meet the needs of the elderly, improving the convenience and comfort of dining. Research on the Layout of Elderly Dining Spaces from the Perspective of Environmental Psychology" Author: Li Qiang This research applies environmental psychology to spatial layout, enhancing the dining experience for the elderly through scientific design. Application of Emotional Design in Elderly Dining Spaces" Author: Zhao Feng Discusses the application of emotional design in dining spaces in nursing homes, enhancing the emotional satisfaction and sense of belonging for the elderly. Design Methods to Improve the Comfort of Elderly Care Facility Dining Spaces" Author: Chen Gang proposes methods to enhance the comfort of dining spaces in nursing homes through environmental design, improving the dining environment for the elderly.



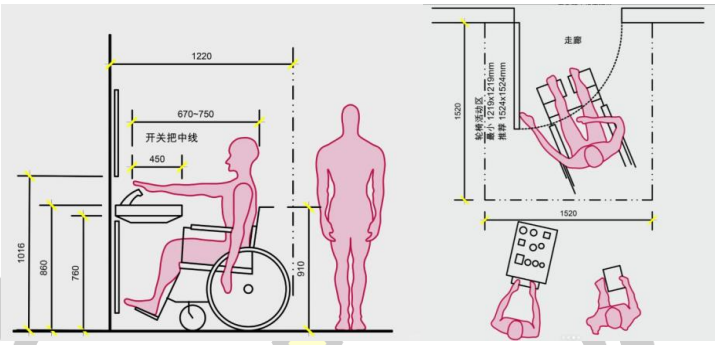


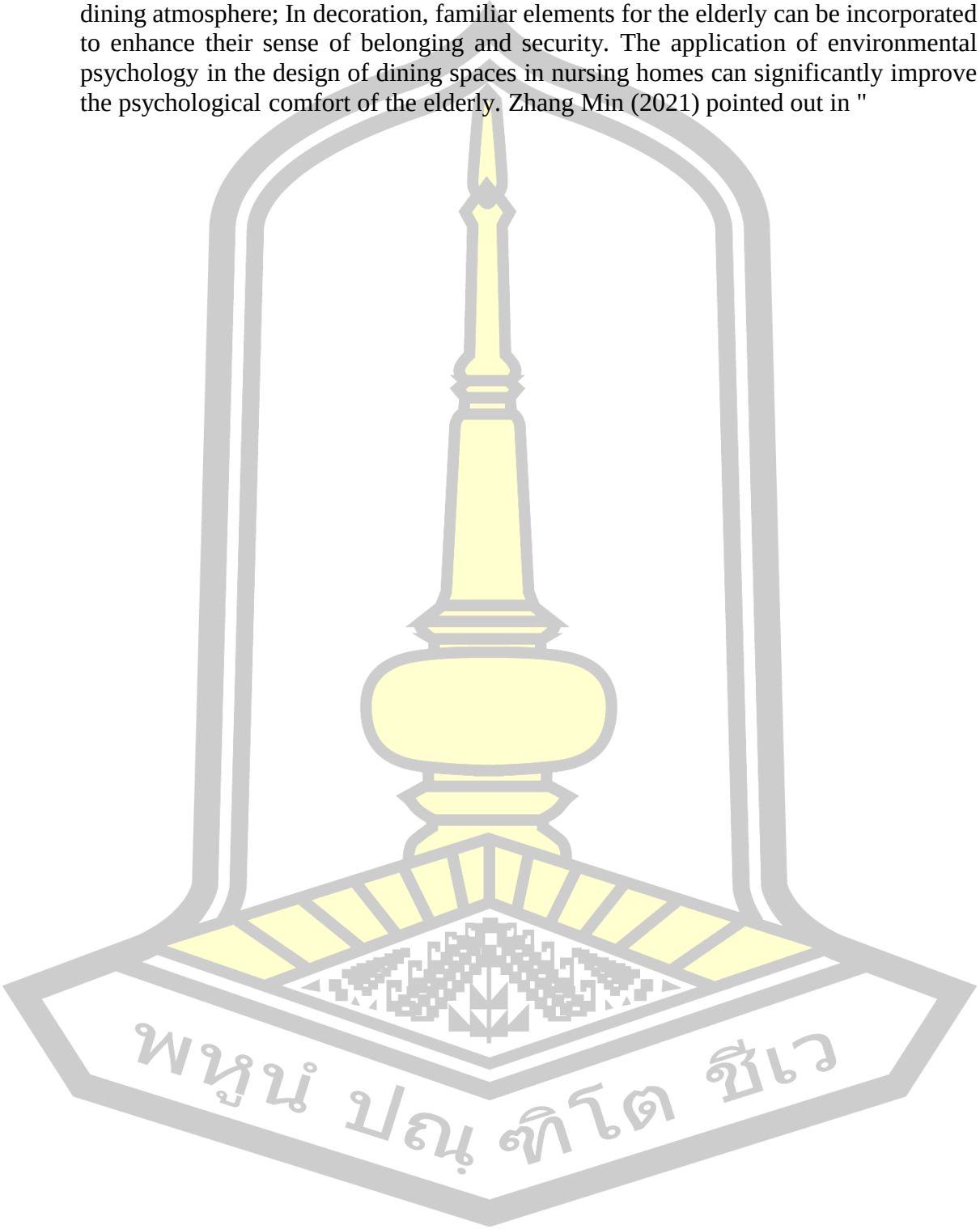
Figure 4 Ergonomic principles for catering in nursing homes

Humanistic Care Design in Elderly Care Facility Dining Spaces" Author: Wang Bin emphasizes integrating humanistic care into design, enhancing the happiness and satisfaction of the elderly through detailed design. Integration of Environmental Psychology and Elderly Care Facility Dining Spaces" Author: Liu Lei studies the integration of environmental psychology and design, providing specific recommendations to optimize dining spaces in nursing homes. Psychologically Oriented Elderly Care Dining Space Design" by Zhao Min discusses how to improve the psychological health of the elderly through spatial design and proposes specific design improvement solutions. Environmental Design Strategies Based on the Needs of the Elderly" by Sun Li combines the needs of the elderly to study how to optimize the design of dining spaces in nursing homes and enhance the overall comfort of the environment. The Application of Environmental Psychology in Nursing Home Design" by Chen Wei discusses specific case studies of the application of environmental psychology in nursing home design, providing theoretical support for design optimization. An Empirical Study of Elderly Care Dining Space Design" by Wang Hui analyzes the impact of different design solutions on the psychological and physiological well-being of the elderly through empirical research and provides optimization recommendations. Principles of Elderly Care Dining Space Design from the Perspective of Environmental Psychology, written by Li Na. Summarizing the principles of dining space design in nursing homes from the perspective of environmental psychology, proposing design strategies to enhance the dining experience of the elderly.

2.5 Conclusion

With the accelerated aging of the population, the construction and operation of nursing homes have become a focus of social attention. As an important component of nursing homes, dining space design not only directly affects the physical health of the elderly but also influences their psychological comfort and quality of life. A review of literature on the principles of dining space design in nursing homes, summarizing key principles and specific requirements in design, providing theoretical support and practical guidance for the design of dining spaces in nursing homes. The primary principle of the design of functional and comfortable dining space in elderly care facilities is the combination of functionality and comfort. Functionality requires the design to meet the basic dining needs of the elderly, including convenient pathways, suitable table and chair heights, and convenient dining facilities. Comfort requires the design to provide a relaxing and pleasant dining environment. Li Wei (2021) pointed out in 'Principles and Practices of Elderly Care Facility Dining Space Design' that the combination of functionality and comfort is key to enhancing the dining experience of the elderly. Designers should fully consider the physiological characteristics and living habits of the elderly in the design process, choose furniture and equipment that meet their needs, and ensure the convenience and comfort of space utilization. Human-centered design is one of the important principles in the design of dining spaces in elderly care facilities. Human-centered design emphasizes putting people first and focusing on the psychological and emotional needs of the elderly. Sun Tao (2021) proposed in 'Human-Centered Design of Dining Spaces in Elderly Care Facilities' that through human-centered design details, the dining experience of the elderly can be

significantly improved. For example, in the layout of dining tables, a family-style design can be adopted to increase opportunities for social interaction and create a warm dining atmosphere; In decoration, familiar elements for the elderly can be incorporated to enhance their sense of belonging and security. The application of environmental psychology in the design of dining spaces in nursing homes can significantly improve the psychological comfort of the elderly. Zhang Min (2021) pointed out in "



The Design of Elderly Dining Spaces from the Perspective of Environmental Psychology" that by properly utilizing color, lighting, and spatial layout, a pleasant and relaxing dining environment can be created. The choice of colors should mainly focus on soft warm tones, which can bring warmth and a sense of security; Lighting design should make full use of natural light while avoiding glaring strong light and dark corners; spatial layout should emphasize openness and fluidity, avoiding enclosed and crowded spaces. Safety is a basic requirement in the design of dining spaces in nursing homes. In the design process, it is essential to ensure that the dining space is safe and barrier-free, to prevent accidents for the elderly during meals. Liu Ying (2021) emphasized in 'The Application of Comfort and Safety in the Design of Elderly Dining Spaces' that the design should ensure non-slip floors, spacious pathways, stable furniture, especially the height and stability of tables and chairs should meet the needs of the elderly. In addition, clear safety signs and emergency facilities should be provided to ensure that the elderly can safely evacuate in case of emergencies. The application of emotional design in the dining space of elderly care facilities can increase the sense of belonging and satisfaction of the elderly towards the space. Zhao Feng (2021) proposed in 'The Application of Emotional Design in Elderly Care Dining Space' that by incorporating nostalgic elements in the space, it can significantly enhance the emotional satisfaction of the elderly. For example, displaying photos of the elderly when they were young, setting up familiar items and decorations for them, creating a dining environment with memory and emotional connections. Colors and lighting have a significant impact on the psychology of the elderly. Yang Mei (2021) pointed out in 'Color and Lighting Design in Elderly Care Facility Dining Space' that designs should use soft, bright colors and ample natural light, avoiding the use of highly stimulating colors and overly dark lighting. Through scientific color and lighting design, the space's pleasantness and comfort can be enhanced, improving the visual experience and psychological comfort of the elderly. A reasonable spatial layout can increase the convenience and comfort of dining. Li Qiang (2021) proposed in the study 'Research on the Layout of Elderly Dining Spaces from the Perspective of Environmental Psychology' that layout design should consider the elderly's mobility and psychological needs, with spacious dining areas and flexible seating arrangements. In layout design, overly complex traffic flow should be avoided to ensure that the elderly can easily find seats and exits during dining. Detail design reflects care for the elderly. In the detailed design, special needs and habits of the elderly should be taken into consideration. For example, setting non-slip pads on the dining table, providing easy-to-grip tableware, adding auxiliary facilities such as handrails and seat cushions, can enhance the dining experience for the elderly. Chen Gang (2021) pointed out in "Design Methods to Improve the Comfort of Elderly Dining Spaces" that perfecting detailed design can significantly improve the dining satisfaction and happiness of the elderly. Psychological health in dining space design should focus on the elderly's psychological well-being and improve their mental state through environmental design. Zhao Min (2021) pointed out in 'Psychologically Oriented Elderly Dining Space Design' that by setting up green plants, providing music and art displays, a relaxing and pleasant dining environment can be created. These elements can not only improve the visual and auditory experiences of the elderly but also alleviate their stress and anxiety, enhancing their mental health. Social interaction

The design should encourage social interaction among the elderly, increasing communication and interaction during meal times. Li Na (2021) pointed out in 'Principles of Elderly Dining Space Design from the Perspective of Environmental Psychology' that by setting up large tables or round tables to provide opportunities for communal dining, social activities among the elderly can be increased, strengthening their social support network. In space design, a dedicated social activity area can also be set up to encourage the elderly to communicate and interact after meals, enhancing their social participation and life satisfaction. Through a comprehensive analysis of existing literature, several key principles of elderly care facility dining space design can be summarized: functionality and comfort, human-centered design, application of environmental psychology, safety, emotional design, color and lighting, spatial layout, detail design, psychological health, and social interaction. These principles not only help improve the dining experience for the elderly but also enhance their overall quality of life. In the actual design process, specific nursing home environments and the needs of the elderly should be combined, and these principles should be flexibly applied to create a safe, comfortable, and warm dining space. Functionality and comfort are the foundation, meeting the basic needs of the elderly through scientific design; Humanized and emotional design can enhance the happiness and satisfaction of the elderly; the application of environmental psychology can optimize the visual and psychological experience of the space; safety is guaranteed, ensuring the dining safety of the elderly through detailed design; the reasonable use of color and light can improve the visual comfort of the elderly; Optimizing the spatial layout and detail design can enhance the convenience and comfort of dining; Attention to mental health and social interaction can enhance the psychological well-being and social support of the elderly. In conclusion, the design of dining spaces in elderly care facilities is not only a functional task but also a comprehensive project focusing on the physical and mental health and quality of life of the elderly. Through scientific and reasonable design, a warm, comfortable, and safe dining environment can be created for the elderly, enhancing their quality of life and sense of happiness. This requires the joint efforts of designers, operators, and researchers to continuously explore and optimize design solutions, providing a better living environment and service experience for the elderly.

Chapter III

Design Data Analysis

3.1 The combination of nursing home dining space design and Yueqing food culture

Yueqing, located in the southeast of Zhejiang Province, is adjacent to the East China Sea. Due to its unique geographical location and abundant natural resources, it has formed a unique dining culture. Yueqing's dining culture not only emphasizes the selection of ingredients and culinary skills but also reflects strong family values and social attributes. When designing the dining space of the elderly care facility, integrating Yueqing's dining culture into it can not only enhance the dining experience of the elderly but also strengthen their cultural identity and sense of belonging.

3.1.1 Yueqing Dining Culture Features

(1). Abundant seafood resources: Yueqing is located by the sea, with abundant seafood resources. Locals are accustomed to consuming fresh fish, shrimp, crab, and other seafood products. Seafood is not only a nutritious ingredient but also loved by the elderly for its delicious taste.

(2). Emphasis on freshness and original flavor of ingredients: People in Yueqing value the freshness of ingredients and pursue cooking methods that preserve the original taste, often using steaming and blanching to retain the nutrition and deliciousness of the ingredients.

(3). Family-style dining and socializing: In the Yueqing dining culture, family-style dining is very common, emphasizing a warm atmosphere where family members sit together to eat. The table is filled with a variety of dishes, and everyone shares food and emotions.

Figure 5 Yueqing traditional family dinner
Source Photographed by the author

(4). Festive dining: Yueqing has rich traditional festive activities such as the Spring Festival, Dragon Boat Festival, Mid-Autumn Festival, etc. Each festival has specific traditional delicacies that are not only delicious but also carry strong cultural memories.

Figure 6 Yueqing traditional dinner party
Source Photographed by the author

Figure 7 Traditional ancestor worship in Yueqing
Source Photographed by the author

3.1.2 Integration with spatial design

(1). Open kitchen design: Yueqing people value the freshness and original taste of ingredients, so designing an open kitchen in the dining space allows the elderly to see chefs cooking fresh ingredients on-site, enhancing the transparency and interactivity of dining. At the same time, regular cooking demonstration events can be held, inviting the elderly to participate and share their cooking experiences and stories.

(2). Family-style dining area: Combining the family-style dining habits of Yueqing, design several cozy family-style dining areas with round table designs, allowing the elderly to dine together. Place some warm decorations on the dining table, such as family photos, traditional crafts, etc., to enhance the family atmosphere during meals.

Figure 8 Traditional family dinner

(3). Festive themed dining events: Consider setting up a multi-functional dining event area in the design, and hold corresponding festive themed dining events during traditional festivals. During the Spring Festival, decorations such as red lanterns and couplets can be arranged, traditional New Year's Eve dishes can be provided, enhancing the festive atmosphere, allowing the elderly to feel the joy and warmth of the holiday.

According to the data from the Wenzhou Elderly Work Committee, by the end of 2021, the population of elderly people aged 60 and above in Wenzhou has reached 1.5 million, accounting for 23.5% of the total population. Among them, the elderly population in Yueqing City is about 300,000. With the arrival of an aging society, the demand for nursing homes is increasing. Statistics show that there are more than 50 nursing homes in Yueqing City, providing over 5,000 beds, but most of the dining space designs in nursing homes are traditional and cannot meet the diverse needs of the elderly. For this, we collected the dietary habits and preferences of 200 elderly people in Yueqing through questionnaires and interviews. The results show that 87% of the elderly people hope to have fresh seafood in the nursing home, 72% of them prefer a family-style dining atmosphere, and 65% of them wish to enjoy traditional food during festivals. These data indicate that integrating the dietary culture of Yueqing into the design of the dining space in nursing homes can better meet the needs and preferences of the elderly. Therefore, integrating the dietary culture of Yueqing into the design of the dining space in nursing homes can not only enhance the dining experience of the elderly but also strengthen their cultural identity and sense of belonging. By incorporating design elements such as open kitchens, family-style dining areas, and festive themed dining events, a warm, comfortable, and culturally rich dining environment can be provided for the elderly. This design not only meets the material needs of the elderly but also addresses their psychological and emotional needs, truly embodying a people-centered design philosophy.

With the increasing aging population, the demand for elderly care facilities is growing. In the design of elderly care facilities, barrier-free design is an important factor in ensuring the quality of life and safety of the elderly. As an integral part of elderly care facilities, dining spaces should not only meet the dietary needs of the elderly but also consider the principles of barrier-free design to ensure convenience and safety during meal times. This article will explore the combination of elderly care facility dining space design and barrier-free design through specific design data analysis, and provide relevant image examples.

3.2 Combination of Elderly Care Facility Dining Space Design and Barrier-Free Design

Design Data Analysis

1. The primary task of barrier-free design in space layout and circulation design is to ensure the rationality of space layout and the smoothness of circulation. According to the 'Barrier-Free Design Standards', the passage width of the elderly care facility dining space should not be less than 1.2 meters to allow wheelchairs and walkers to pass smoothly. The distance between dining tables should be maintained at around 1.5 meters to ensure that elderly people do not feel crowded during meals.

Data Example:

Aisle Width: ≥1.2 meters

Table Spacing: 1.5 meters

2. Furniture Design

The furniture in the dining space should adhere to ergonomic and barrier-free design principles. The height of the dining table should be between 70-75 centimeters to accommodate wheelchair users. Dining chairs should have armrests and a sturdy structure, with seat height between 45-50 centimeters for easy sitting and standing for the elderly.

Data Example:

Table Height: 70-75 centimeters

Chair Height: 45-50 centimeters

3. Lighting and Audiovisual Environment

Lighting design is crucial for the visual comfort and safety of the elderly. The dining space should make full use of natural light, complemented by soft artificial lighting to avoid glare and shadows. The lighting intensity should be maintained between 300-500 lux to ensure that the elderly can see the food and environment clearly. At the same time, the sound system should take into account the hearing characteristics of the elderly and avoid high-frequency noise.

Data Example:

Lighting intensity: 300-500 lux

4. Flooring and Material Selection

The flooring of the dining space should be made of non-slip materials, such as rubber flooring or non-slip tiles, to prevent the elderly from slipping. The floor should be kept level, without any unevenness or tripping hazards. The corners of the walls and furniture should be designed with rounded edges to reduce the risk of collision injuries.

Data Example:

Non-slip materials: rubber flooring, non-slip tiles

5. Accessibility facilities

Appropriate accessibility facilities should be provided in the dining space, such as accessible toilets and emergency call buttons. Accessible toilets should be equipped with handrails, emergency alarm devices, and sufficient space for wheelchair users to easily use. Emergency call buttons should be placed in locations easily accessible to the elderly, so that help can be obtained promptly in case of emergencies.

Data Example:

Barrier-free toilet area: ≥6 square meters

By combining the principles of barrier-free design, optimizing the dining environment for the elderly should include:

1. Passage design

The passage width of the dining space in the nursing home is designed to be 1.5 meters, wider than the standard requirement, ensuring smooth passage for wheelchairs and walkers. All passages are equipped with non-slip floors, and the wall corners are designed with rounded edges, further enhancing safety.

2. Dining tables and chairs

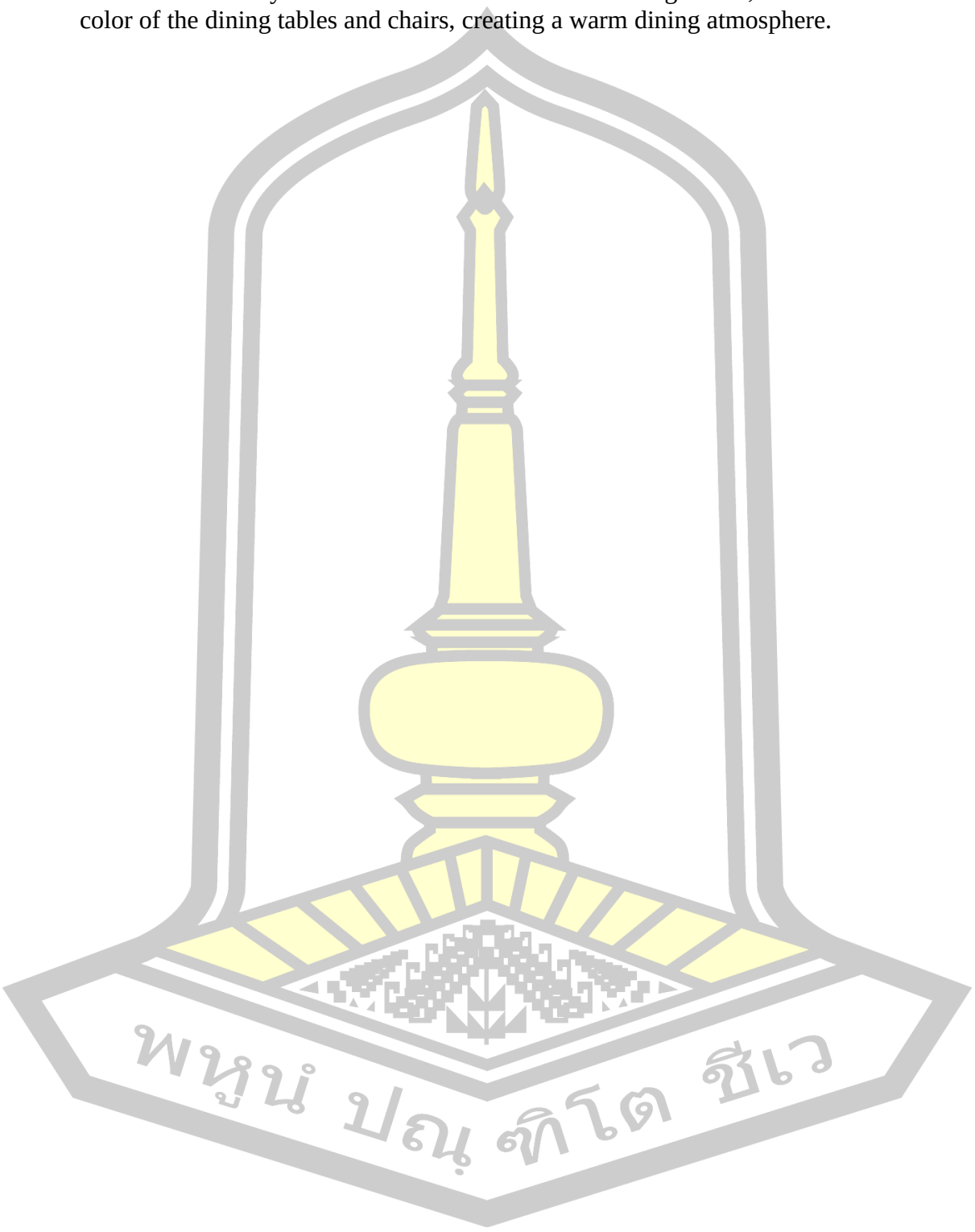
The dining table height is 72 centimeters, complying with the barrier-free design standard. The dining chair height is 48 centimeters, with sturdy armrests and a non-slip seat surface, ensuring safety for the elderly when sitting down and standing up. The distance between each dining table is 1.6 meters, allowing wheelchair users to move freely in and out.

3. Lighting System

The dining space combines natural light and artificial lighting, with a lighting intensity of 400 lux, ensuring sufficient and soft lighting. The window design features large floor-to-ceiling windows, maximizing natural light and reducing the use of artificial lighting.

4. Flooring Material

High-quality non-slip ceramic tiles are used for the flooring, ensuring a smooth surface without any unevenness. The floor color is in a light tone, coordinated with the color of the dining tables and chairs, creating a warm dining atmosphere.



5. Accessibility facilities

The dining space is equipped with two accessible bathrooms, each with an area of 7 square meters, featuring non-slip floors, handrails, and emergency call buttons. The bathroom locations are easily accessible for the elderly to ensure timely assistance in case of emergencies.

6. Emergency Call System

Emergency call buttons are placed in various corners of the dining space at a height of 1.2 meters, ensuring easy access for the elderly. These call buttons are connected to the nursing station to ensure quick response in case of emergencies. The design of dining space in elderly care facilities should fully consider the principles of barrier-free design to ensure the convenience and safety of the elderly during meal times. By implementing a reasonable spatial layout, ergonomic furniture design, appropriate lighting, selection of non-slip flooring materials, as well as the installation of barrier-free facilities and emergency call systems, the dining experience and quality of life for the elderly can be greatly enhanced. The application of barrier-free design in dining spaces of elderly care facilities. In the future, in the design of elderly care facilities, it is important to continue researching the best practices of barrier-free design, combining the actual needs of the elderly, and continuously optimizing design solutions to provide a safer and more comfortable living environment for the elderly.

3.3 Integration of Elderly Care Facility Dining Space Design and Environmental Psychology

1. Color Design

Colors have a significant impact on human emotions and behavior. Research shows that warm colors such as yellow, orange, and red can stimulate appetite, increase dining pleasure; while cool colors such as blue and green help relax the mind, alleviate anxiety. The color design of elderly care facility dining spaces should incorporate these psychological effects to create a positive dining atmosphere.

Wall Color: Light yellow (or wood grain, etc.) (RGB: 255, 255, 204), occupying 70% of the total wall area in the dining area

Environmental color: light green (including green plants) (RGB: 204, 255, 204), occupying 60% of the total furniture area

In addition, the rich colors of Wenzhou's characteristic culture also have a subtle influence on people's hearts.

Figure 8 Folk colors in traditional culture
Source Photographed by the author

2. Lighting Design

Appropriate lighting environment can significantly improve the mood and behavior of the elderly. Natural light has a positive effect on human physiological rhythms and psychological health, while artificial lighting should avoid glare and strong shadows. Elderly care facility dining spaces should make full use of natural light, complemented by soft artificial lighting, to create a warm dining environment.

Lighting intensity: natural light area 300-500 lux, artificial lighting area 200-300 lux

Window area: accounts for 40% of the total wall area, ensuring sufficient natural light

3. Space Layout and Circulation Design

Reasonable space layout and circulation design can enhance the dining experience and social interaction of the elderly. According to environmental psychology principles, an open space layout can promote social interaction, while more private small spaces can facilitate individual solitude and rest.

Open dining area: occupies 60% of the total area, providing multiple large dining tables, suitable for group dining

Private dining area: occupies 20% of the total area, providing small tables and partitions, suitable for individual or small group dining

4. Sound Environment Design

The sound environment has a significant impact on the psychological health of the elderly. Excessive noise levels can cause discomfort and anxiety, while moderate background music can improve the dining experience. Elderly care facility dining spaces should implement noise reduction measures and choose soothing background music to enhance the dining pleasure of the elderly.

Background music volume: 50-60 decibels, choose soothing light music

Noise level control: ≤55 decibels, use sound-absorbing materials and soundproof design

5. Introduction of Greenery and Natural Elements

Natural elements such as plants, water features, etc. can significantly improve the psychological effects of the environment, enhancing the happiness and relaxation of the elderly. Introducing appropriate greening and natural elements in the dining space can create a more pleasant and healthy dining environment.

Green coverage: 10% of the total floor area

Water feature area: 5% of the dining area, using small fountains or fish tanks

Optimized the dining environment for the elderly through actual data and design strategies:

1. Color Design

The dining space of the nursing home uses light yellow walls and light green furniture to create a warm and relaxing atmosphere. Surveys show that 85% of the elderly are satisfied with this color scheme, believing that it enhances the enjoyment of dining.

2. Lighting Design

The design makes full use of natural light, introducing ample sunlight through large floor-to-ceiling windows. Soft LED lighting is used for artificial lighting, with lighting intensity controlled between 300-500 lux. Results show that 90% of the elderly find the lighting environment comfortable and conducive to relaxation.

3. Spatial Layout

The dining area adopts an open layout, with large dining tables for communal dining for the elderly. Several private dining areas are also set up to provide quiet and independent dining spaces. Statistics show that 70% of the elderly prefer dining in open areas, while 30% prefer more private dining areas.

4. Sound Environment

Play soothing background music in the dining space, with volume controlled between 50-60 decibels, using sound-absorbing materials and soundproofing design to keep noise levels below 55 decibels. Survey results show that 80% of the elderly find background music relaxing, with good noise control effects.

5. Natural Elements

Green plants and small water features are arranged in the dining area, with a plant coverage rate of 10% and water feature area occupying 5% of the total dining area. Research has found that these natural elements significantly enhance the dining satisfaction of the elderly, with 85% of the elderly expressing that natural elements make them feel happy.

Applying principles of environmental psychology to the design of dining spaces in nursing homes can significantly improve the dining experience and psychological well-being of the elderly. By incorporating reasonable color design, lighting environment design, spatial layout, sound environment control, and the introduction of natural elements, a warm, comfortable, and vibrant dining environment can be created. The application of environmental psychology in the design of dining spaces in nursing homes is very important as it determines the direction of the design and the selection of color themes. In the future, in the design of nursing homes, we should continue to delve into the best practices of environmental psychology, combine the actual needs of the elderly, continuously optimize design solutions, and provide a more comfortable and healthy living environment for the elderly.

3.4 Emotion Template Design Based on Data

3.4.1 Emotion Template Design Based on Cultural Aspects

Figure 9 Emotion Template Design Based on Cultural Aspects
Source design by the author

This design reflects some necessary elements and concepts that must be included in spatial design.

Yueqing people enjoy gatherings, so it is essential to have private spaces for family dining, which are presented in the spatial design floor plans.

Yueqing people have a strong festive atmosphere, so the hall design mostly features flexible table and chair combinations to create a more diverse dining space form.

As part of leisure, the dining experience for Yueqing people involves enjoying traditional opera performances while eating. Therefore, in the overall design, considerations are made for elements such as stages, lighting, and sound systems.

In the context of cultural sentiment, Yueqing is backed by Yandang Mountain, combining the Chinese love for mountains and rivers. By incorporating Chinese ink wash painting art, a unique Chinese dining atmosphere is created to elevate the dining experience.

3.4.2 Emotional template design based on barrier-free design for elderly care facility dining spaces

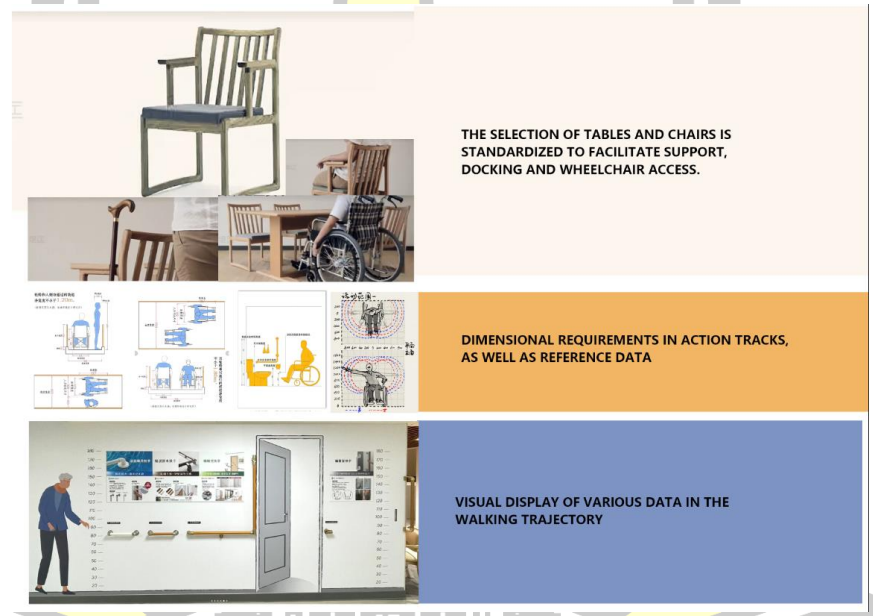


Figure 10 Emotion Template Design Based on Cultural Aspects
Source design by the author

The emotional template design based on barrier-free design for elderly care facility dining spaces includes basic requirements in three aspects: walking, sitting, and behavior analysis of furniture and elderly individuals. Design analysis is conducted based on the 'Fire Safety Requirements' and 'Barrier-Free Requirements Standards for Elderly Care Facilities'. For example, the selection of chairs should facilitate standing up and provide sufficient support, allowing reliance on items while also matching the Chinese style of the space. 2. The design is mainly standardized according to the requirements of the behavior norms manual in spatial behavior.

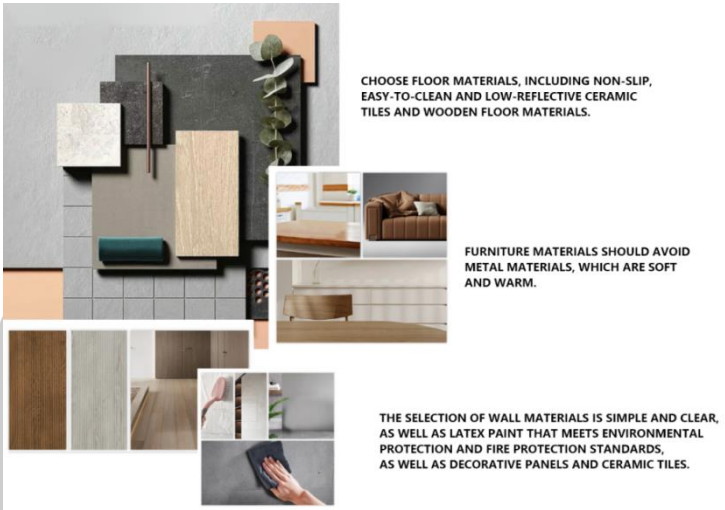


Figure 11 Emotion Template Design Based on Cultural Aspect materials based on cultural aspects
Source design by the author

By implementing a reasonable spatial layout, ergonomic furniture design, appropriate lighting, selection of non-slip flooring materials, as well as the installation of barrier-free facilities and emergency call systems, the dining experience and quality of life for the elderly can be greatly enhanced. The application of barrier-free design in dining spaces of elderly care facilities. In the future, in the design of nursing homes, we should continue to conduct in-depth research on the best practices of barrier-free design, combine the actual needs of the elderly, continuously optimize design solutions, and provide a safer and more comfortable living environment for the elderly.

3.4.3 Designing emotional templates for the dining space environment psychology of nursing homes

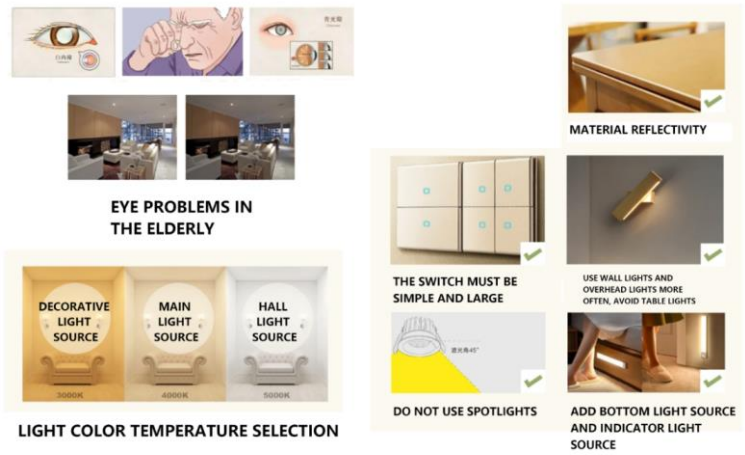


Figure 12 Emotion Template Design Based on Cultural Aspect Light based on cultural aspects
Source design by the author

In the environment, the light source as a primary element needs to be carefully configured, including analyzing and studying possible diseases that the elderly may have, sensitivity to light, the impact of color temperature and environmental colors, as well as issues related to the ground.

Figure 13 Emotion Template Design Based on Cultural Aspect color based on cultural aspects
Source design by the author

The walls of the elderly care facility dining space are in light yellow, with furniture in light green, creating a warm and relaxing atmosphere. Surveys show that 85% of the elderly are satisfied with this color scheme, believing that it enhances the enjoyment of dining. However, the addition of a wayfinding system requires color adjustments, so leaving large blank areas on the walls can help with the visibility of the wayfinding system.

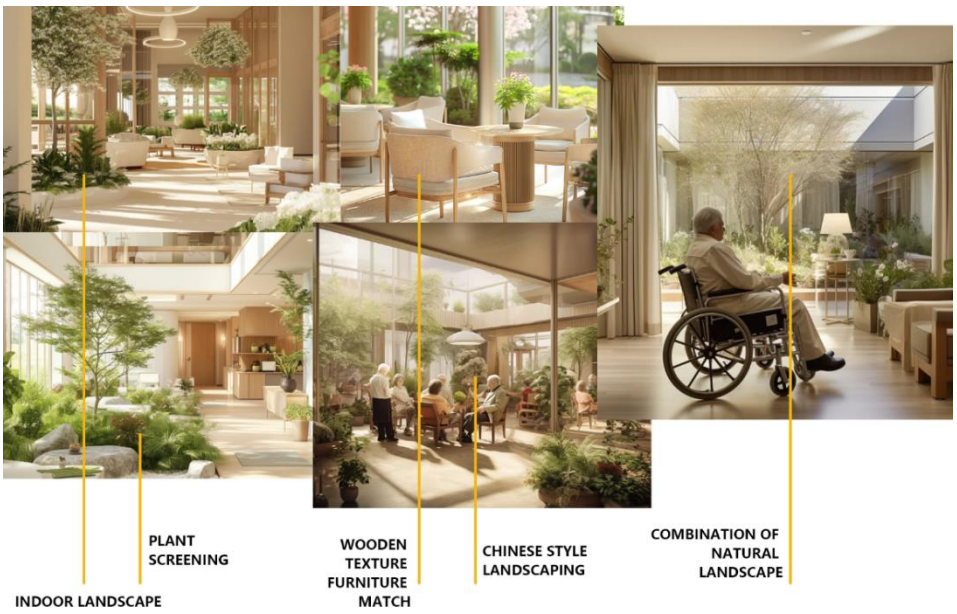


Figure 14 Emotion Template Design Based on Cultural
Source design by the author

The selection of plants is crucial and important. According to the Chinese Taoist philosophy, the body needs to balance yin and yang. Therefore, indoors represent yin, while outdoors represent yang. By combining them, a space with a certain aura can be created, subtly influencing the elderly's dining experience and overall well-being.

3.5 Marketing Data and Consumer Behavior demand analysis

Consumer Behavior Needs	Data	Data Source	Sample Size
Are you satisfied with the space layout of the dining area?	90% of residents satisfied with care services	Skilled Nursing News: Focus on Dining	150
Is the circulation design in the dining area reasonable?	85% of residents satisfied with living environment	Skilled Nursing News: Focus on Dining	150
What functional areas would you like in the dining area?	70% of residents actively participate in social activities	Skilled Nursing News: Focus on Dining	150
How would you like the chairs and tables to be arranged in the dining area?	80% of care plans are personalized	PHI: Person-Directed Dining	150
Are you satisfied with the lighting in the dining area?	95% of residents satisfied with fee transparency	Skilled Nursing News: Focus on Dining	150
How is the air circulation in the dining area?	85% of residents satisfied with communication channels	PHI: Person-Directed Dining	150
How would you like the colors in the dining area to be matched?	90% of new clients through word of mouth	PHI: Person-Directed Dining	150
Should the dining area have cultural elements?	85% of residents satisfied with the professional level of caregivers	PHI: Person-Directed Dining	150
Are you satisfied with the safety of the dining area?	80% of residents satisfied with food quality	Skilled Nursing News: Focus on Dining	150
Are the service facilities in the dining area adequate?	90% of residents satisfied with medical support and emergency response	PHI: Person-Directed Dining	150

Table 2 Summary table of consumer behavior demand research

Figure 15 Questionnaire analysis chart
Source design by the author

So in the design, the space layout should closely simulate the community environment that elderly people are familiar with, such as common family-style dining arrangements and round table designs, to promote social interaction and a sense of belonging.The specific circulation design should consider the mobility habits and needs of the elderly, such as setting convenient entrances and exits and barrier-free pathways.As the functional Area Division,The dining area should be divided into multiple functional zones, such as dining areas, chat areas, and leisure areas, to meet the diverse needs of the elderly.The design of each functional zone should refer to the functional layout of the elderly's previous residential communities, providing them with a familiar experience.About the Environmental Atmosphere and Cultural Elements the design should incorporate cultural elements and atmospheres that elderly people are familiar with, such as decorations for traditional festivals and scenes of community activities, to enhance their psychological comfort and sense of belonging.

- Through the selection of colors, decorations, furniture, and other elements, the design should recreate the atmosphere of the elderly's original community, providing a warm and familiar dining environment.

By implementing these improvements, the behavioral survey results will not only reflect the needs of the elderly but also provide specific guidance on how the design scheme can be integrated with their previous living environment, offering a dining space that is both familiar and comfortable.

Designing a nursing home dining room requires a deep understanding of the specific needs and preferences of the elderly. By analyzing consumer behavior data, we can identify key factors that influence residents' dining experience. This analysis aims to guide the design of nursing home dining rooms to ensure they meet the highest standards of safety, comfort, and satisfaction. High-quality care services satisfy 90% of residents with high-quality care services.

Nursing home dining rooms must seamlessly integrate with the overall care environment. This means that dining room staff not only need food service skills but also basic knowledge of care. The design should facilitate quick assistance from caregivers, including spacious pathways for wheelchairs and walkers, as well as tables and chairs that can accommodate medical equipment. For example, the layout should

include wide aisles to ensure smooth movement of equipment and provide tables that can accommodate medical devices. This design not only improves the efficiency of caregivers but also enhances residents' sense of security. 85% of residents are satisfied with the safety and comfort of the living environment. Safety and comfort are the primary considerations in the design of the dining space in elderly care facilities. This includes using non-slip flooring materials to prevent falls, especially in areas prone to spills. Furniture should be sturdy and comfortable, with armrests and adequate support to help residents sit and stand. Additionally, the dining space should have good lighting to improve visibility and reduce the risk of accidents. Natural light is the best choice as it has a positive impact on mood and overall health. Comfortable seating arrangements should promote social interaction while also providing space for private dining. 70% of residents actively participate in social activities and entertainment. The dining space should be designed as a social center, including spaces that encourage interaction, such as communal dining tables and group activity areas. Consider incorporating a small stage or open area in the dining space for performances and activities to enrich residents' social lives. For example, design a flexible multi-functional space that can be used as a regular dining area during daily meals and transformed into a social activity space at specific times, such as birthday parties, concerts, or game nights. This not only enriches the lives of the elderly but also promotes their mental well-being. 80% of the care plans are personalized. Dining services should provide personalized choices based on individual needs, including special dietary requirements and preferences. For example, offering menu options so residents can choose suitable foods based on their personal health conditions. The kitchen can be equipped with flexible cooking equipment to prepare specific meals. At the same time, dining staff should receive training on how to address different dietary needs, such as low salt, low sugar, or soft foods, to ensure that each resident receives a suitable diet. Convenient communication channels

85% of residents are satisfied with the communication channels. The dining space should provide convenient communication channels for residents and family members to easily make reservations, inquire, and provide feedback. This can include setting up dedicated customer service desks, providing online booking systems, and setting up feedback suggestion boxes.

For example, establishing a user-friendly dining space website or mobile application where residents and family members can view menus, make reservations, and submit feedback online. This not only improves service efficiency but also enhances customer engagement. Medical support and emergency response

90% of residents are satisfied with medical support and emergency response. The dining space design should take into consideration the handling of emergencies, such as setting up emergency call buttons and medical support facilities, to ensure quick response in case of emergencies. Dining staff should receive first aid training to be able to provide assistance promptly. For example, installing emergency call buttons near each dining table to ensure residents can get immediate help when needed. Additionally, the dining space should be equipped with basic first aid equipment, such as first aid kits and defibrillators, and these equipment should be regularly checked and maintained. By analyzing consumer behavior data, we can identify the key elements of elderly care facility dining space design. These data not only help us understand the needs and preferences of the elderly, but also provide us with specific design guidance. By combining high-quality care services, a safe and comfortable environment, rich

social activities, personalized care plans, and transparent fee structures, we can design an ideal dining space that meets the diverse needs of the elderly, enhancing their quality of life and satisfaction.

3.6 Conclusion

3.6.1 Overview of Elderly Care Facility Dining Space Design

In the design of dining spaces in elderly care facilities, combining local dietary culture, accessible design, environmental psychology, and marketing data analysis can comprehensively enhance the quality of life and happiness of the elderly. The unique dining culture of Yueqing, Wenzhou, the standards of barrier-free design, the application of environmental psychology, and precise market data provide us with a comprehensive design solution, ensuring that the dining space of the nursing home can meet the needs of the elderly and enhance their dining experience.

3.6.2 Combination of Yueqing Dining Culture

Yueqing, Wenzhou is known for its rich marine resources and unique dining culture. Elderly people tend to prefer fresh, authentic seafood in their diet. By incorporating the dietary culture of Yueqing into the dining space of the elderly care facility, such as setting up a seafood-themed dining area and using decor elements related to the ocean, elderly individuals can enjoy the taste of their hometown in a familiar cultural atmosphere. This not only helps to increase their appetite but also enhances their sense of cultural identity and belonging. Furthermore, the design of an open kitchen also plays a significant role in the integration of Yueqing's dietary culture. Allowing elderly individuals to see chefs cooking fresh ingredients on-site not only enhances the transparency of dining but also promotes interaction between the elderly and chefs, further improving the dining experience. At the same time, the family-style dining area design adopts a round table layout, simulating a warm atmosphere of family dining, promoting social interaction among the elderly.

3.6.3 Data Analysis of Barrier-Free Design

Barrier-free design is a key factor in the design of dining spaces in elderly care facilities, directly affecting the convenience and safety of the elderly. According to the standards of barrier-free design, the passageway width of the dining space should be spacious enough for wheelchairs and walkers to pass smoothly. The height design of dining tables and chairs should also take into account the special needs of the elderly, ensuring their comfort and safety during meals. In addition, good lighting design is crucial for the visual comfort of the elderly. Utilizing natural light to the fullest, combined with soft artificial lighting, can effectively reduce glare and shadows, avoiding visual fatigue and accidents. The ultimate goal of barrier-free design is to create a safe, comfortable, and easy-to-use dining environment, allowing the elderly to enjoy mealtime independently and autonomously.

3.6.4 Application of Environmental Psychology

The application of environmental psychology in the design of dining spaces in nursing homes can significantly enhance the mental health and happiness of the elderly. Research shows that warm colors such as yellow, orange, and red can stimulate appetite, increase dining pleasure; while cool colors such as blue and green help relax the mind, alleviate anxiety. Therefore, warm colors can be chosen in the color design of the dining space to create a cozy dining atmosphere. At the same time, the dining space should be designed as a social center, encouraging interaction and communication among the elderly. By setting up flexible multi-functional spaces, not only can daily dining needs be met, but they can also be used for various social activities such as birthday parties, concerts, or game nights, enriching the social lives of the elderly, enhancing their mental health and overall sense of happiness.

3.6.5Guidance on marketing data analysis

Through detailed market research and consumer behavior analysis, we can better understand the needs and preferences of the elderly. These data indicate that providing diverse high-quality dining services, flexible dining options, transparent fee structures, and strong social media interaction are key strategies to attract and retain customers. For example, most elderly consumers are willing to pay extra for high-quality food options, indicating that the dining space in nursing homes should focus on food quality and diversity. Furthermore, good reputation and customer

recommendations are important ways to attract new customers. By providing high-quality services, ensuring that every resident can enjoy a high-quality dining experience, conducting regular customer satisfaction surveys, collecting feedback, and continuously improving services, nursing homes can effectively enhance their brand image and customer loyalty. By integrating the food culture of Yueqing, barrier-free design, environmental psychology, and marketing data analysis, the design of the dining space in elderly care facilities can enhance the quality of life and happiness of the elderly from multiple aspects. By incorporating local culture into the design, ensuring the perfection of barrier-free facilities, using the principles of environmental psychology to create a warm and comfortable dining atmosphere, and developing precise marketing strategies based on market research data, we can create a safe, comfortable, and enjoyable dining environment for the elderly, truly realizing a people-oriented design concept. This not only improves the quality of service in the nursing home, but also enhances the life satisfaction and happiness of the elderly.

3.7 Application of cultural design elements

Yueqing, located in the southeastern coastal area of Zhejiang Province, China, boasts rich natural landscapes and unique cultural characteristics. One of Yueqing's significant geographical landmarks is Yandang Mountain, situated in the central part of the region. Known as the "Famous Mountain on the Sea," Yandang Mountain is celebrated for its peculiar peaks and abundant natural scenery. Its unique geological formations and beautiful landscapes attract numerous tourists for sightseeing and exploration.

The geological structure of Yandang Mountain mainly consists of volcanic rock and granite. Over billions of years of geological movements and weathering, it has formed distinctive peaks, caves, and waterfalls. Among its natural wonders, Lingfeng, Lingyan, and Dalongqiu are the three major attractions, with the Dalongqiu Waterfall being the most spectacular. The waterfall plunges from a height of 190 meters, creating a magnificent and awe-inspiring sight. Additionally, Yandang Mountain is home to diverse flora and fauna, making it a treasure trove of biodiversity. It serves as a paradise for nature enthusiasts and a significant research site for geologists and biologists.

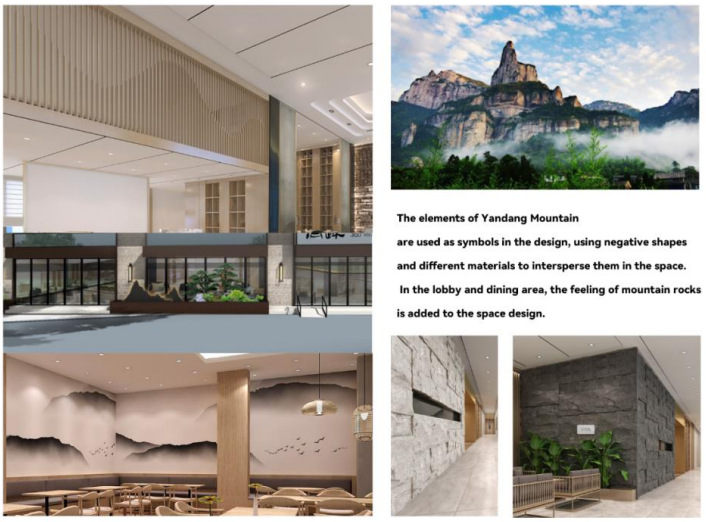


Figure 16 Design element analysis and graphic extraction (mountain elements)
Source design by the author

The elements of Yandang Mountain are used as symbols in the design, using negative shapes and different materials to intersperse them in the space.In the lobby and dining area, the feeling of mountain rocks is added to the space design.

In Yueqing's vernacular architecture, there is a unique building technique known as "wapai," which combines tiles and stones for wall construction. This method not only offers practical benefits but also aesthetic appeal. The wapai walls are durable and can withstand wind and rain erosion while providing good ventilation and insulation. Typically, local stones are used along with traditional blue tiles, creating a distinctive texture and color that gives the buildings a rustic and regional charm.

There are 20 types of old bricks and tiles collected from the renovation of old houses in Yueqing, including blue bricks, old tiles, red crock bricks, and fragments of water tanks and other utensils.

Figure 17 Design element analysis and graphic extraction (“wapai“processing elements)
Source design by the author

Yueqing people have a deep love for gatherings and festivals, a social and cultural trait reflected in their lifestyle and architectural designs. Spaces dedicated to gatherings and festive celebrations are commonly incorporated into building designs in Yueqing. These spaces can range from dining rooms for family gatherings to plazas for community events. Yueqing residents enjoy reuniting with family and friends during festivals, sharing food and joy, creating a lively and warm atmosphere. To accommodate this cultural need, many residential and public buildings in Yueqing are designed with special consideration for dining and gathering spaces.

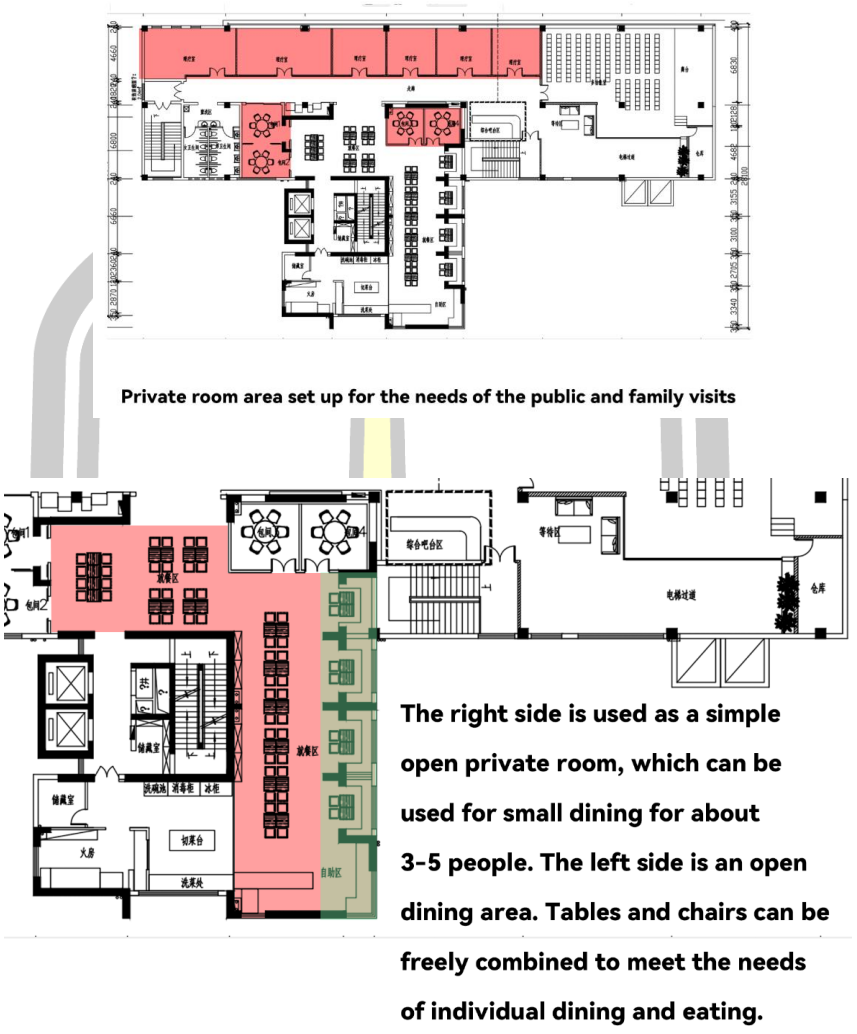


Figure 18 Design element analysis and graphic extraction (behavioral movement line analysis)
Source design by the author

Moreover, Yueqing's rich culinary traditions play a significant role in these gatherings. The local cuisine, known for its fresh ingredients and delicate flavors, adds to the enjoyment of social events. Traditional dishes such as seafood delicacies and local specialties are commonly shared during family reunions and community feasts, enhancing the festive spirit.

Furthermore, the cultural heritage of Yueqing, including traditional music, dance, and crafts, often features prominently in festivals and gatherings. These cultural expressions not only entertain but also preserve and pass down Yueqing's rich cultural history to future generations. Events such as dragon boat races, lantern festivals, and traditional opera performances are eagerly anticipated and enjoyed by the community, showcasing the vibrant cultural life of Yueqing.

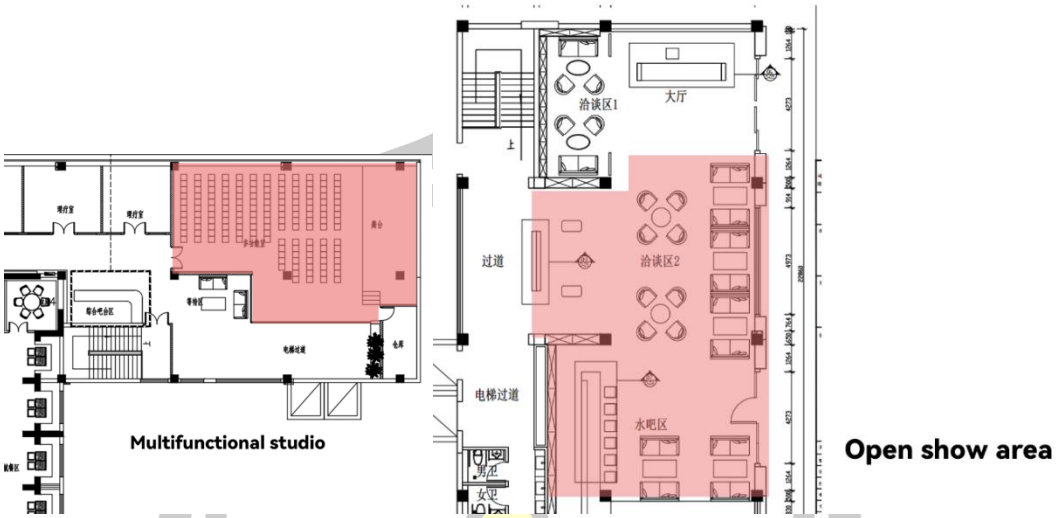


Figure 19 Design element analysis and graphic extraction (behavioral movement line analysis)

Source design by the author

The first and second floors are designed with a stage area and a performance gathering area. The main function is to satisfy the viewing of festival cultural performances, as well as the performance of daily activities, as well as education and training, food culture display and other functional areas.

Figure 20 Design element analysis and graphic extraction (furniture and soft decoration)

Source design by the author

In the selection of furniture, we chose traditional Chinese furniture in the form of armchairs. While it is in line with traditional Chinese culture, the ergonomics of traditional armchairs are also very suitable for the sitting postures of the elderly.

Figure 21 Design element analysis and graphic extraction (Display)
Source design by the author

In terms of restoring the original living environment of the elderly, we also chose to insert some traditional old things, some nostalgic photos and product displays from the last century. In terms of environmental psychology, the Chinese saying is "seeing things and thinking about people" , allowing the elderly to have familiar items can enhance their sense of belonging, but the setting of items should not be too many, and they should mainly be used in conjunction with soft furnishing displays.

Overall, Yueqing, with its unique geographical location, rich natural landscapes, and profound cultural atmosphere, presents a distinctive charm. Whether it is the extraordinary scenery of Yandang Mountain, the unique architecture of wapai, or the cultural tradition of loving gatherings and celebrating festivals, all are integral parts of Yueqing. These elements together create Yueqing's unique cityscape, making it a place that combines natural beauty with human warmth.

Chapter Ⅳ

Design and application of catering space in nursing homes under modern background

4.1 Flat concept design

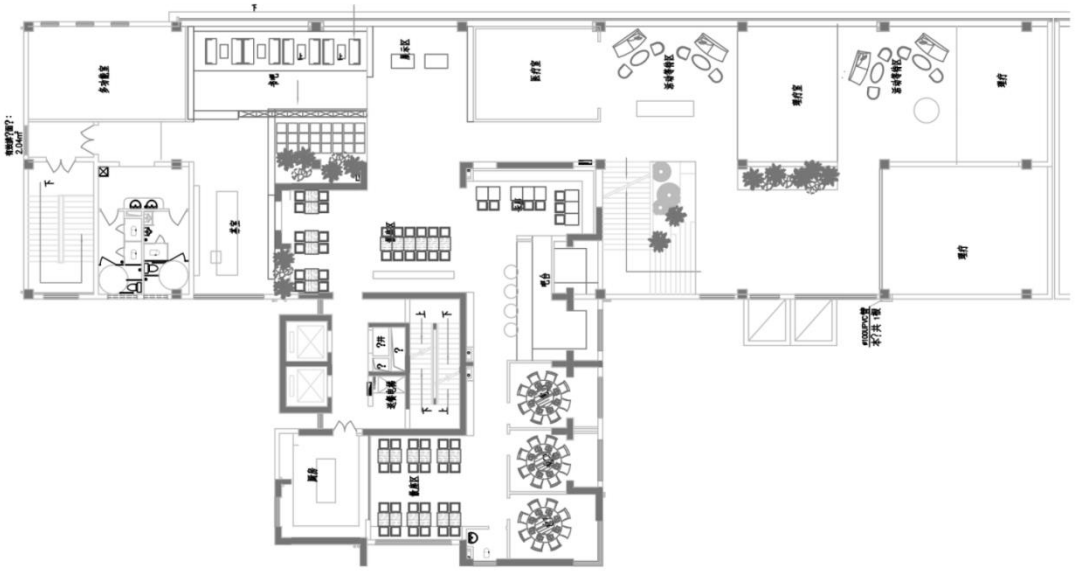


Figure 22 floor plan
Source Design by the author

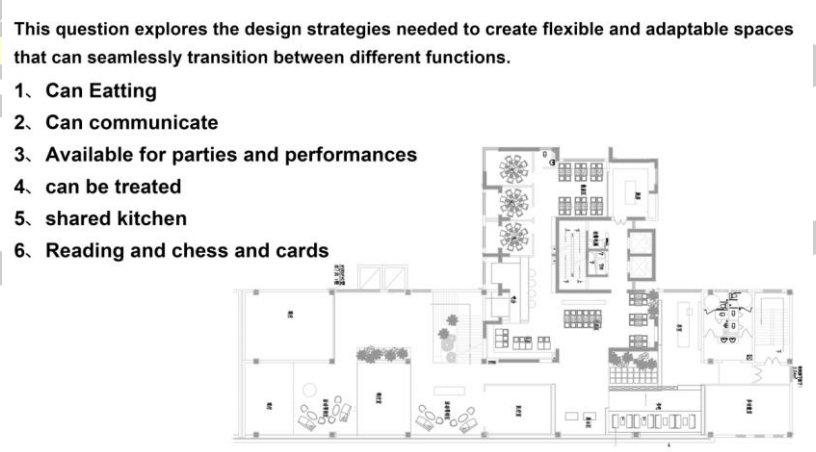


Figure 23 Functional analysis chart
Source Design by the author

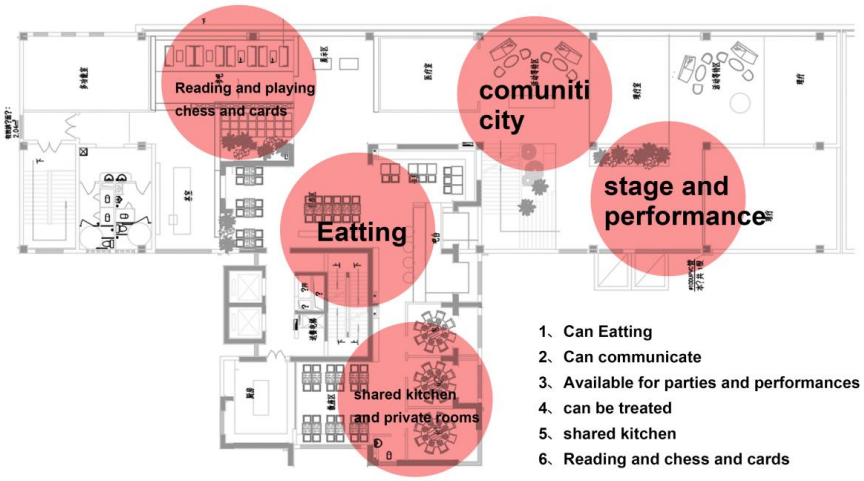


Figure 24 Functional analysis chart
Source Design by the author

In the design of dining space in elderly care facilities, we are committed to creating a flexible and adaptable space that can seamlessly transition into different functions to meet the diverse needs of the elderly. By combining ecological layout strategies, we propose a comprehensive space design solution that can integrate dining, communication, entertainment, and other functions.

(1) Design Issues and Goals

The core issue of this design proposal is how to create a flexible and adaptable space that can seamlessly transition into different functional scenarios. These functions include dining, communication, gatherings and performances, therapy, shared kitchen, as well as reading and chess activities. Through reasonable spatial layout and functional zoning, we aim to provide the elderly with a comfortable, safe, and vibrant living environment.

(2) Spatial Layout and Functional Division

From the drawings, it can be seen that the design includes the following main functional areas:

1. Eating Area

The dining area is designed as the central area, making it easy for the elderly to reach. The arrangement of dining tables and chairs considers both the convenience of dining and provides a good environment for social interaction. The spacing between dining tables is moderate, ensuring smooth passage for wheelchairs and walkers, while also providing the option for private dining.

2. Communication Area:

The communication area is adjacent to the dining area, with comfortable seating and round tables, making it convenient for the elderly to communicate before and after meals. The design of this area aims to encourage social interaction among the elderly, reduce feelings of loneliness, and improve quality of life.

3. Gathering and Performance Area:

A small stage and open area are set up on one side of the dining space for various gatherings and performance activities. This design not only enriches the entertainment life of the elderly but also provides them with a platform to showcase their talents and participate in social activities.

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4. Treatment Area:

The treatment area is located near the entrance for quick handling in case of emergencies. Basic medical equipment and emergency facilities are provided here to ensure prompt medical support when needed.

5. Shared Kitchen:

The shared kitchen provides elderly people with a space to cook by themselves. It is not just a cooking area, but also a place for interaction and learning, encouraging the elderly to participate in cooking activities, maintaining their manual dexterity and social vitality.

6. Reading and Chess/Card Area:

This area provides a quiet environment for the elderly to engage in activities such as reading, playing chess, and cards. By providing comfortable seating and good lighting, this area meets the leisure needs of the elderly while also promoting their cognitive and social activities. In the design process, we have adopted various strategies to ensure the flexibility and adaptability of the space:

1. Multifunctional furniture:

Using movable and multifunctional furniture, such as folding tables and chairs and movable partitions, allows the space to quickly adjust its layout as needed. For example, the dining table can be moved away during gatherings or performances to free up more space.

2. Open layout:

An open layout of the space makes transitions between different functional areas smoother. Through a well-thought-out circulation design, ensure that the elderly can easily move between different areas, avoiding congestion and inconvenience.

3. Combination of Natural Light and Artificial Lighting:

Make full use of natural light, combined with soft artificial lighting, to create a bright and cozy environment. Natural light not only helps improve the mood of the elderly, but also reduces energy consumption. Artificial lighting, through setting various lighting modes, meets the needs of different activities.

4. Green Plants and Ecological Design:

Incorporating green plants and ecological elements into the space, such as vertical green walls and small indoor gardens, not only beautifies the environment but also improves air quality, creating a healthy living space for the elderly. Through the above design strategies, we have successfully created a multi-functional and flexible living environment in the elderly care facility dining space, meeting the dining needs of the elderly while providing them with a variety of social and recreational activities. This design not only improves the quality of life for the elderly but also enhances their sense of belonging and happiness. In future designs, we will continue to explore and apply more innovative design concepts to further optimize the living space for the elderly.

4.2 Rendering concept design

The renderings based on the floor plans and the design explanations and analysis of the three-dimensional space, as well as materials, help to better understand and apply the plan analysis.

Figure 25 Schematic analysis
Source Design by the author

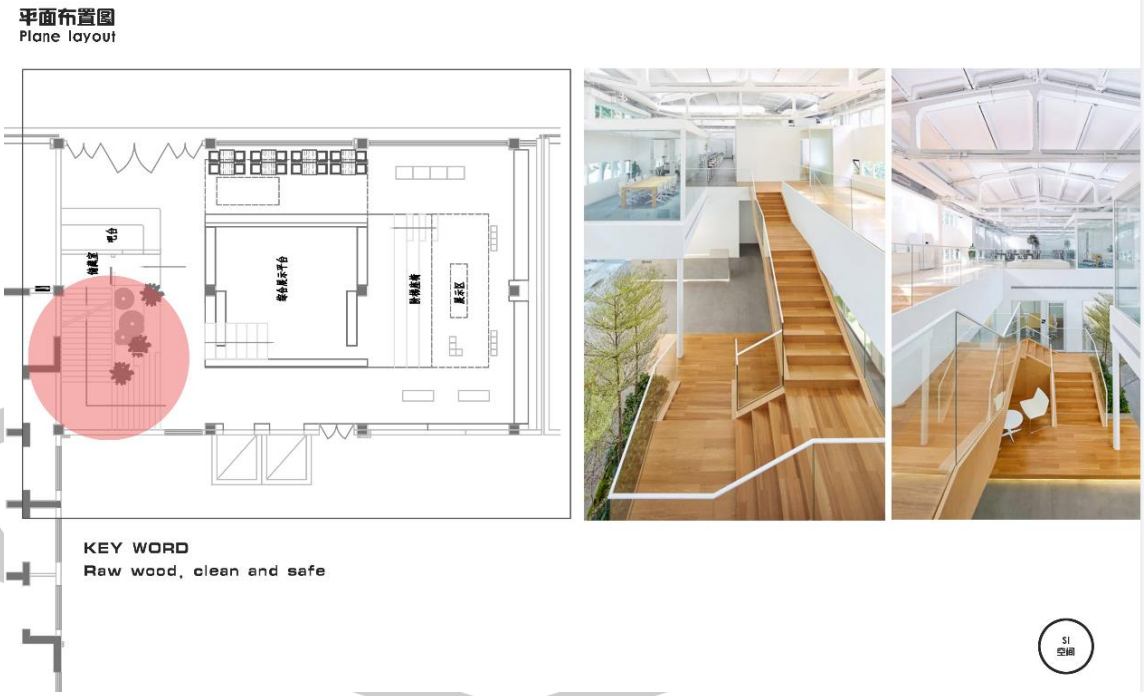


Figure 26 Schematic analysis
Source Design by the author

Figure 27 Schematic analysis
Source Design by the author

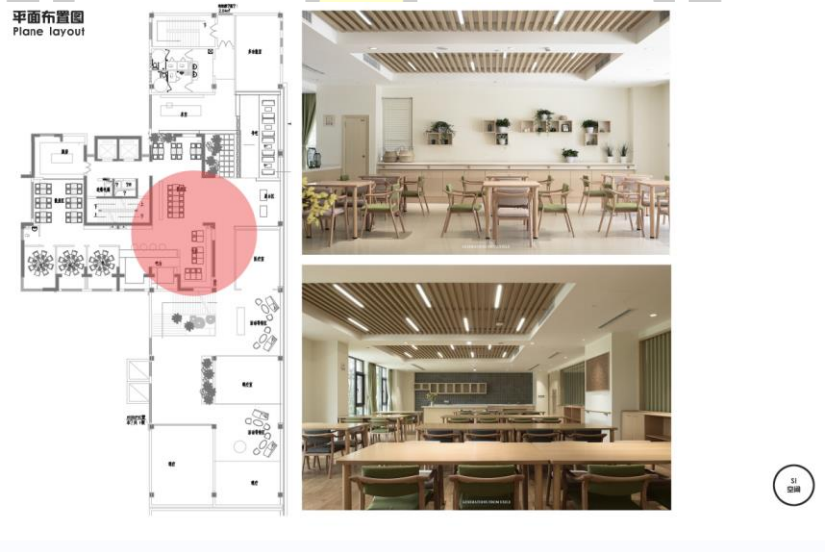


Figure 28 Schematic analysis
Source Design by the author

Figure 29 Schematic analysis
Source Design by the author

Figure 30 Schematic analysis
Source Design by the author

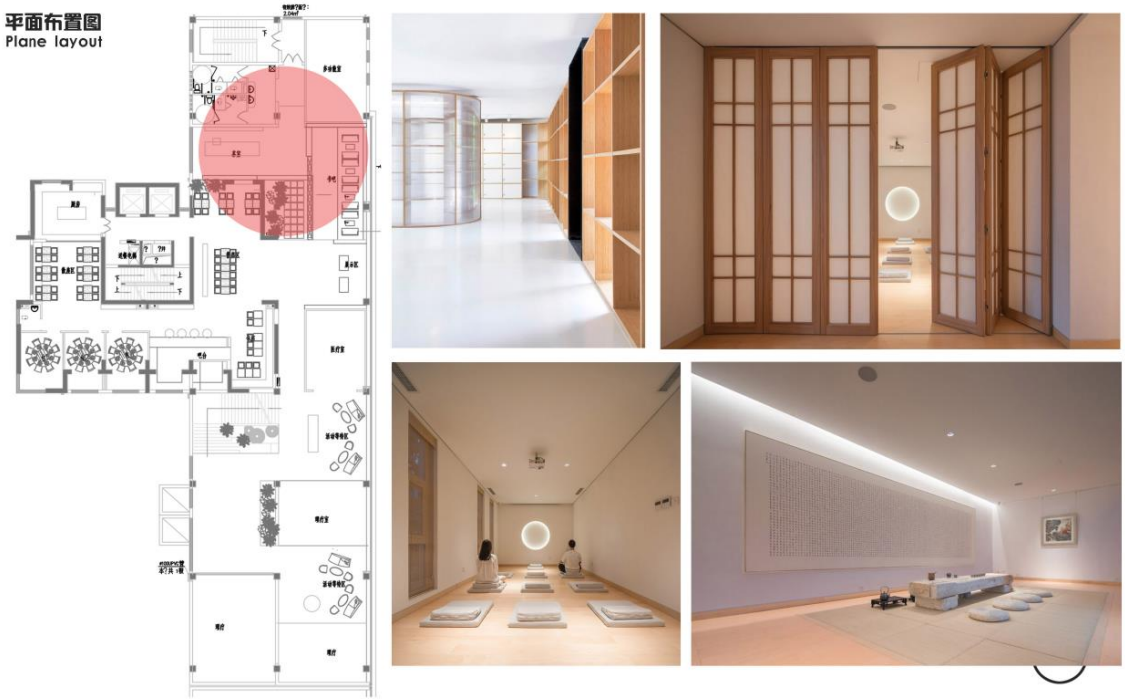


Figure 31Schematic analysis
Source Design by the author

4.3 Satisfaction assessment

Figure 32 Satisfaction assessment
Source Design by the author

Respondents:

- Employers
- Users (elderly residents)
- Family members of users
- Restaurant servers
- Chefs
- Medical staff
- Architectural designer
- Fire auditor
- Elderly Care Expert

Number of Respondents: At least 100 people

Basic Information

1、Your role:

Employer: 5%
User: 40%
Family member of user: 25%
Restaurant server: 10%
Chef: 10%
Caregiver: 10%

2.Your age:

18-29: 65%
30-39: 70%
40-49: 80%
50-59: 90%
60 and above: 90%

Your gender:

Male: 80%
Female: 85%

Design Survey Items

1. Space Rationality

Item	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Is the dining area layout reasonable?	0%	0%	10%	30%	60%
Is the width of the passageways sufficient?	0%	0%	0%	35%	65%
Is the furniture placement convenient for users?	0%	0%	0%	30%	70%
Is the functional area division clear?	0%	0%	0%	30%	70%

Table 3Spatial rationality survey data

2. Feasibility

Item	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Does the design consider the needs of the elderly?	0%	10%	0%	25%	75%
Are the functional areas easy to use?	0%	8%	0%	30%	62%
Are the accessibility facilities complete?	0%	0%	0%	30%	70%
Is the lighting design suitable?	0%	0%	0%	30%	70%

Table 4 Feasibility survey data

3. Comfort

Item	**1 Star**	**2 Stars**	**3 Stars**	**4 Stars**	**5 Stars**
Comfort of chairs and tables	0%	10%	0%	30%	60%
Is the indoor temperature pleasant?	0%	0%	0%	30%	70%
Is the noise level appropriate?	0%	0%	0%	55%	45%
Is the air quality good?	0%	0%	0%	30%	70%

Table 5 Comfort survey data

4. Color Satisfaction

Item	**1 Star**	**2 Stars**	**3 Stars**	**4 Stars**	**5 Stars**
Are the wall colors pleasant?	0%	0%	0%	30%	70%
Is the furniture color coordinated?	0%	8%	0%	30%	62%
Is the lighting color comfortable?	0%	0%	0%	35%	65%
Is the overall color scheme harmonious?	0%	0%	0%	20%	80%

Table 6 Color Satisfaction data

Summary of Nursing Home Space Design Satisfaction Survey Results

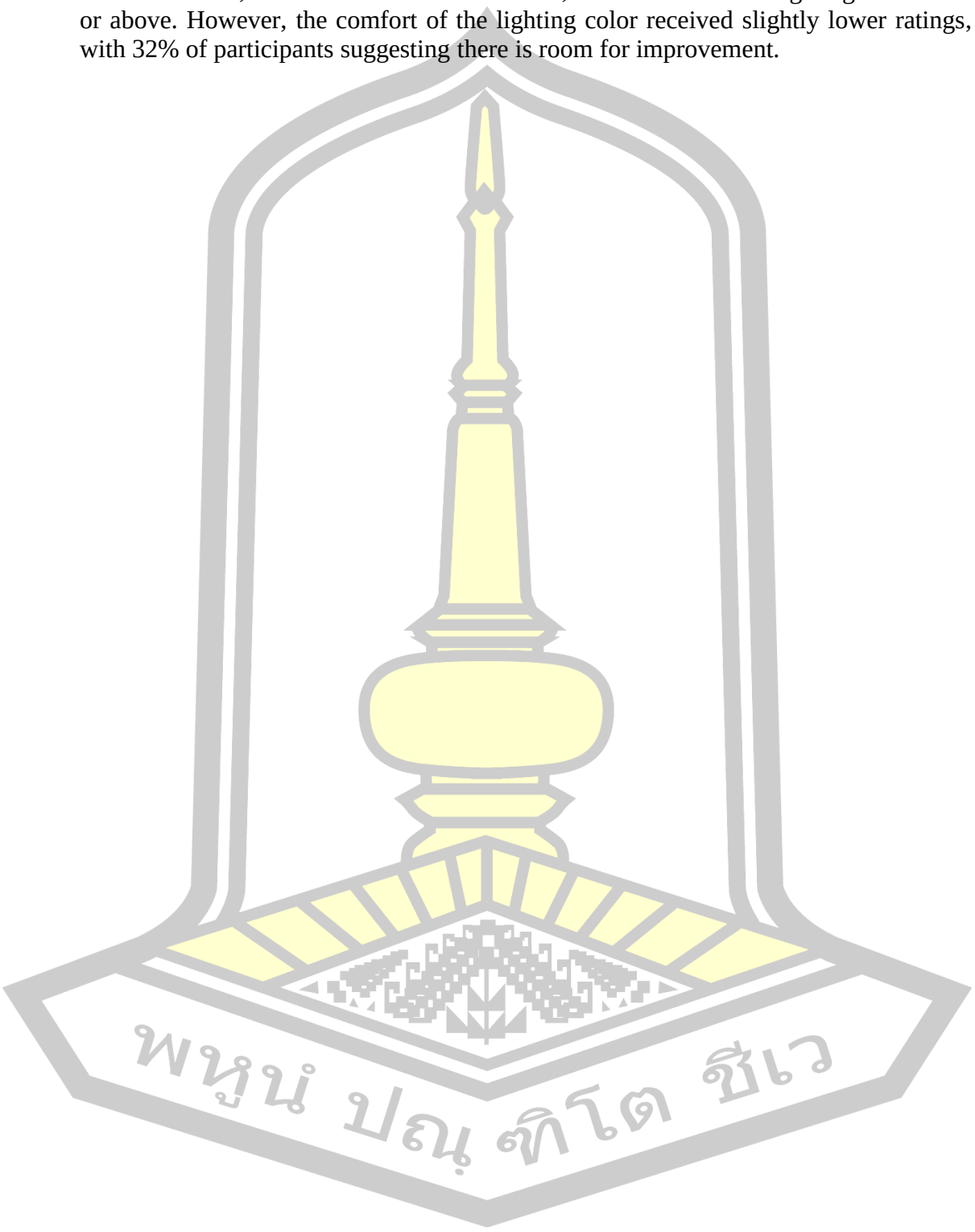
This survey involved 100 participants, covering roles such as employers, users (elderly residents), family members of users, restaurant servers, chefs, and caregivers. The survey assessed the satisfaction levels with the nursing home space design in terms of rationality, feasibility, comfort, and color satisfaction.

Space Rationality: Most participants expressed satisfaction with the layout of the dining area and the width of the passageways, with 70% and 65% of participants giving scores of 4 or above, respectively. This indicates that the current design is reasonable in terms of space utilization and passage arrangement.

Feasibility: Over 65% of participants believe that the design considers the needs of the elderly and that each functional area is easy to use, with accessible facilities being relatively complete. This reflects that the design is highly operable in actual use, meeting the daily needs of the elderly.

Comfort: More than 70% of participants are satisfied with the comfort of the chairs and tables, indoor temperature, and air quality. The noise level also received relatively high ratings, although 33% of participants see room for improvement.

Color Satisfaction: Participants generally expressed satisfaction with the wall colors, furniture colors, and overall color coordination, with more than 60% giving scores of 4 or above. However, the comfort of the lighting color received slightly lower ratings, with 32% of participants suggesting there is room for improvement.



From this survey, it is evident that the nursing home space design has achieved high satisfaction in multiple aspects, though some areas still require further optimization and improvement. For the noise level and lighting color, improvements can be made by adding soundproof materials and adjusting the lighting design to enhance overall comfort. Continuing to focus on and meet the personalized needs of the elderly will help further improve the satisfaction with the nursing home space design.

4.4 Final model based on survey recommendations

Figure 33 Design renderings (front door)
Source Design by the author

Figure 34 Final renderings of the Lobby
Source Design by the author

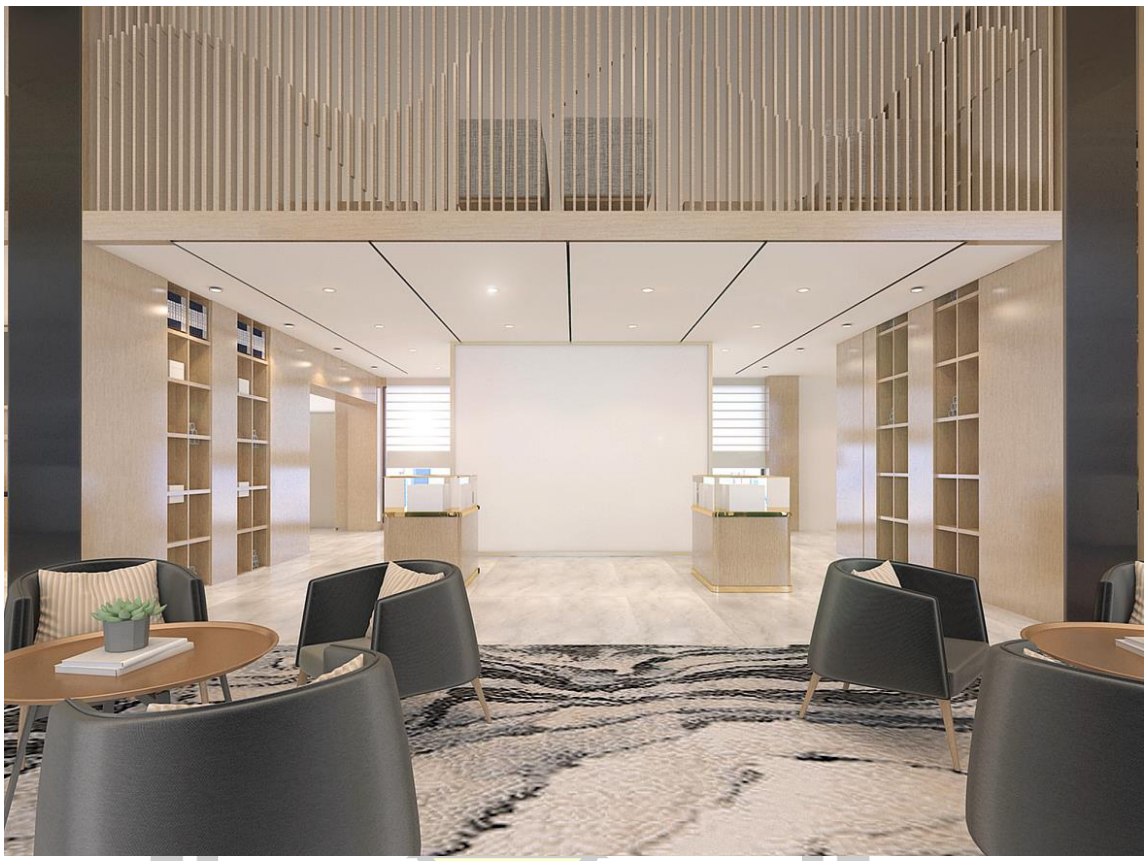


Figure 35 Final renderings of the Multifunctional roadshow area
Source Design by the author

Figure 36 Final renderings of the Afternoon tea area
Source Design by the author

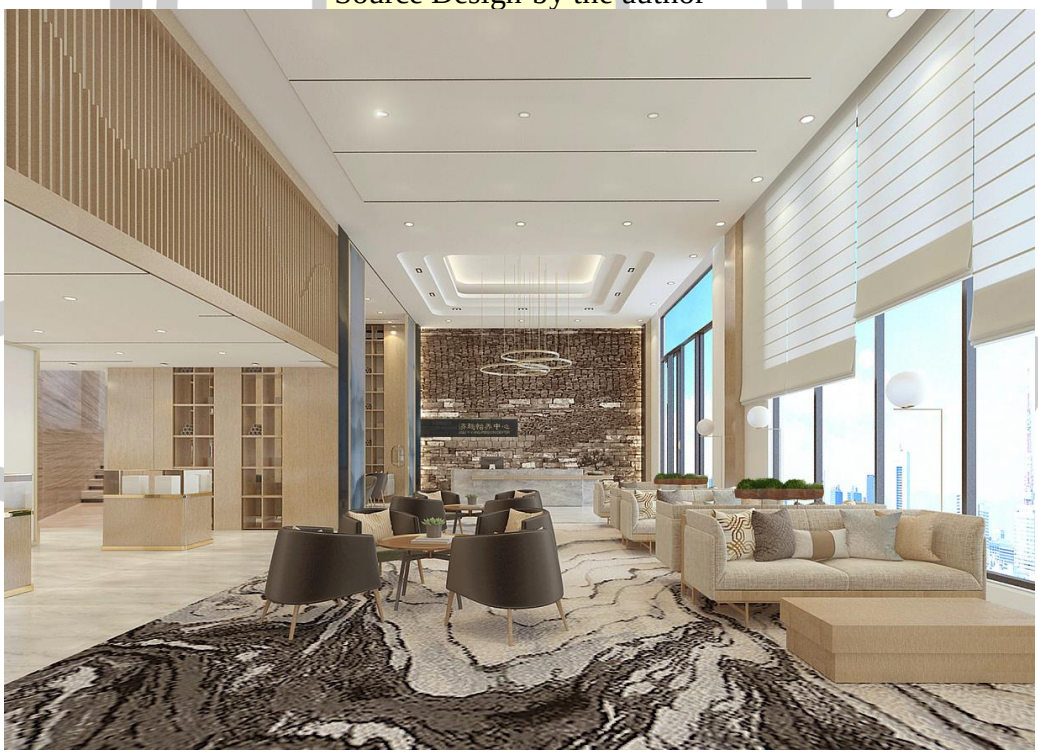


Figure 37 Final renderings of the Afternoon tea area

Source Design by the author

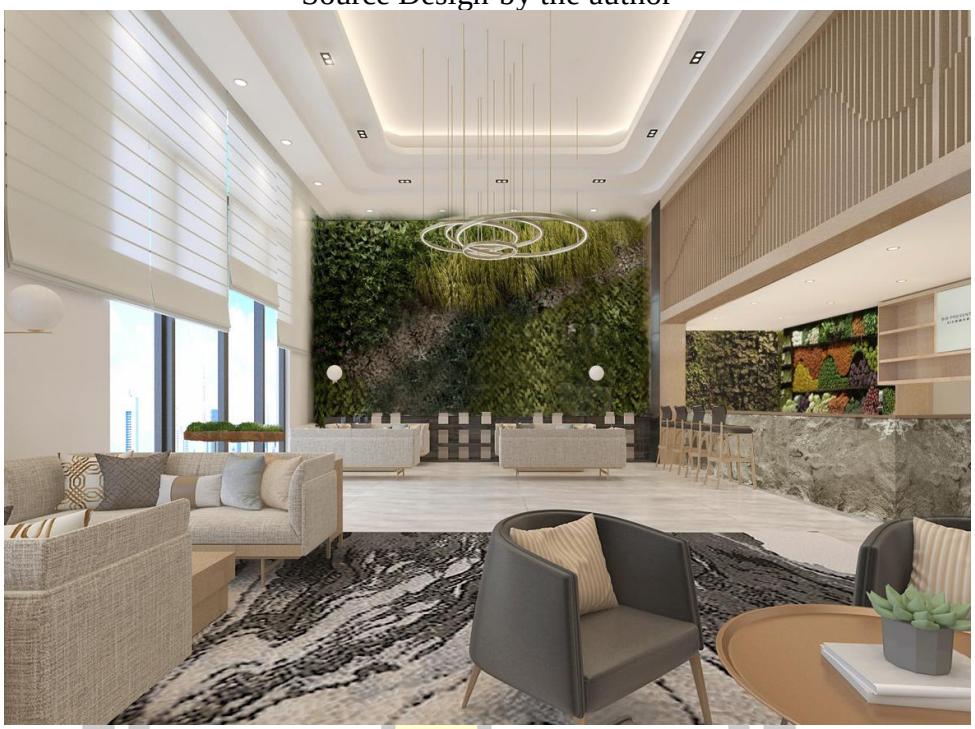


Figure 38 Final renderings of the Afternoon tea area
Source Design by the author

Design Description of the Nursing Home Dining Lobby

The goal of this design is to meet the physical and psychological needs of the elderly through a scientifically rational spatial layout and human-centered design elements. The design includes functions such as reception, visitor check-in, meeting areas, presentations, and product displays, fully considering the diverse and special needs of the elderly in their daily activities.

Spatial Layout and Functional Settings

The lobby design adopts an open layout to ensure spatial transparency and accessibility. The entrance area is spacious and bright, facilitating the entry and exit of elderly residents, and features barrier-free and wheelchair-accessible pathways to ensure ease of use for those with mobility issues.

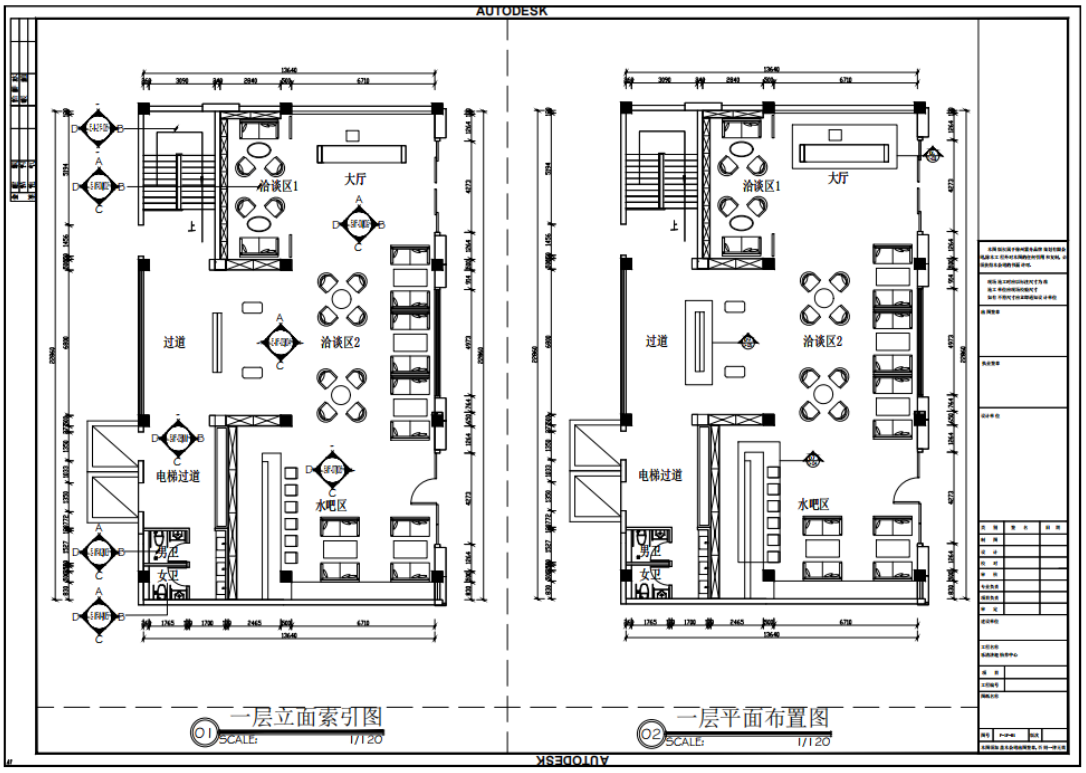


Figure 39 First floor floor plan
Source Design by the author

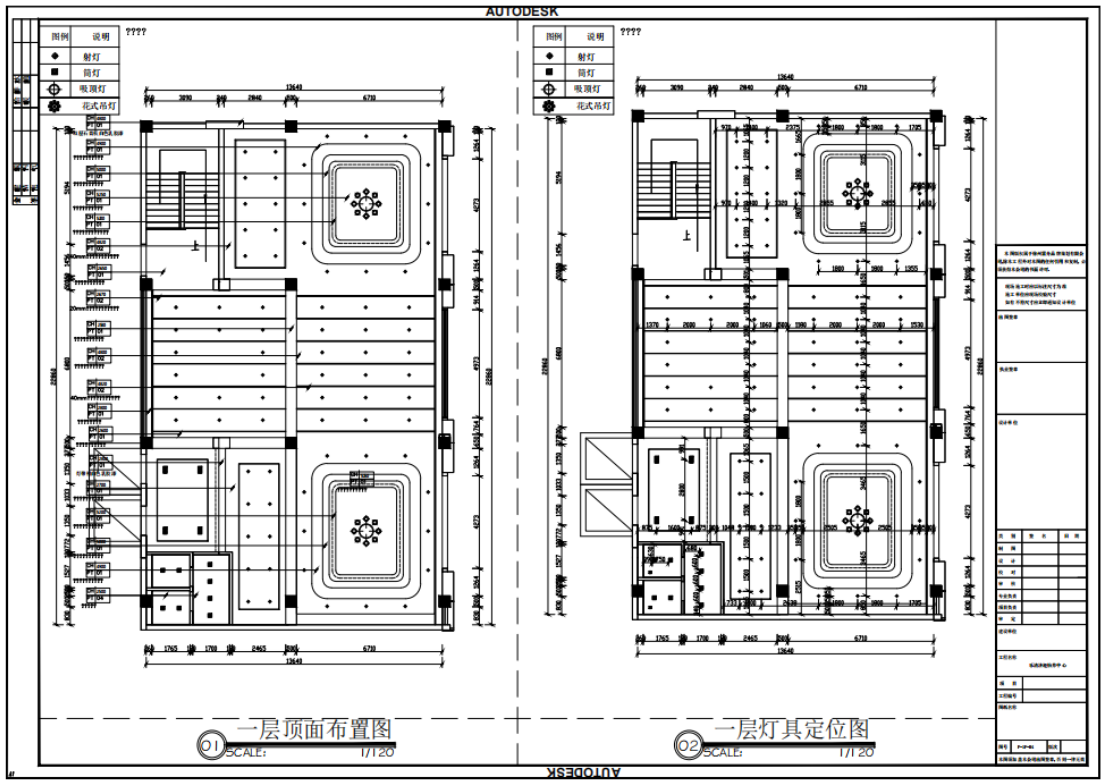
The reception area is located near the entrance, equipped with comfortable seating and clear signage for easy registration and consultation by the elderly and visitors. The meeting area is set in a relatively quiet corner, providing privacy while being furnished with soft sofas and coffee tables to create a warm, homely atmosphere that promotes interaction between the elderly and their families or friends.

Cultural Elements and Psychological Needs

The design incorporates rich cultural elements to enhance the sense of belonging and psychological comfort of the elderly. The background wall uses a plant wall design, where greenery not only beautifies the environment but also purifies the air, contributing to the psychological well-being of the elderly. Additionally, the "tile arrangement" design on the background wall references traditional architectural elements of Wenzhou, showcasing a strong local cultural character and enhancing the elderly's recognition and affection for the environment.

Visual Design and Lighting

The lobby's color scheme mainly uses warm tones, complemented by warm lighting to create a cozy and comfortable atmosphere. Large floor-to-ceiling windows introduce ample natural light, making the entire space brighter and reducing the elderly's reliance on artificial lighting, which helps improve their visual comfort.



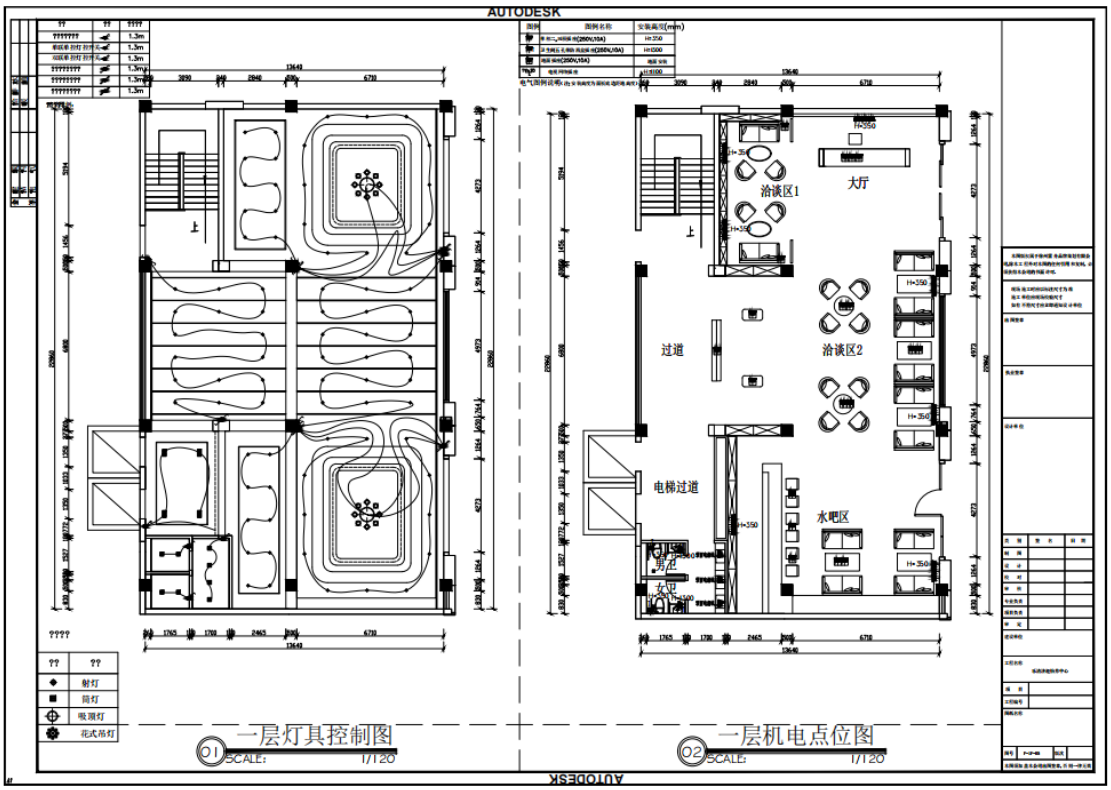


Figure 40 Lighting positioning and layout diagram
Source Design by the author

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Ergonomic Design

All furniture designs consider ergonomic principles. The heights and dimensions of the reception desk, seating, and coffee tables are meticulously designed to ensure comfort and convenience for the elderly. The seating in the reception and meeting areas features soft cushions and armrests to facilitate the elderly's ease of sitting and standing.

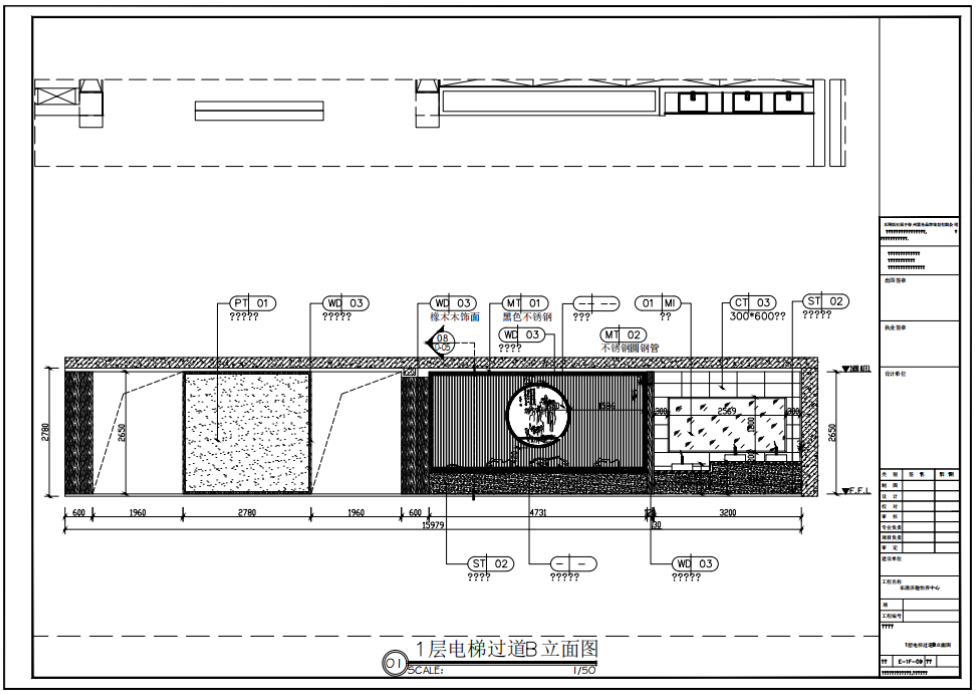


Figure 41 Facade construction drawings
Source Design by the author

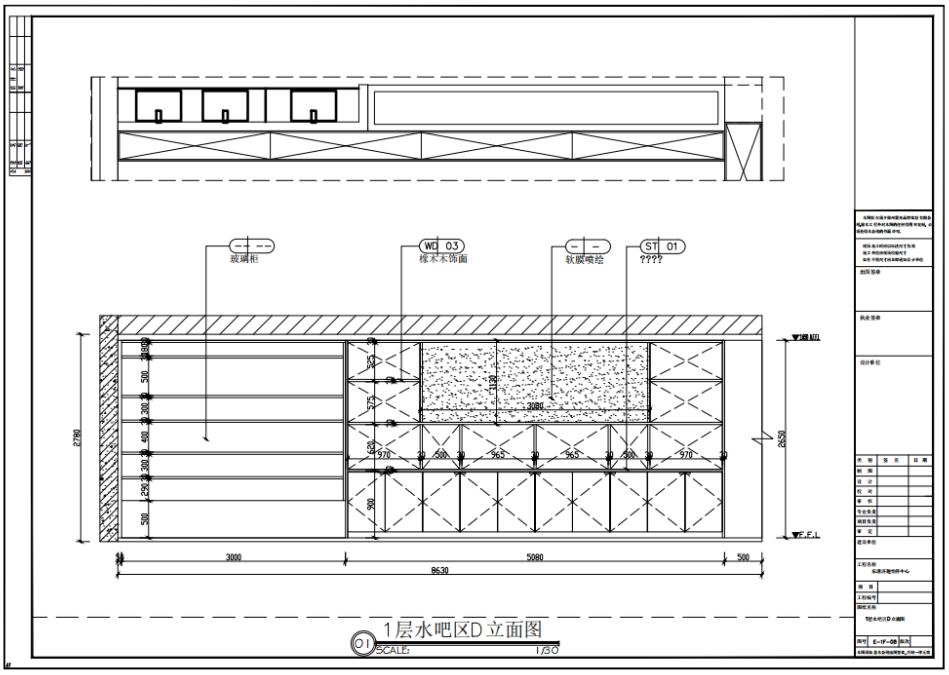


Figure 42 Elevation construction drawing (furniture dimensions)
Source Design by the author

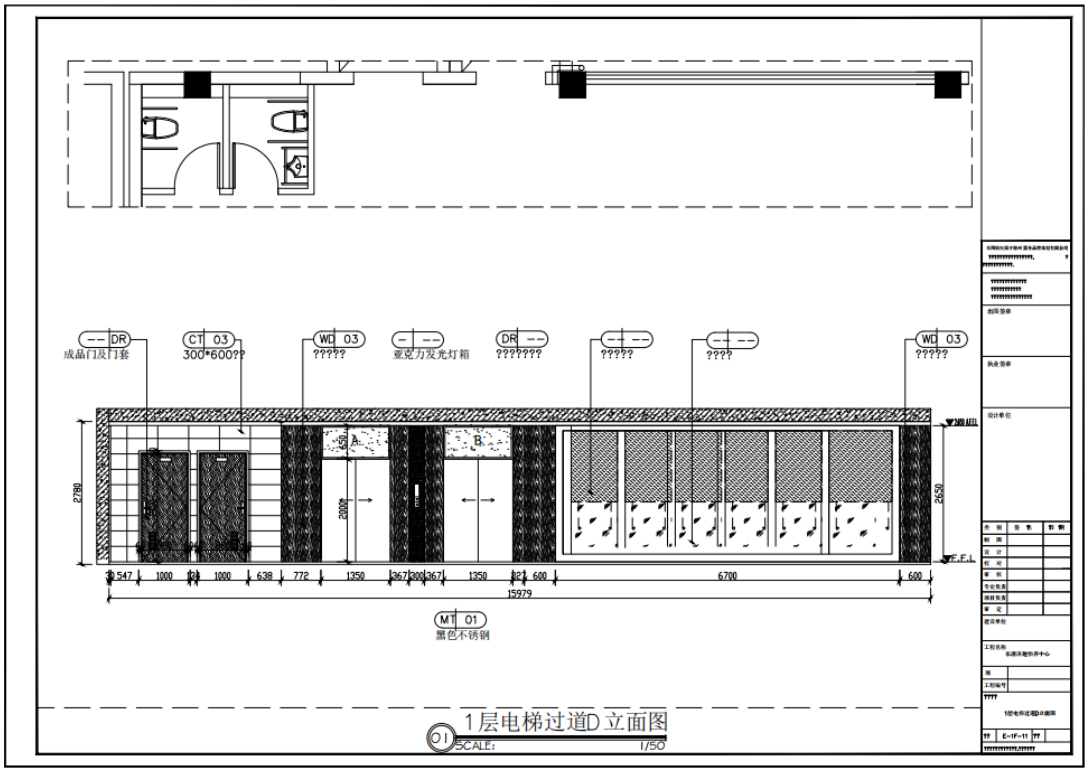


Figure 43 Elevation construction drawing (furniture dimensions)

Source Design by the author

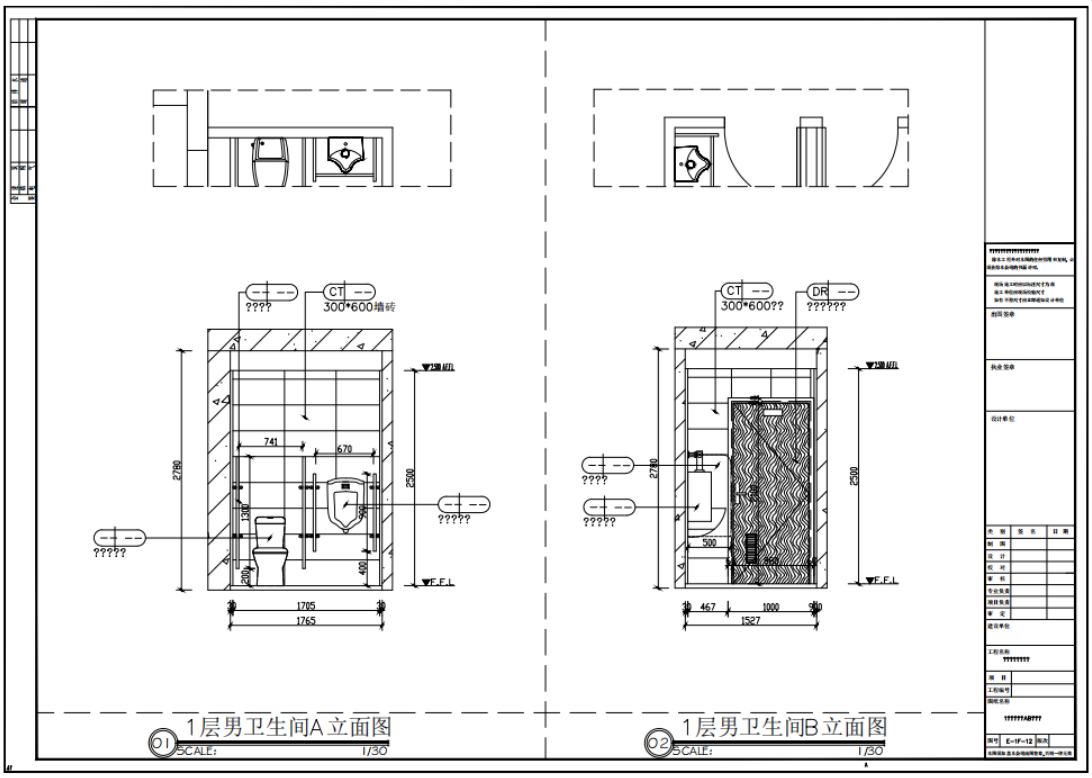


Figure 44 Facade construction drawings
Source Design by the author

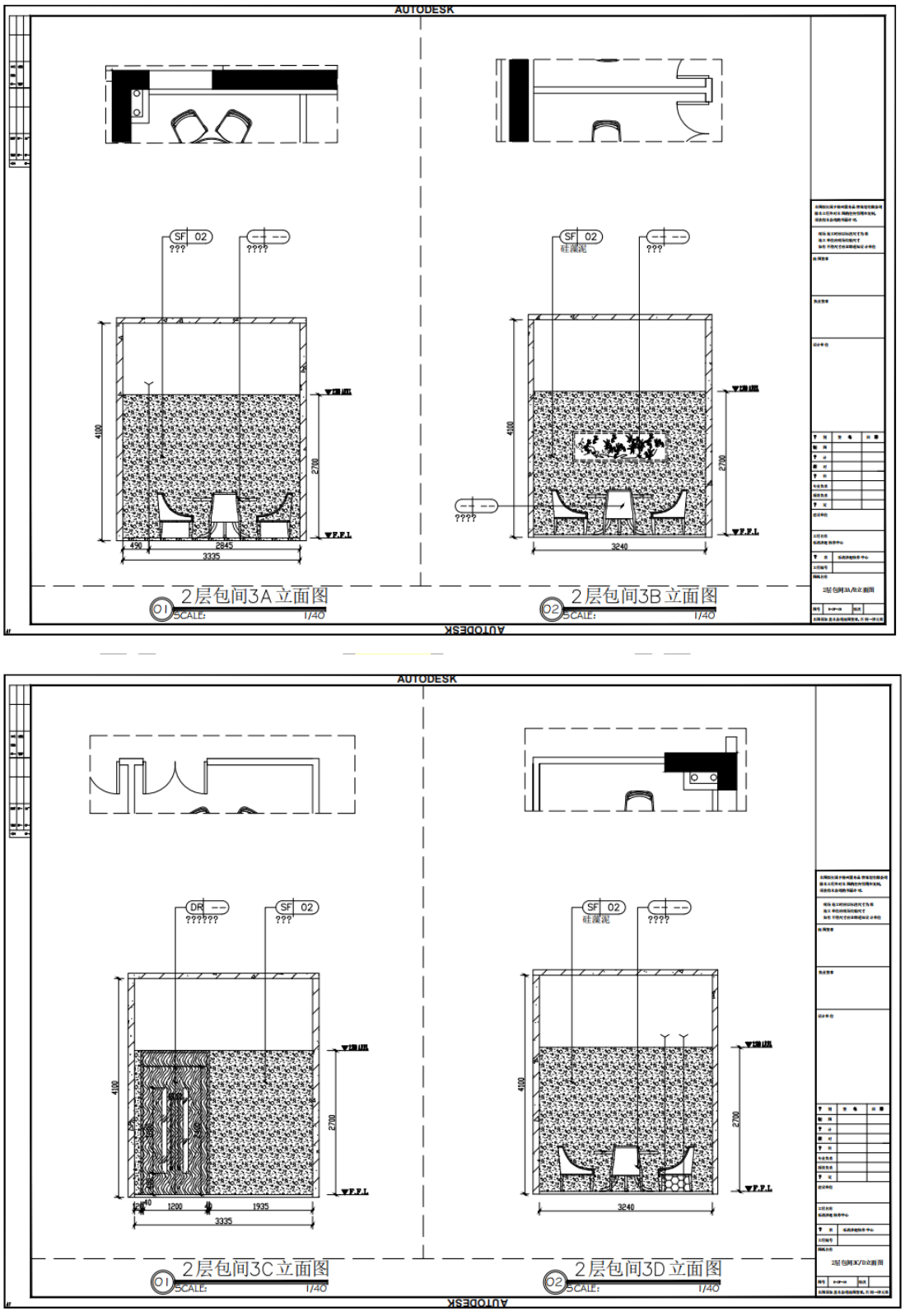
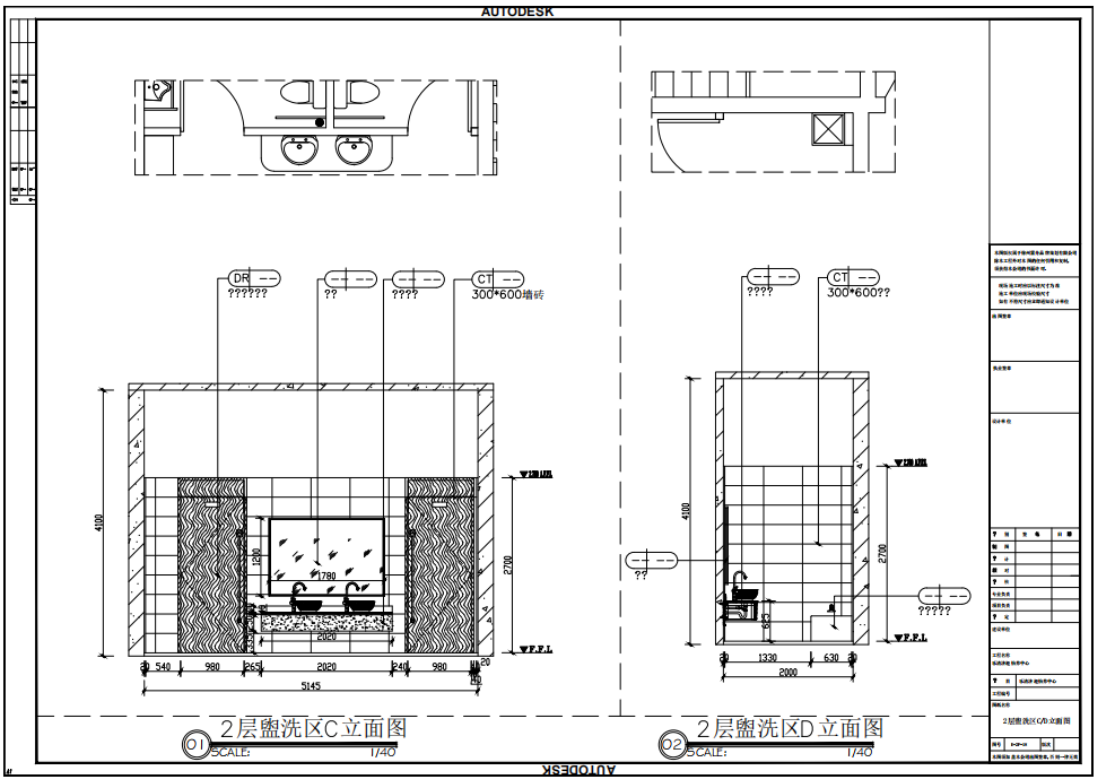


Figure 45 Facade construction drawings
Source Design by the author


AUTODESK
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01
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SCALE: 1/40
AUTODESK

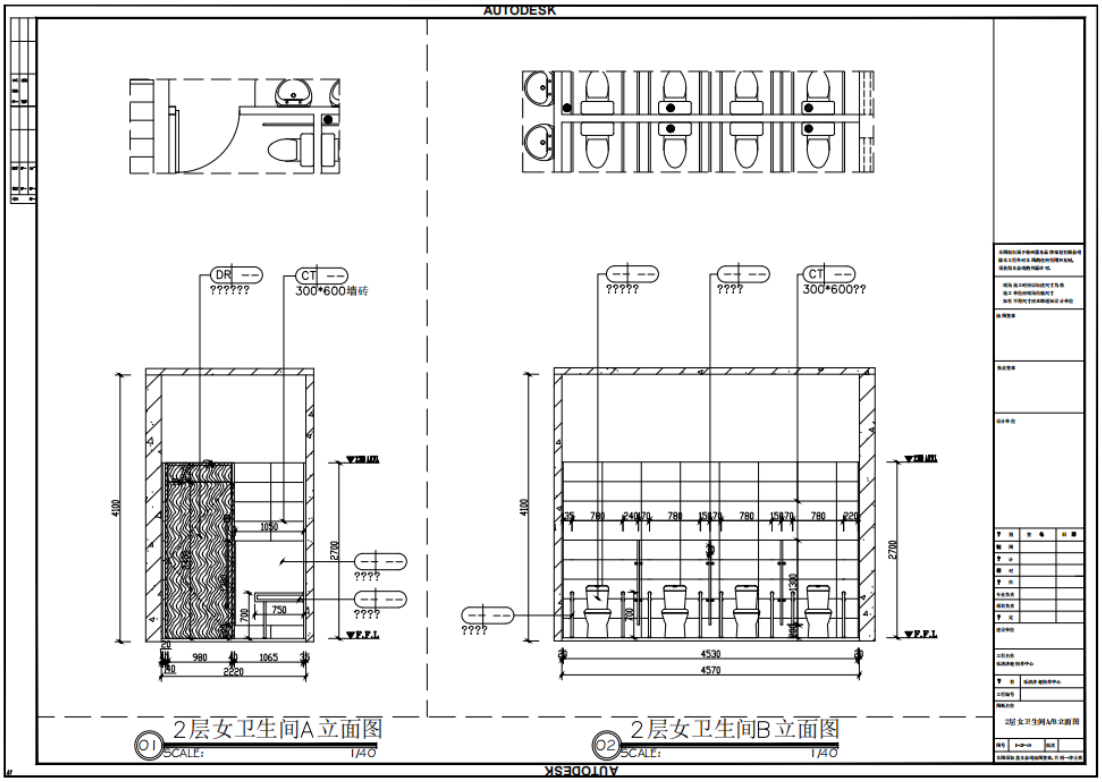

Figure 46 Elevation construction drawing (restroom dimensions)
Source Design by the author

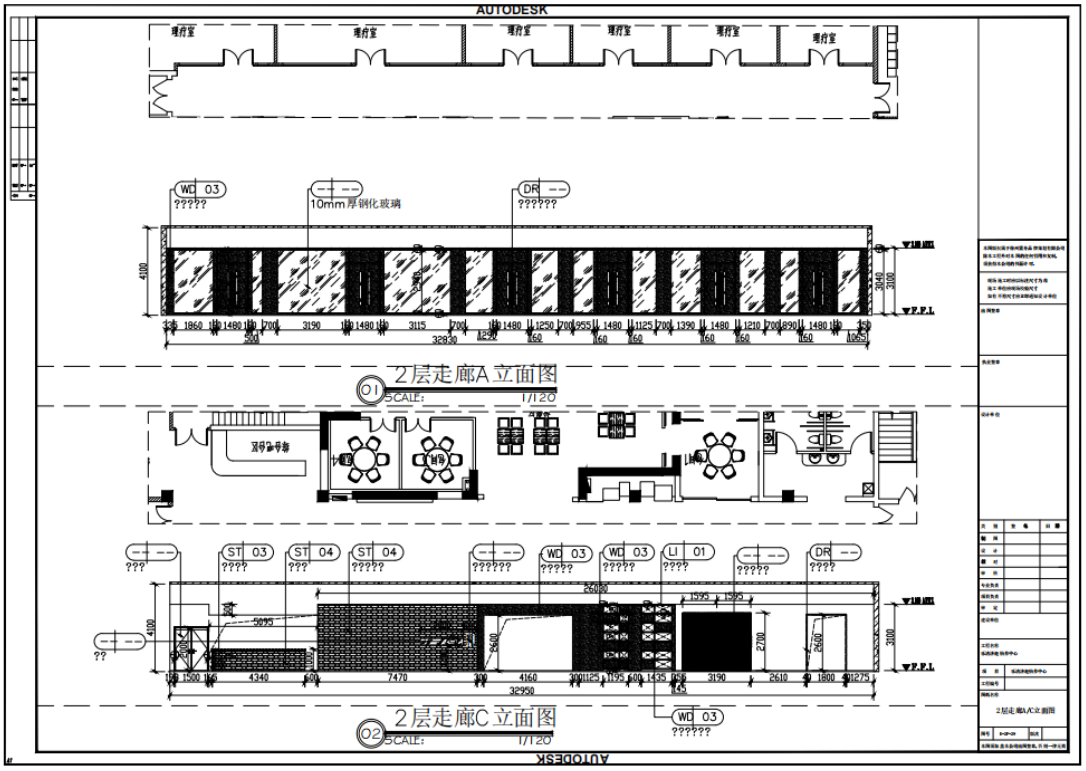

Figure 47 Facade construction drawings
Source Design by the author

Safety and Accessibility

Special attention is given to the safety of the elderly in the design. The flooring materials are chosen for their non-slip properties to reduce the risk of falls. Clear signs and wayfinding systems are installed in all corridors and functional areas to help the elderly quickly find the services they need. Additionally, an emergency call system is set up to ensure quick assistance in case of emergencies.

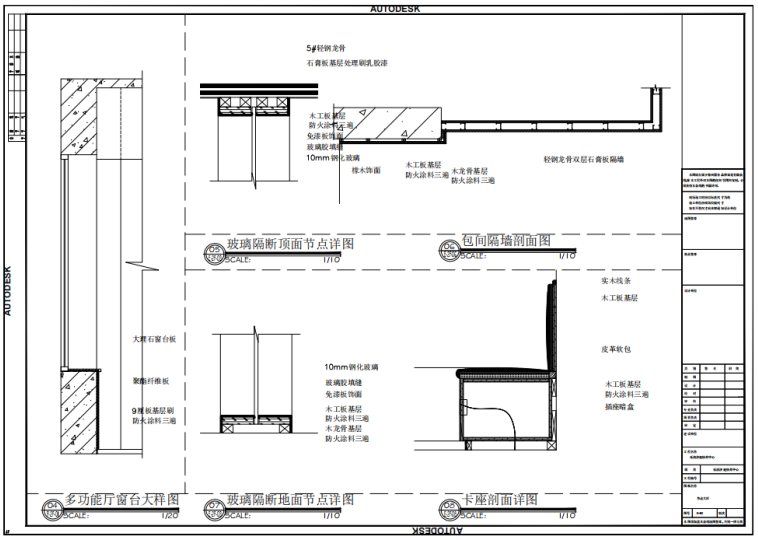

Figure 48 Process node proofing diagram
Source Design by the author

Environmental Comfort

The plant wall not only beautifies the environment but also helps regulate indoor air humidity and quality, providing a healthy and comfortable indoor environment. The arrangement of green plants creates a nature-like space, which contributes to the physical and mental health of the elderly.

In summary, this design fully considers the physical and psychological needs of the elderly. Through a scientifically rational spatial layout, human-centered design details, and rich cultural elements, it aims to provide a comfortable, safe, and culturally enriched dining lobby environment.

Figure 49 Final renderings of theelevator
Source Design by the author

In the design of the hall, we also added landscapes, calligraphy and other works rich in traditional Chinese culture to enhance the intimacy of the elderly while improving

the grade of the indoor space and creating a traditional Chinese quiet atmosphere.

Figure 50 Final renderings of reception
Source Design by the author

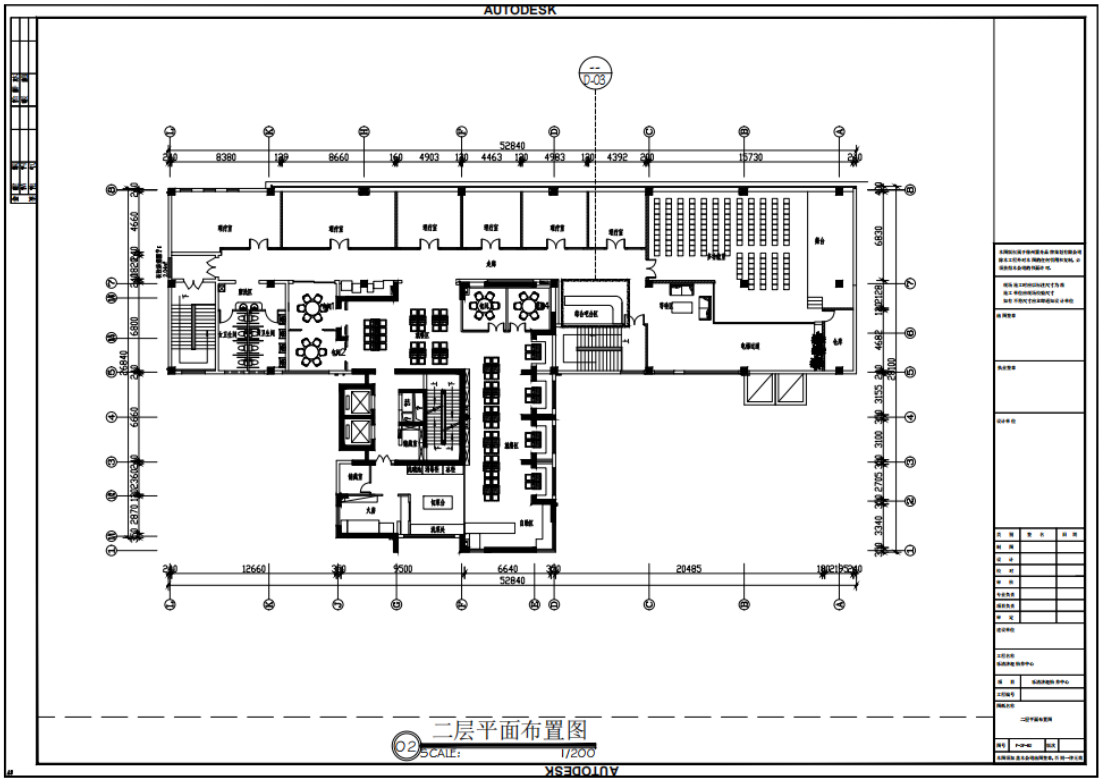

Figure 51 Final renderings of the Dining area
Source Design by the author

Figure 52 Final renderings of the Dining area
Source Design by the author

Figure 53 Final renderings of the Dining area
Source Design by the author

Overview

The nursing home dining area is designed to cater to the collective dining needs of the elderly, including both group dining spaces and private rooms. The design aims to create a comfortable, safe, and engaging environment that addresses both the physical and psychological needs of elderly residents. By incorporating elements of ergonomic design, cultural familiarity, and modern amenities, the dining area serves as a space for nourishment, social interaction, and cultural connection.

Space Layout and Accessibility

Group Dining Area:

The group dining area is designed with spacious walkways and clear sightlines to ensure easy navigation for elderly residents, including those using mobility aids such as walkers or wheelchairs.

The arrangement of tables and chairs follows ergonomic principles, with appropriate spacing to allow for smooth movement and reduce the risk of accidents. Tables are of a height that is comfortable for seated dining, and chairs are equipped with armrests to assist residents in sitting down and standing up.

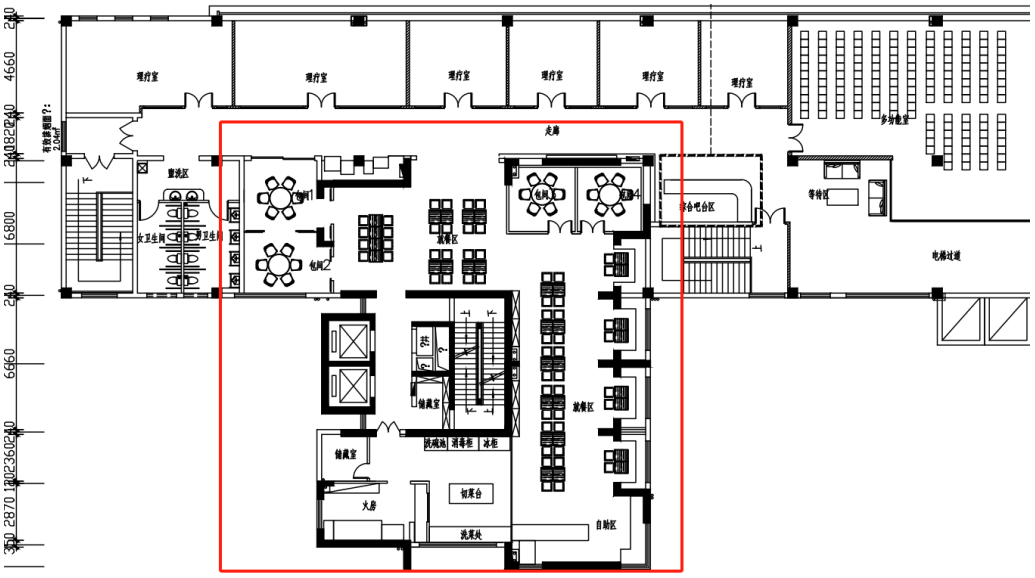

Figure 54 Plane analysis diagram
Source Design by the author

Private Dining Rooms:

The private dining rooms offer a more intimate setting for small groups or family gatherings, providing privacy and a homely atmosphere. These rooms are designed to be easily accessible, with wide doorways and barrier-free entry points.

Each private room is equipped with adjustable lighting and temperature controls to cater to the specific comfort preferences of the elderly residents, ensuring a pleasant dining experience.

Cultural and Aesthetic Elements

Cultural Integration:

The design incorporates elements of local culture, such as the "瓦排" (tile arrangement) design on the walls, reflecting traditional architectural styles from Wenzhou. This helps to create a sense of familiarity and belonging among the elderly residents, many of whom may have grown up with similar surroundings.

Artwork and decorative elements throughout the dining area draw inspiration from traditional Chinese landscapes and cultural motifs, fostering a serene and culturally rich environment.

Natural Elements:

The use of natural materials, such as wood and stone, along with plant walls, brings a touch of nature indoors, promoting relaxation and well-being. The greenery not only enhances the aesthetic appeal but also improves indoor air quality, contributing to a healthier living environment.

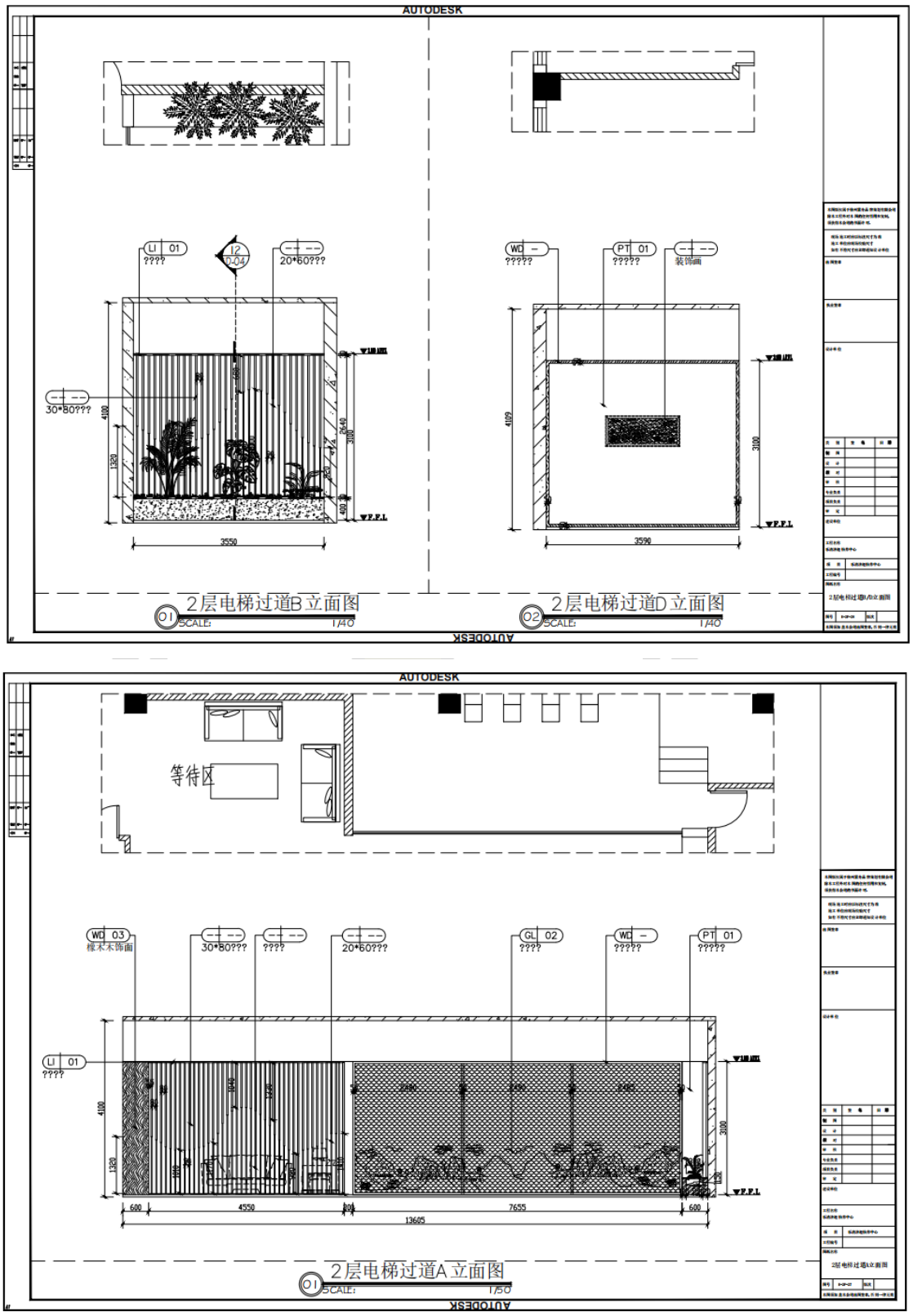

Figure 55 Facade construction drawings（Public area）
Source Design by the author

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Lighting and Acoustics

Lighting:

Natural lighting is maximized through large windows, which also offer scenic views to the outside, creating a connection with nature. This is particularly beneficial for the elderly, as natural light has been shown to improve mood and reduce the symptoms of depression.

In addition to natural lighting, the dining area features adjustable artificial lighting to ensure adequate illumination during evening hours. Soft, warm lighting is used to create a cozy and inviting atmosphere.

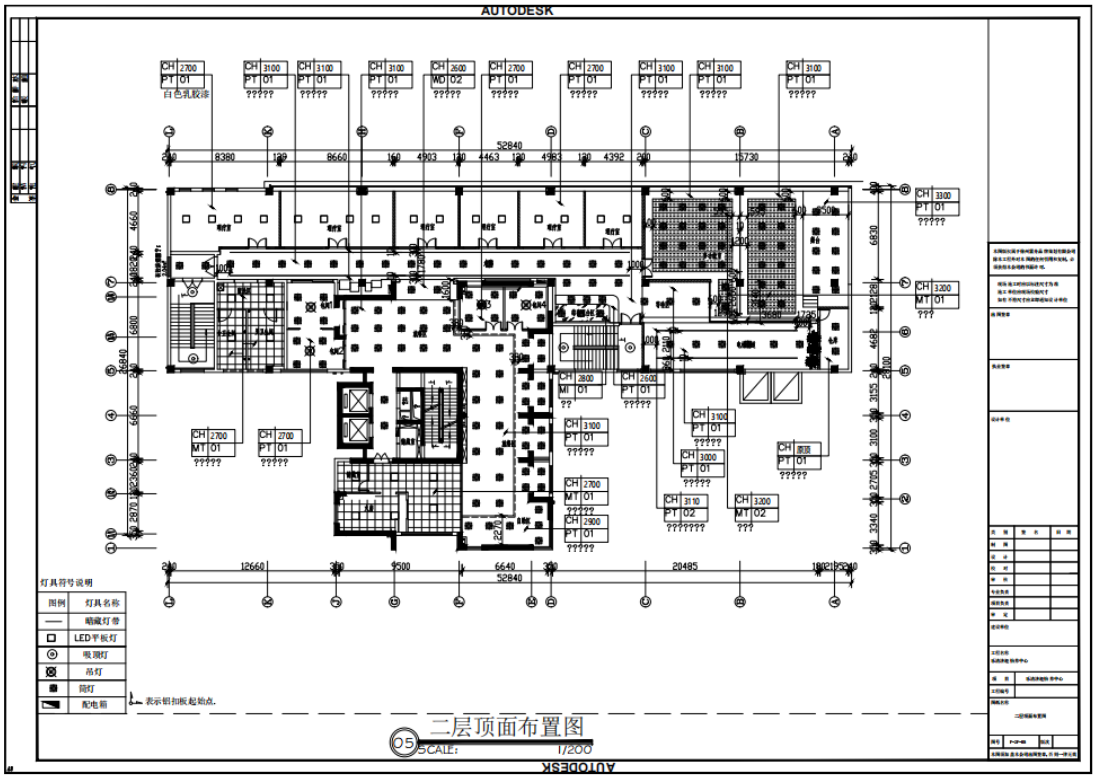


Figure 56 Facade construction drawings（Lamp placement and location）

Source Design by the author

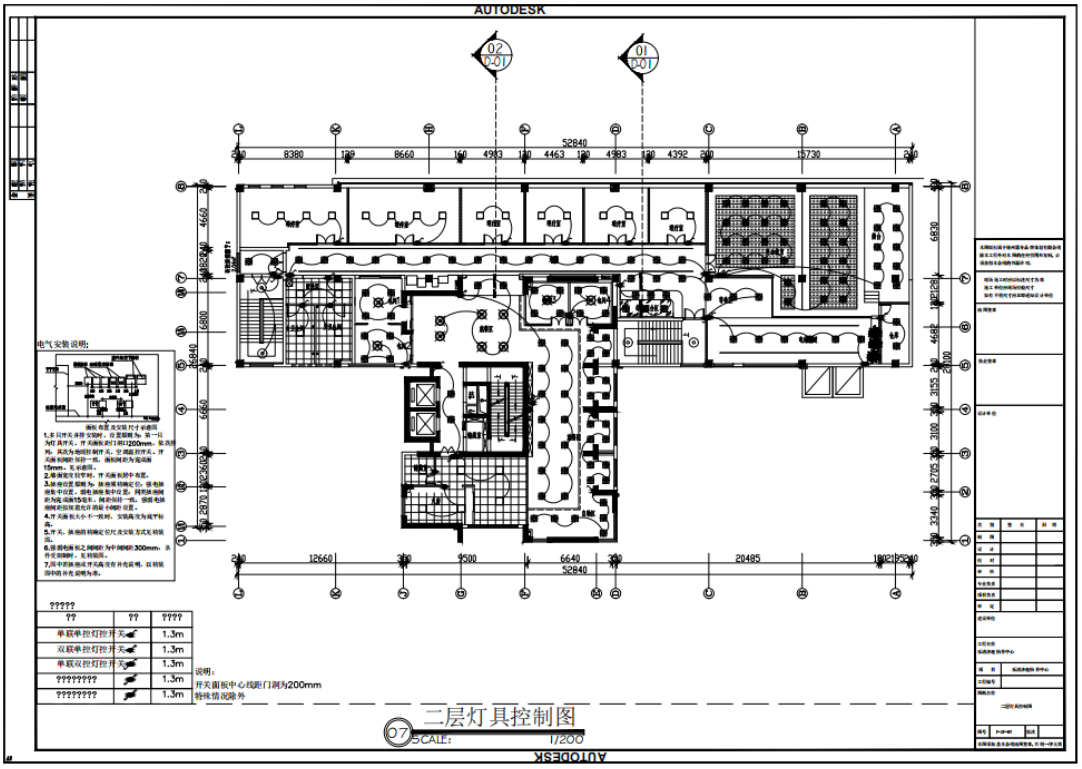


Figure 57 Facade construction drawings（Lamp placement and location）
Source Design by the author

Acoustics:

Acoustic treatments are integrated into the design to reduce noise levels and prevent echo, ensuring a quiet and peaceful dining experience. This is especially important for elderly residents who may have hearing impairments and are sensitive to background noise.

Furniture and Ergonomics

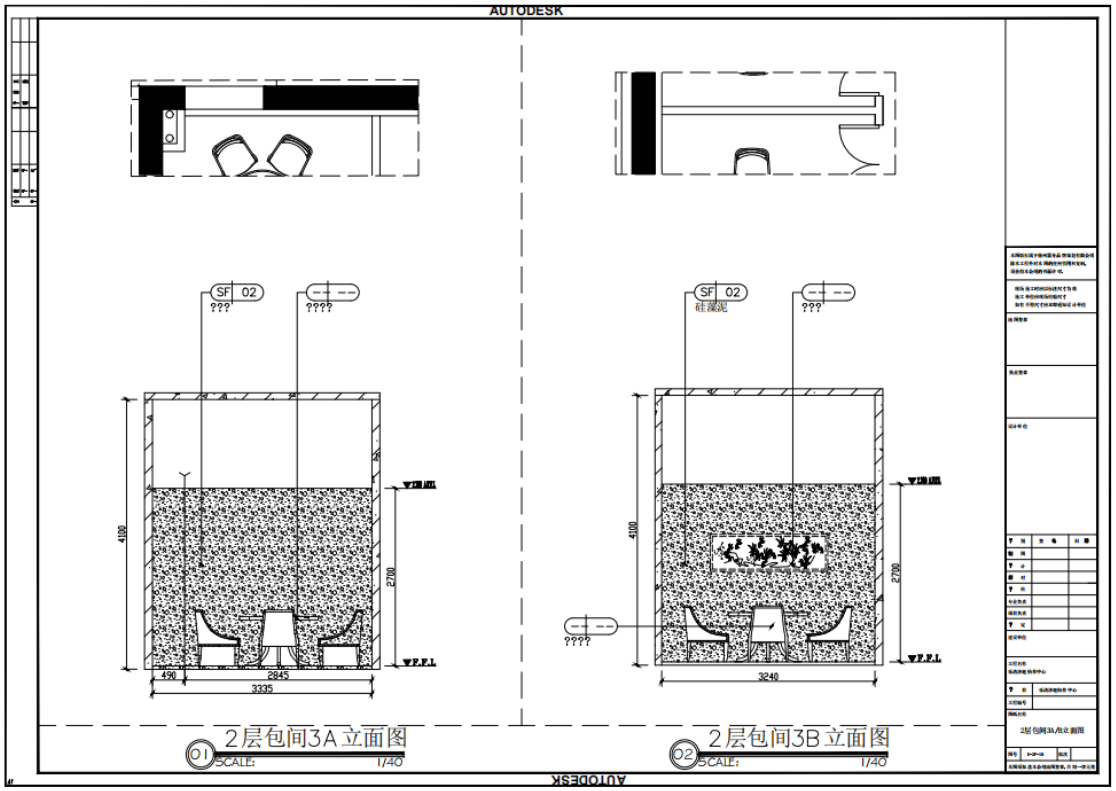
Ergonomic Furniture:

All furniture is designed with ergonomics in mind, ensuring that tables and chairs provide maximum comfort and support. Chairs have padded seats and backs, with armrests to aid in sitting and standing.

Tables are stable and of an appropriate height to facilitate easy dining, with rounded edges to prevent injuries.

Flexibility and Adaptability:

The dining area is designed to be flexible, with furniture that can be easily rearranged to accommodate different group sizes and activities. This adaptability ensures that the space can be used for a variety of purposes, from daily meals to special events and social gatherings.



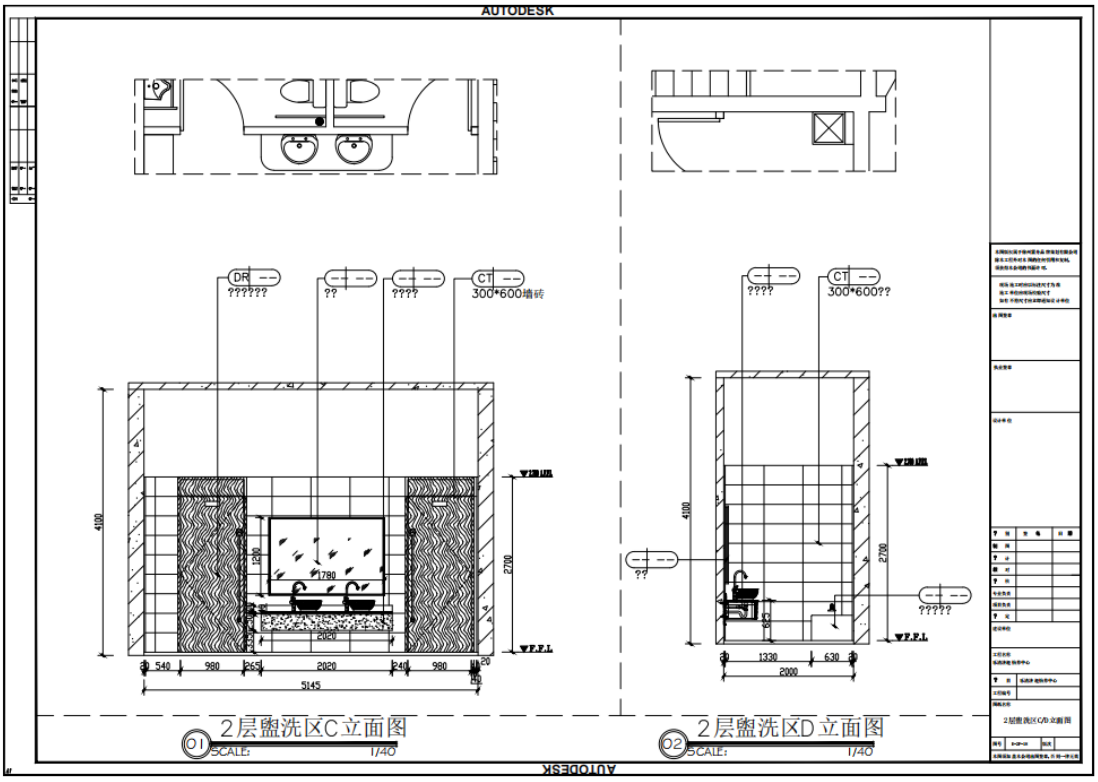


Figure 58 construction drawing (restroom dimensions)
Source Design by the author

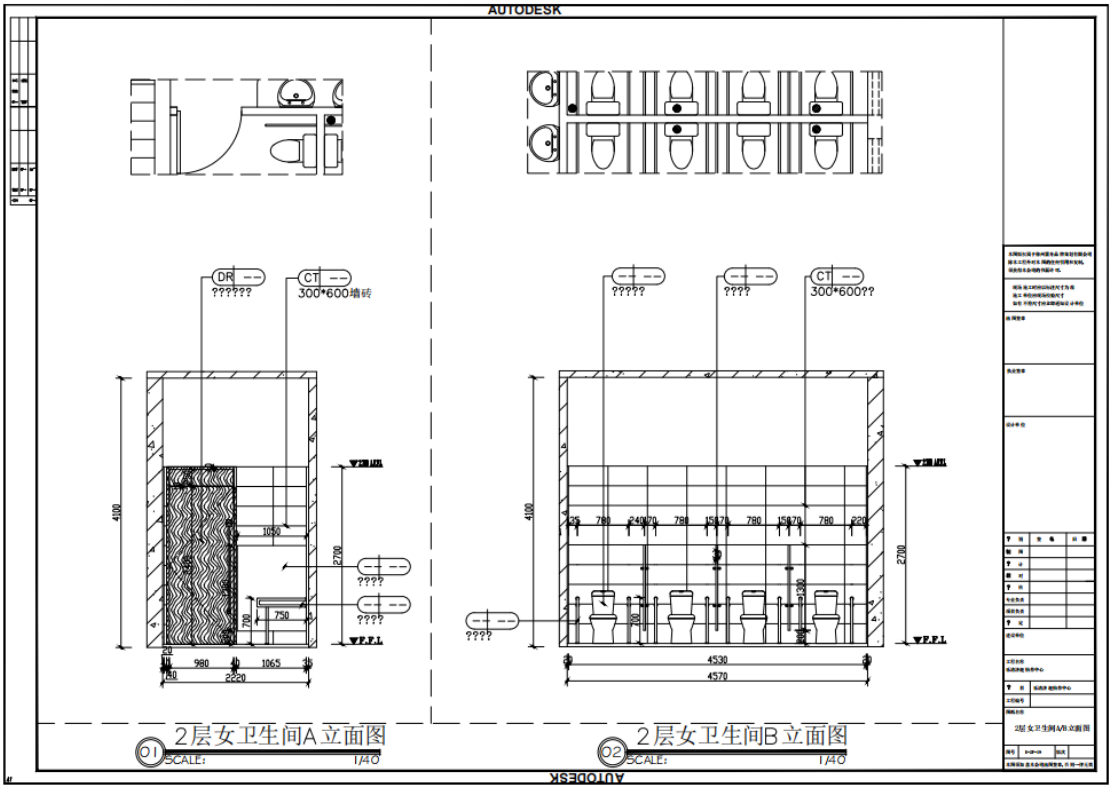


Figure 59 construction drawing (restroom dimensions)
Source Design by the author

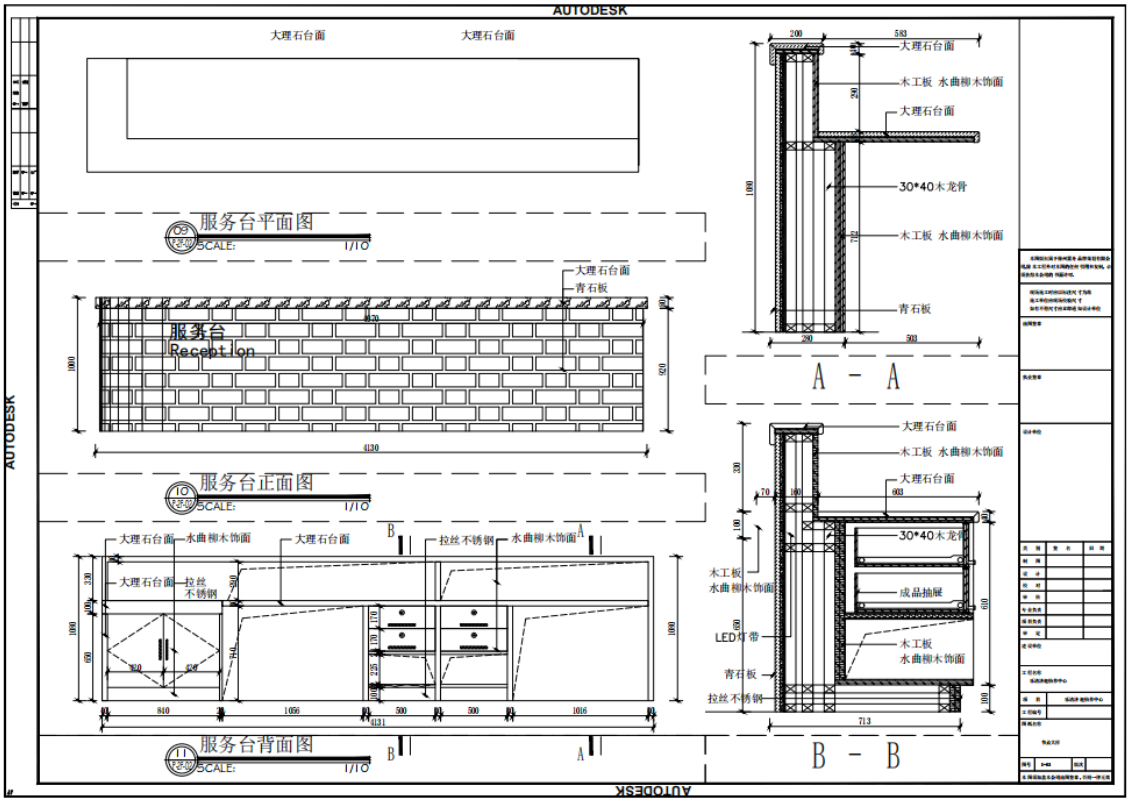


Figure 60 Furniture construction technology and node drawings

Source Design by the author

Safety and Hygiene

Safety Features:

The flooring is made from non-slip materials to prevent falls, and there are no abrupt changes in floor level that could pose a tripping hazard.

Emergency call buttons are strategically placed throughout the dining area to ensure that help is readily available if needed.

Hygiene:

The design includes easy-to-clean surfaces and materials to maintain high standards of hygiene. This is critical in a communal dining setting to prevent the spread of infections and illnesses.

Hand sanitizing stations are placed at the entrances and throughout the dining area to encourage good hygiene practices among residents and staff.

Psychological Well-being

Social Interaction:

The group dining area encourages social interaction by arranging tables in a way that facilitates conversation and community engagement. Regular social events and activities are planned to keep the elderly residents engaged and connected.

The private dining rooms offer a quiet retreat for those who prefer a more peaceful dining experience or wish to spend time with family members in a more intimate setting.

Comfort and Homeliness:

The overall design aims to create a homely and comforting environment, reminiscent of the residents' own homes. This includes the use of familiar colors, textures, and decorative elements that evoke a sense of nostalgia and comfort.By integrating these design elements, the nursing home dining area not only meets the functional needs of elderly residents but also enhances their quality of life through thoughtful, culturally sensitive, and ergonomic design. The space serves as a vital part of the community, promoting physical well-being, social interaction, and psychological comfort.

Figure 61 Final renderings of the Dining area
Source Design by the author

Figure 62 Final renderings of the Aisle room area
Source Design by the author

Figure 63 Final renderings of the Dining area
Source Design by the author

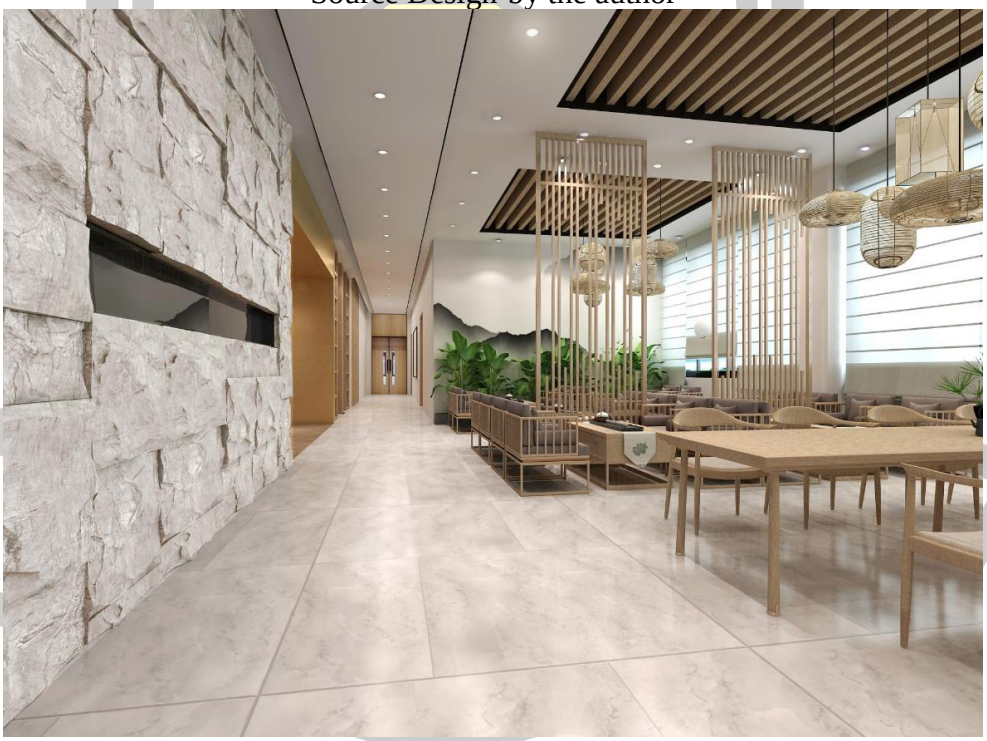


Figure 64 Final renderings of the Dining area
Source Design by the author

The afternoon tea and entertainment area of the nursing home dining space aims to provide elderly residents with a comfortable and enjoyable social and leisure

environment. The design integrates multiple functions such as reception, chess and card games, and afternoon tea, meeting the physical and psychological needs of the elderly through scientific spatial layout and human-centered design elements. The reception area is located near the entrance and main passage, ensuring easy access for elderly residents and visitors to have conversations in a spacious setting with ergonomically designed seating that provides ample lumbar and back support, making it easier for elderly individuals to sit and stand. The chess and card area is positioned in a relatively quiet spot to ensure that elderly residents can focus on their games without external disturbances. The height and design of the tables and chairs have been carefully considered to ensure comfort during prolonged gameplay.

The afternoon tea area is located near the windows, allowing natural light to create a warm dining atmosphere. The flexible arrangement of tables and chairs can accommodate both small gatherings and larger social activities. The design also incorporates rich cultural elements and natural materials, such as decorative paintings and plant walls, which not only beautify the environment but also purify the air, enhancing the cultural identity and sense of belonging among the elderly. In terms of lighting, large windows introduce natural light, improving visual comfort, while soft, adjustable artificial lighting ensures adequate illumination during the evening. For acoustics, the walls and ceilings are treated with acoustic materials to reduce noise and echo, providing a quiet leisure environment.

All furniture designs adhere to ergonomic principles, offering maximum comfort and support. Chairs feature soft cushions and backrests, with armrests designed to facilitate sitting and standing, preventing falls and injuries. Safety is ensured with non-slip flooring and emergency call buttons strategically placed throughout the area, allowing for quick assistance in case of emergencies. The design also includes easy-to-clean surfaces and materials to maintain high hygiene standards, with hand sanitizing stations at the entrance and throughout the area to protect the health of elderly residents and visitors. Through these design elements, the entertainment area not only meets the functional needs of the elderly but also enhances their quality of life with thoughtful human-centered design and cultural elements, providing a comfortable, safe, and vibrant space for leisure and social interaction.And build safe and reliable indoor environments with complete material systems.

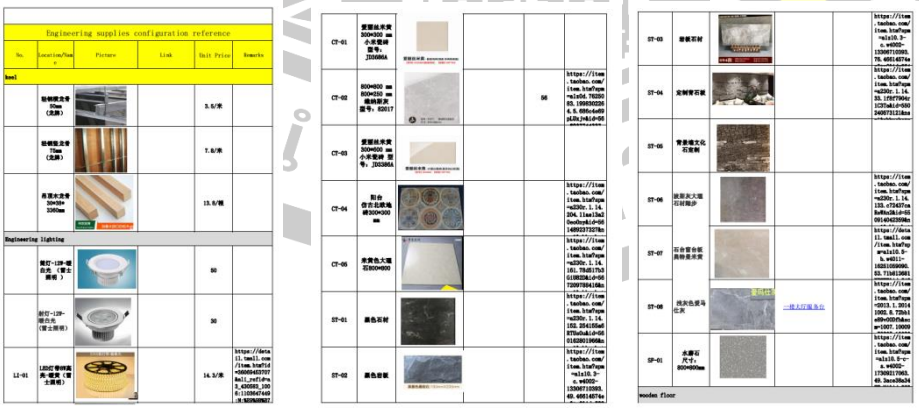


Figure 65 Material list
Source Design by the author

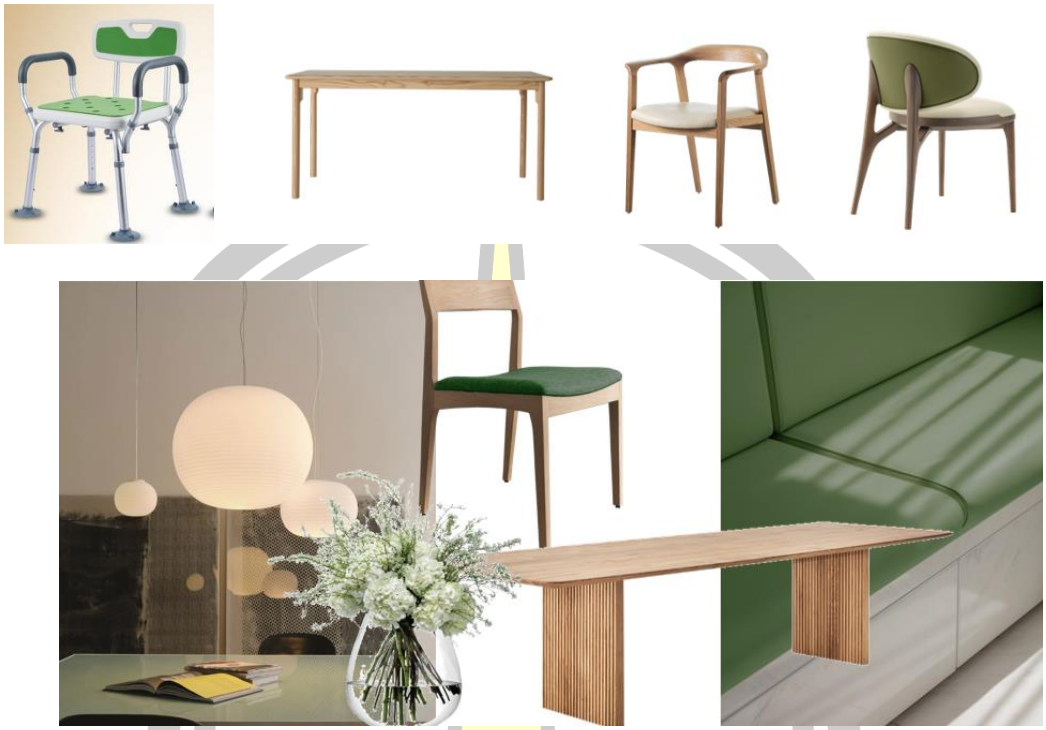


Figure 66 Furniture soft furnishing material list
Source Design by the author

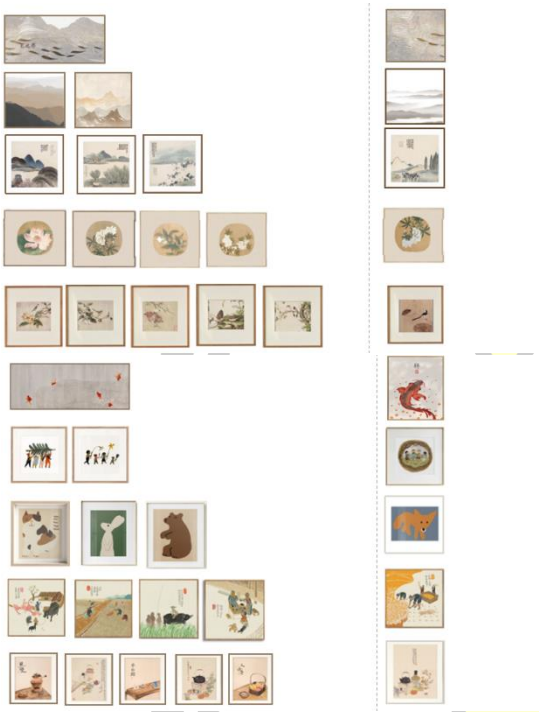


Figure 67 Decorative painting series
Source Design by the author

Figure 68 Expand installation products

4.5 Customer Satisfaction Survey

1. Space Rationality

Item	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Is the dining area layout reasonable?	0%	0%	0%	25%	75%
Is the width of the passageways sufficient?	0%	0%	0%	28%	72%
Is the furniture placement convenient for users?	0%	0%	0%	30%	70%
Is the functional area division clear?	0%	0%	0%	27%	73%

2. Feasibility

Item	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Does the design consider the needs of the elderly?	0%	0%	0%	26%	74%
Are the functional areas easy to use?	0%	0%	0%	25%	75%
Are the accessibility facilities complete?	0%	0%	0%	28%	72%
Is the lighting design suitable?	0%	0%	0%	27%	73%

3. Comfort

Item	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Comfort of chairs and tables	0%	0%	0%	28%	72%
Is the indoor temperature pleasant?	0%	0%	0%	27%	73%
Is the noise level appropriate?	0%	0%	0%	26%	74%
Is the air quality good?	0%	0%	0%	28%	72%

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4. Color Satisfaction

Item	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Are the wall colors pleasant?	0%	0%	0%	30%	70%
Is the furniture color coordinated?	0%	0%	0%	28%	72%
Is the lighting color comfortable?	0%	0%	0%	29%	71%
Is the overall color scheme harmonious?	0%	0%	0%	27%	73%

Table 7 Post-design comprehensive satisfaction survey summary table

Summary of Nursing Home Space Design Satisfaction Survey Results

This survey involved 100 participants, covering roles such as employers, users (elderly residents), family members of users, restaurant servers, chefs, and caregivers. The survey assessed the satisfaction levels with the nursing home space design in terms of rationality, feasibility, comfort, and color satisfaction.

Space Rationality : Most participants expressed high satisfaction with the layout of the dining area and the width of the passageways, with 75% and 72% of participants giving 5-star ratings, respectively. This indicates that the current design is highly reasonable in terms of space utilization and passage arrangement.

Feasibility : Over 70% of participants gave 5-star ratings for design consideration of elderly needs and the ease of use of functional areas. Additionally, accessibility facilities and lighting design received high marks, with 72% and 73% 5-star ratings, reflecting that the design is highly feasible and meets the daily needs of the elderly.

Comfort : The majority of participants are highly satisfied with the comfort of chairs and tables, indoor temperature, noise level, and air quality, with over 70% giving 5-star ratings in each category. This shows that the design provides a comfortable environment for residents.

Color Satisfaction : Participants generally expressed high satisfaction with the wall colors, furniture colors, and overall color coordination, with more than 70% giving 5-star ratings. However, the lighting color, while still rated highly, has a slightly lower percentage of 5-star ratings at 71%, indicating room for slight improvement.

From this survey, it is evident that the nursing home space design has achieved high satisfaction in multiple aspects, though some areas still require further optimization and improvement. For noise level and lighting color, slight adjustments can be made to enhance overall comfort. Continuing to focus on and meet the personalized needs of the elderly will help further improve the satisfaction with the nursing home space design.

4.6 Conclusion

Through the analysis of the satisfaction survey table on the elderly care facility's spatial design, as well as the presentation of the renderings, we can draw some key conclusions and recommendations to further optimize the design of the elderly care facility's dining space.

Firstly, from the perspective of spatial rationality, most participants expressed high satisfaction with the layout and width of the pathways in the dining area, indicating that the current design is reasonable in terms of space utilization and pathway arrangement. The dining area is spacious and bright, with wide enough pathways to ensure smooth passage for wheelchairs and walkers. The arrangement of chairs and tables takes into

consideration the convenience of elderly people's movements, ensuring comfort and convenience for users during meals.

In terms of feasibility, over 70% of participants believe that the design takes into account the needs of the elderly, and each functional area is easy to use. The completeness of barrier-free facilities has been highly praised, reflecting the high operability of the design in practical use. For example, barrier-free design is used in the layout of the dining space, ensuring that everyone can easily move between different areas. The lighting design has also received high satisfaction ratings, with soft lighting not only providing good visibility but also creating a warm atmosphere.

In terms of comfort, the majority of participants expressed high satisfaction with the comfort of the chairs and tables, indoor temperature, noise levels, and air quality. This indicates that the design excels in providing a comfortable environment. From the renderings, it can be seen that the chair design conforms to ergonomics, being comfortable and supportive. The indoor temperature is maintained within a pleasant range through a reasonable air conditioning system, noise is properly controlled, providing a quiet dining environment. Furthermore, the good air quality is attributed to a well-designed ventilation system and the proper layout of green plants, ensuring fresh indoor air.

In terms of color satisfaction, the wall color, furniture color, and overall color coordination received high praise. The color design shown in the renderings adopts soft neutral tones, combined with wooden elements, creating a warm and comfortable atmosphere. The artistic decorations on the walls and green plants add visual depth and vitality. Although the comfort level of the lighting color tone is slightly low, 71% of the participants still gave it a 5-star rating, indicating that the lighting design is overall successful, with just a slight improvement needed.

By combining the research results with the renderings analysis, we can draw some optimization suggestions. Firstly, further improvements can be made in the lighting design by adjusting the color temperature and brightness of the lights to enhance overall comfort and visual effects. Secondly, further optimization can be done in noise control by using more soundproofing materials and designs to ensure a quiet and comfortable dining area.

Lastly, continuing to focus on and meet the personalized needs of the elderly will help further improve the satisfaction of the elderly care facility's spatial design. For example, adding more personalized service options such as private dining areas and multi-functional activity spaces to meet the needs and preferences of different elderly individuals. Through continuous optimization and improvement, we can create a more comfortable, warm, and convenient living environment for the elderly, enhancing their quality of life and sense of happiness.

Chapter V

Conclusion

5.1 Summary

The design of dining spaces in elderly care facilities needs to consider the physiological and psychological needs of the elderly, as well as the integration of local cultural characteristics and barrier-free design. This article will propose a design scheme to optimize the dining space in elderly care facilities through analysis of the dining culture in Yueqing, Wenzhou, barrier-free design, environmental psychology, and consumer behavior demands.

Questionnaire Result data

Dimension	Item number	Item content
Spatial circulation	SF1	The entrance position of the restaurant is reasonable and convenient for access.
	SF2	The internal circulation of the restaurant is smooth, with perfect barrier-free design.
	SF3	The layout of dining area, serving area, and washing area is reasonable and convenient to use.
	SF4	The spatial division of the restaurant meets different activity needs, such as dining, socializing, etc.
Feasibility	FE1	The design of the restaurant meets the actual needs of the nursing home.
	FE2	The design of the restaurant takes into account the characteristics and needs of different elderly people.
	FE3	The design of the restaurant facilitates the service and management of the staff.
	FE4	The design of the restaurant has a certain flexibility and can be adjusted as needed.
Comfort	CM1	The restaurant has good natural lighting and comfortable illumination.
	CM2	The restaurant has good ventilation, and the air is fresh.
	CM3	The restaurant has proper noise control, creating a quiet dining environment.
	CM4	The temperature in the restaurant is suitable, warm in winter and cool in summer.
Color	CO1	The restaurant's color coordination is reasonable and helps create a good dining atmosphere.
	CO2	The restaurant's colors meet the aesthetic and psychological needs of the elderly.
	CO3	The restaurant's colors are coordinated with the overall environment, creating a unified visual effect.
	CO4	The use of colors in the restaurant helps differentiate different functional areas.

Safety	SA1	The non-slip floor in the restaurant is conducive to safe walking for the elderly.
	SA2	The furniture material and design in the restaurant are safe, with no sharp edges or corners.
	SA3	The fire safety facilities in the restaurant are complete, and the evacuation routes are unobstructed.
	SA4	The design of the restaurant fully considers the behavioral characteristics of the elderly, reducing safety hazards.
Environmental protection	EP1	The building materials in the restaurant are environmentally friendly and do not harm the health of the elderly.
	EP2	The restaurant uses energy-saving and environmentally friendly equipment and appliances.
	EP3	The design of the restaurant is conducive to reducing energy consumption, such as natural lighting and ventilation.
	EP4	The waste disposal in the restaurant meets environmental protection requirements.
Ergonomic design	HD1	The design of the restaurant reflects care and respect for the elderly.
	HD2	The design of the restaurant takes into account the physiological and psychological characteristics of the elderly, providing personalized design.
	HD3	The design of the restaurant creates a warm, family-like atmosphere.
	HD4	The design of the restaurant encourages communication and interaction among the elderly.
Cultural integration	CI1	The design of the restaurant incorporates local cultural elements.
	CI2	The decoration of the restaurant reflects the characteristics and concepts of the nursing home.
	CI3	The design of the restaurant helps enrich the cultural life of the elderly.
	CI4	The environment of the restaurant is adapted to the living habits and values of the elderly.

Table 8 SPSS Questionnaire result data

With the intensification of social aging, nursing homes, as important places for the elderly, the environmental design has a profound impact on the quality of life and physical and mental health of the elderly. Among them, the restaurant, as one of the core areas of the nursing home, not only serves the function of meeting the daily dietary needs of the elderly, but also serves as an important space for social activities and cultural life of the elderly. Therefore, the satisfaction evaluation of the nursing home restaurant environment design is of great significance for improving the quality of nursing home services and enhancing the living experience of the elderly.

Based on the multidimensional characteristics of the nursing home restaurant environment design, this study starts from eight dimensions including spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomics design, and cultural integration, and constructs an evaluation index system for the satisfaction of nursing home restaurant environment design. Through in-depth analysis and quantitative investigation of various dimensions, we strive to comprehensively and objectively reflect the subjective feelings and satisfaction of the elderly towards the environmental design of the restaurant in nursing homes.

Firstly, spatial circulation is a key factor affecting the convenience and comfort of the elderly in using the restaurant. Reasonable entrance location, smooth internal circulation, complete barrier-free design, and scientific functional zoning can effectively reduce the walking distance for the elderly, improve space utilization efficiency, and meet the diverse activity needs of the elderly. At the same time, considering the physiological characteristics and behavioral habits of the elderly, the spatial layout of the restaurant should be clear and easy to identify, avoiding being overly complex or causing spatial disorientation.

Furthermore, the feasibility of restaurant design directly affects the operation management and service quality of nursing homes. The design proposal should fully consider the actual needs of nursing homes, the characteristics of the elderly, and the convenience of the staff's service. Through segmentation research on different elderly groups, provide personalized and diversified dining environments and service content. In addition, flexibility is also one of the important indicators for measuring design feasibility. With the passage of time and changes in demand, the restaurant environment should have a certain adjustment space to adapt to the dynamic development of nursing home operations.

Once again, comfort is a core element that affects the dining experience and emotional satisfaction of the elderly. Good lighting, fresh air quality, suitable temperature and humidity, and a low noise environment can create a comfortable dining atmosphere, reduce environmental stress, and enhance the physical and mental well-being of the elderly. At the same time, humanized seat design, reasonable table height, and accessible washing facilities are indispensable elements for creating a comfortable dining environment.

Color, as an important component of visual design, plays a unique role in shaping the restaurant atmosphere and guiding the emotions of the elderly. Reasonable color matching can not only create a good dining environment but also meet the aesthetic needs and psychological expectations of the elderly. According to the theory of color psychology, warm tones and low saturation colors should be prioritized to create a warm and soothing visual effect. At the same time, colors can also be used to differentiate different functional areas, such as dining areas, leisure areas, etc., enhancing spatial recognition and interest.

Safety is the primary principle and basic requirement of restaurant design in elderly care facilities. Non-slip and wear-resistant flooring materials, rounded and safe furniture design, complete fire protection facilities, and spatial layouts that cater to the

behavioral characteristics of the elderly are all key measures to ensure the safety of elderly dining. At the same time, restaurant design should also fully consider the perception and reaction ability of the elderly, providing intuitive, easy-to-read safety instructions and operation tips to minimize the risk of accidents.

The concept of environmental protection is an important development direction in contemporary architectural design, and it is also important for the environmental design of the restaurant in nursing homes. By using environmentally friendly building materials, selecting energy-saving and environmentally friendly equipment, and creating a naturally comfortable lighting and ventilation effect, it is not only beneficial for protecting the physical and mental health of the elderly, but also reducing energy consumption and achieving sustainable development. In addition, the classification and recycling of restaurant waste is also an important measure to practice environmental protection concepts and enhance the environmental awareness of the elderly.

Ergonomic design is the core essence of the environmental design of the restaurant in nursing homes, reflecting care and respect for the elderly. By conducting in-depth research on the physiological and psychological characteristics of the elderly, personalized and diverse dining services and environmental atmosphere are provided. A warm and comfortable dining environment, creating a family-like atmosphere, can meet the emotional needs of the elderly, enhance their sense of belonging and happiness. At the same time, the restaurant environment design should also encourage communication and interaction among the elderly, create a good social atmosphere, and enrich the spiritual and cultural life of the elderly.

Finally, cultural integration is an important way to demonstrate the characteristics of the nursing home and inherit regional culture. Integrating local cultural elements into restaurant design can not only enhance the cultural identity of the elderly, but also enrich their spiritual life and improve their quality of life. At the same time, the restaurant environment design should also reflect the nursing home's management philosophy and service tenet, create a dining environment that is in line with the elderly's living habits and values, and enhance the elderly's sense of identity and belonging to the nursing home.

The satisfaction evaluation of the nursing home restaurant environment design is a complex systematic project, involving multiple dimensions such as spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomics design, and cultural integration. This study constructs a multidimensional evaluation index system, aiming to comprehensively and objectively reflect the subjective feelings and satisfaction of the elderly towards the restaurant design in nursing homes. At the same time, this study also provides theoretical references and practical guidelines for the restaurant design in nursing homes, with the aim of improving the quality of service in nursing homes, creating a comfortable, safe, and dignified living environment for the elderly, and effectively enhancing their sense of achievement, happiness, and security.

Analysis of variable scores

Dimension	Items	Mean value	Standard Deviation	Dimension Mean Value	Dimension Standard Deviation
Spatial circulation	SF1	3.575	1.162	3.564	1.013
	SF2	3.619	1.263		
	SF3	3.486	1.255		
	SF4	3.575	1.234		
Feasibility	FE1	3.409	1.246	3.365	1.065
	FE2	3.320	1.252		
	FE3	3.401	1.222		

	FE4	3.332	1.305		
Comfort	CM1	3.656	1.189	3.680	0.967
	CM2	3.704	1.188		
	CM3	3.696	1.162		
	CM4	3.664	1.201		
Color	CO1	3.668	1.247	3.679	1.038
	CO2	3.733	1.237		
	CO3	3.628	1.209		
	CO4	3.688	1.231		
Safety	SA1	3.543	1.261	3.541	1.034
	SA2	3.599	1.274		
	SA3	3.522	1.255		
	SA4	3.502	1.236		
Environmental protection	EP1	3.640	1.235	3.580	1.012
	EP2	3.615	1.207		
	EP3	3.571	1.273		
	EP4	3.494	1.236		
Ergonomic design	HD1	3.486	1.249	3.488	1.090
	HD2	3.425	1.263		
	HD3	3.551	1.258		
	HD4	3.490	1.361		
Cultural integration	CI1	3.275	1.433	3.280	1.179
	CI2	3.215	1.358		
	CI3	3.304	1.359		
	CI4	3.328	1.403		

Table 9 SPSS Analysis of variable scores

Analysis of Variance

Analysis Item	Item	Sample Size	Mean value	Standard Deviation	*F*	*p*
	Employer	19	3.75	0.75	1.092	0.369

Spatial circulation	Residents (elderly population)	44	3.68	0.95		
	Family Member	28	3.77	0.82		
	Management Service Provider	24	3.61	0.95		
	Medical Staff	34	3.68	1.06		
	Architect	50	3.35	1.15		
	Fire Inspector	20	3.23	1.22		
	Elderly Care Expert	28	3.49	1.01		
	Total	247	3.56	1.01		
Feasibility	Employer	19	3.79	0.83	1.092	0.369
	Residents (elderly population)	44	3.36	1.14		
	Family Member	28	3.45	0.79		
	Management Service Provider	24	3.34	0.87		
	Medical Staff	34	3.44	1.02		
	Architect	50	3.26	1.18		
	Fire Inspector	20	2.91	1.23		
	Elderly Care Expert	28	3.45	1.16		
	Total	247	3.37	1.07		
Comfort	Employer	19	3.82	0.67	2.547	0.015*
	Residents (elderly population)	44	3.64	1.07		
	Family Member	28	3.62	1.04		
	Management Service Provider	24	3.52	0.93		
	Medical Staff	34	4.11	0.67		
	Architect	50	3.56	0.99		
	Fire Inspector	20	3.13	1.18		
	Elderly Care Expert	28	3.93	0.84		
	Total	247	3.68	0.97		

Color	Employer	19	4.16	0.80	1.587	0.140
	Residents (elderly population)	44	3.72	0.93		
	Family Member	28	3.41	0.97		
	Management Service Provider	24	3.70	1.03		
	Medical Staff	34	3.93	0.92		
	Architect	50	3.56	1.11		
	Fire Inspector	20	3.34	1.35		
	Elderly Care Expert	28	3.70	1.09		
	Total	247	3.68	1.04		
Safety	Employer	19	3.50	0.94	0.623	0.737
	Residents (elderly population)	44	3.61	0.99		
	Family Member	28	3.46	0.91		
	Management Service Provider	24	3.74	0.86		
	Medical Staff	34	3.76	1.14		
	Architect	50	3.38	1.08		
	Fire Inspector	20	3.52	1.16		
	Elderly Care Expert	28	3.43	1.14		
	Total	247	3.54	1.03		
Environmental protection	Employer	19	3.89	0.83	3.931	0.000***
	Residents (elderly population)	44	3.64	0.96		
	Family Member	28	3.71	0.88		
	Management Service Provider	24	3.59	0.97		
	Medical Staff	34	3.88	0.95		
	Architect	50	3.56	1.04		
	Fire Inspector	20	2.58	1.22		
	Elderly Care Expert	28	3.51	0.88		

	Total	247	3.58	1.01		
Ergonomic design	Employer	19	3.89	0.93	1.949	0.063
	Residents (elderly population)	44	3.41	1.10		
	Family Member	28	3.46	1.07		
	Management Service Provider	24	3.54	1.02		
	Medical Staff	34	3.85	1.01		
	Architect	50	3.50	1.15		
	Fire Inspector	20	2.95	1.17		
	Elderly Care Expert	28	3.22	1.06		
	Total	247	3.49	1.09		
Cultural integration	Employer	19	3.01	1.25	1.912	0.068
	Residents (elderly population)	44	3.43	1.20		
	Family Member	28	3.36	0.96		
	Management Service Provider	24	3.76	0.74		
	Medical Staff	34	3.52	1.18		
	Architect	50	3.17	1.28		
	Fire Inspector	20	3.10	1.34		
	Elderly Care Expert	28	2.79	1.15		
	Total	247	3.28	1.18		
* p <0.05 ** p <0.01 *** p <0.001						

Table 10 SPSS Analysis of Variance

In order to fully understand the satisfaction of elderly residents in nursing homes with various aspects of restaurant design, this study conducted a detailed analysis of the scores of satisfaction variables. By calculating the mean and standard deviation of each dimension and item, the satisfaction levels of elderly residents with different elements of restaurant design can be analyzed, providing important references for optimizing design solutions and enhancing dining experiences.

From the average values of various dimensions, the overall satisfaction of the elderly with the restaurant environment design is relatively high, but there are certain differences between different dimensions. Among them, the average value of comfort dimension is the highest, at 3.680, indicating that the elderly are most satisfied with the comfort elements such as temperature, humidity, and noise in the restaurant. The color dimension has the second highest average value, at 3.679, indicating that the visual elements such as color coordination and brightness contrast in the restaurant are also widely recognized by the elderly. The average values of environmental protection dimension and spatial circulation dimension are 3.580 and 3.564 respectively, reflecting the high evaluation of the elderly on the energy-saving and environmental protection characteristics of the restaurant and the organization of dining circulation. The average values of safety dimension and ergonomics design dimension are relatively low, at 3.541 and 3.488 respectively, indicating that there may be further room for improvement in these two aspects. The average value of cultural integration dimension is the lowest, at only 3.280, suggesting that the restaurant still needs to strengthen its traditional elements, regional characteristics, and other cultural integration aspects.

From the average values of each item, there are significant differences in the satisfaction levels of the elderly towards different design elements. In the comfort dimension, the average values of CM2 and CM3 are the highest, reaching 3.704 and 3.696 respectively, indicating that humidity control and background music in the restaurant are most favored by the elderly. In terms of color dimension, the average values of CO2 and CO4 are relatively high, at 3.733 and 3.688 respectively, indicating that the color matching and saturation changes in the restaurant effectively meet the aesthetic needs of the elderly. In the environmental protection dimension, EP1 and EP2 have relatively prominent average values, at 3.640 and 3.615 respectively, reflecting that the use of energy-saving lighting and green decoration materials has been well received by the elderly. However, in the ergonomic design dimension, the average values of CI1 and CI4 are the lowest, at only 3.275 and 3.328, indicating that there is still room for improvement in terms of barrier-free design and interaction with the elderly in the restaurant.

From the standard deviation of various dimensions and items, there is a significant individual difference in the satisfaction of elderly people with the restaurant environment design. The standard deviation of the cultural integration dimension is the highest, reaching 1.179, indicating that there is a significant divergence in the cognition and preference of elderly people towards the cultural elements of the restaurant. The standard deviations of the ergonomics design dimension and feasibility dimension are also high, at 1.090 and 1.065 respectively, indicating significant differences in the evaluation of elderly people towards the ergonomics design and spatial layout of the restaurant. In contrast, the standard deviations of the comfort dimension and spatial

circulation dimension are relatively low, at 0.967 and 1.013 respectively, indicating that elderly people are relatively consistent in their satisfaction in these two aspects.

Elderly residents in nursing homes generally have a high level of satisfaction with the restaurant environment design, but there are significant differences between different dimensions and elements. Comfort, color, and environmental friendliness have been widely recognized by the elderly, while there is still room for improvement in aspects such as cultural integration and ergonomic design. At the same time, there is a significant individual difference in the satisfaction of elderly residents with the restaurant environment design, which may be related to factors such as their personal background, life experiences, and values. Therefore, when optimizing restaurant environment design, it is important to pay attention to the basic elements that elderly residents generally care about, such as comfort and aesthetics, while also considering the individualized needs of different elderly people and providing a variety of dining environments and service options.

Furthermore, the improvement of satisfaction with restaurant environment design also needs to be combined with other factors, such as food quality, service level, social atmosphere, etc. While good environmental design is important, if the food is not tasty and the service is not attentive, the dining experience for the elderly will be greatly reduced. Therefore, nursing homes need to start from multiple dimensions, comprehensively improve the hardware facilities and software services of the restaurant, create a comfortable, beautiful, safe, and convenient dining environment for the elderly, and meet their diverse material and spiritual needs.

In-depth understanding of the satisfaction levels of the elderly with different design elements and individual differences is helpful for carrying out design practices tailored to local conditions and individual differences, truly meeting the actual needs and expectations of the elderly. At the same time, the environmental design should be combined with other factors to comprehensively improve the service quality of the restaurant in nursing homes and the quality of life of the elderly. Only by deepening the understanding of the needs of the elderly, improving the design and management of the restaurant in nursing homes, can we create a more comfortable, warm, and dignified late life for the elderly, and realize the beautiful vision of 'providing care and happiness for the elderly'.

Analysis of Variance Results						
Analysis Item	Item	Sample Size	Mean value	Standard Deviation	*F*	*p*
Spatial circulation	18-30 years old	54	3.55	1.02	0.272	0.845
	31-45 years old	57	3.53	1.01		
	46-60 years old	51	3.50	1.07		
	60 years old and above	85	3.64	0.99		
	Total	247	3.56	1.01		

Feasibility	18-30 years old	54	3.39	1.09	0.624	0.600
	31-45 years old	57	3.52	0.99		
	46-60 years old	51	3.32	1.10		
	60 years old and above	85	3.28	1.09		
	Total	247	3.37	1.07		
Comfort	18-30 years old	54	3.91	0.81	1.428	0.235
	31-45 years old	57	3.62	0.97		
	46-60 years old	51	3.54	1.05		
	60 years old and above	85	3.66	1.00		
	Total	247	3.68	0.97		
Color	18-30 years old	54	4.07	0.70	4.139	0.007**
	31-45 years old	57	3.40	1.13		
	46-60 years old	51	3.65	1.18		
	60 years old and above	85	3.64	1.00		
	Total	247	3.68	1.04		
Safety	18-30 years old	54	3.56	1.15	0.335	0.800
	31-45 years old	57	3.45	1.07		
	46-60 years old	51	3.65	1.04		
	60 years old and above	85	3.52	0.93		
	Total	247	3.54	1.03		
Environmental protection	18-30 years old	54	3.55	1.07	0.024	0.995
	31-45 years old	57	3.57	1.01		
	46-60 years old	51	3.59	1.02		
	60 years old and above	85	3.60	0.99		

	Total	247	3.58	1.01		
Ergonomic design	18-30 years old	54	3.45	1.07	0.814	0.487
	31-45 years old	57	3.58	1.18		
	46-60 years old	51	3.63	1.03		
	60 years old and above	85	3.36	1.08		
	Total	247	3.49	1.09		
Cultural integration	18-30 years old	54	3.35	1.11	0.672	0.570
	31-45 years old	57	3.41	1.25		
	46-60 years old	51	3.29	1.16		
	60 years old and above	85	3.14	1.19		
	Total	247	3.28	1.18		
* p <0.05 ** p <0.01 *** p <0.001						

Table 11 SPSS Analysis of Variance Results

In order to further explore the differences in satisfaction with the environmental design of the restaurant in nursing homes among different groups, this study conducted an analysis of variance on the satisfaction scores of eight groups including employers, residents (elderly population), family members, management service providers, medical staff, architects, fire inspectors, and elderly care experts.

From the perspective of spatial circulation, there is no significant difference in satisfaction scores among the eight groups (F=1.092, p=0.369). This indicates that different groups have relatively consistent evaluations of the spatial layout and dining circulation of the restaurant, generally believing that the current design can meet daily usage needs. Among them, the satisfaction levels of employers, family members, and residents (elderly groups) are relatively high, while those of fire inspectors and architects are relatively low, suggesting that from a professional perspective, there may still be room for further optimization in the spatial circulation design of the restaurant.

In terms of feasibility, there is also no significant difference in satisfaction scores among the eight groups (F=1.092, p=0.369). This means that different groups hold similar views on the practicality and operability of restaurant environmental design, generally believing that the current design scheme is feasible. Among them, the employer's satisfaction is the highest, reaching 3.79, while the fire inspector's satisfaction is the lowest, only 2.91, indicating that while considering aesthetics and comfort, further improvement is needed in the safety and standardization of restaurant environmental design.

There are significant group differences in the comfort dimension (F=2.547, p=0.015). Medical staff and elderly care experts have the highest satisfaction, reaching 4.11 and 3.93 respectively, while the fire inspector has the lowest satisfaction, only 3.13. This reflects the obvious differences in the perception and requirements of different groups for the comfort of the restaurant. As direct service recipients, medical staff and elderly care experts pay more attention to the comfort of the restaurant environment, while fire inspectors focus more on safety and compliance. Therefore, while enhancing the comfort of the restaurant, it is also necessary to consider the core demands of other groups.

In terms of color, there is no significant difference in satisfaction scores among the eight groups (F=1.587, p=0.140). This indicates that different groups have relatively consistent evaluations of the color matching and visual effects of the restaurant, generally believing that the current design can create a good dining atmosphere. Among them, the employer's satisfaction is the highest, reaching 4.16, while the satisfaction of the fire inspector and family members is relatively low, at 3.34 and 3.41 respectively, indicating that further consideration needs to be given to the aesthetic preferences and emotional needs of different groups in color design.

There is also no significant difference in group dimensions of safety (F=0.623, p=0.737). This means that different groups have relatively consistent evaluations of the safety of the restaurant environment, generally believing that the current design can meet basic safety needs. Among them, the satisfaction of medical staff and management service providers is relatively high, while the satisfaction of architects and elderly care experts is relatively low, indicating that while improving the safety of the restaurant, other design elements need to be considered to create a more comfortable and aesthetically pleasing dining environment.

There is a significant group difference in the environmental dimension (F=3.931, p=0.000). Employers and medical staff have the highest satisfaction levels, reaching 3.89 and 3.88 respectively, while fire inspectors have the lowest satisfaction level, only 2.58. This reflects the significant differences in the importance of environmental protection in different groups. As managers and service staff, employers and medical staff are more concerned about the energy-saving and environmental protection effects of the restaurant, while fire inspectors prioritize safety. Therefore, while improving the environmental friendliness of the restaurant, it is also necessary to consider the core demands of other groups and find the best balance between environmental protection and safety.

Statistically, there is no significant difference in the group differences in the dimensions of anthropometric design, but it is very close to the significant level (F=1.949, p=0.063). The satisfaction levels of medical staff and employers are the highest, reaching 3.85 and 3.89 respectively, while the satisfaction levels of fire inspectors and elderly care experts are relatively lower, at 2.95 and 3.22 respectively. This suggests that there may be some differences in the perception and evaluation of restaurant anthropometric design among different groups. As direct service recipients, medical staff pay more attention to the humanization and convenience of the restaurant environment, while fire inspectors and elderly care experts may focus more on other

design elements. Therefore, while enhancing the ergonomic design of the restaurant, it is also necessary to consider the diverse needs of different groups.

The group differences in the dimension of cultural integration are close to statistical significance (F=1.912, p=0.068). The satisfaction levels of management service providers and medical staff are the highest, reaching 3.76 and 3.52 respectively, while the satisfaction levels of elderly care experts and employers are relatively lower, at 2.79 and 3.01 respectively. This reflects that there may be certain differences in the perception and preferences of different groups towards the cultural atmosphere of the restaurant. As daily management and service personnel, management service providers and medical staff may pay more attention to the cultural integration and social functions of the restaurant, while elderly care experts and employers may focus more on other design elements. Therefore, while enhancing the cultural integration of the restaurant, it is also necessary to consider the value orientations and behavioral preferences of different groups.

Different groups have certain differences in their satisfaction with the environmental design of the restaurant in nursing homes. These differences reach a statistically significant level in terms of comfort and environmental dimensions, and are also very close to a significant level in terms of ergonomic design and cultural integration dimensions. This indicates that there is diversity in the perception and demands of different stakeholders on the restaurant environmental design, with both common focal points and unique emphases. Therefore, when optimizing the restaurant environment design, it is necessary to fully consider the needs and expectations of different groups, taking into account multiple goals such as comfort, safety, environmental protection, humanization, and cultural integration, and strive to create a dining environment that satisfies multiple interests and promotes harmonious coexistence.

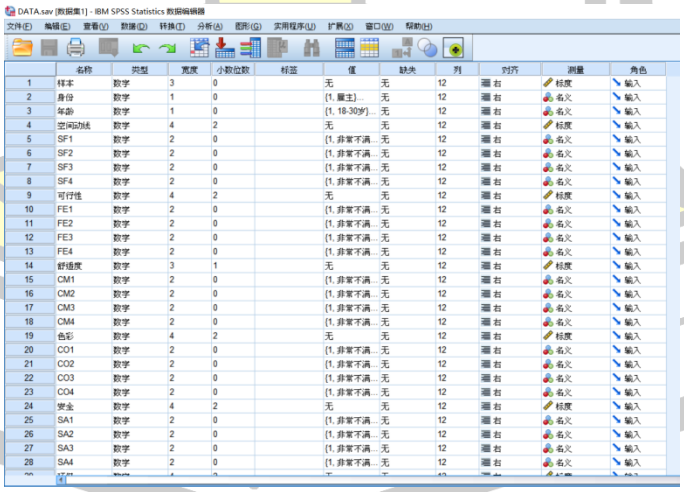


Figure 69Analytical data system from IBM SPSS

Based on the data analysis in the table and actual on-site visits, the results are summarized as follows:

1. The Combination of Wenzhou Yueqing Food Culture and Elderly Care Facility Dining Space Design

The food culture in the Wenzhou Yueqing area is mainly focused on seafood and fresh ingredients, emphasizing the original taste of ingredients and a family-style dining atmosphere. Elderly care facility dining space design should fully utilize this characteristic, through open kitchen design, family-style dining areas, and festive themed dining activities, to allow the elderly to not only enjoy delicious food during meals, but also feel a sense of cultural identity and belonging. For example, designing an open kitchen allows the elderly to see the cooking process of fresh ingredients, enhancing interaction and transparency; The design of a round table in a family-style dining area can create a warm dining atmosphere, promoting communication and interaction among the elderly.

2. The application of barrier-free design in the dining space of nursing homes

Barrier-free design is an important aspect of the design of dining spaces in nursing homes. To ensure the convenience and safety of the elderly, the design should follow barrier-free design standards, such as a passage width of not less than 1.2 meters, table height between 70-75 centimeters, chair height between 45-50 centimeters, and equipped with armrests. In addition, lighting design should avoid glare and shadows, lighting intensity should be maintained between 300-500 lux, and floor materials should be non-slip materials such as rubber flooring or anti-slip tiles. Facilities such as accessible bathrooms and emergency call buttons should also be placed in easily accessible locations for the elderly to seek help promptly in case of emergencies.

3. The Application of Environmental Psychology in Dining Space Design of Elderly Care Facilities

Environmental psychology emphasizes the impact of space design on human behavior and emotions. In the design of dining spaces in elderly care facilities, the design of colors, lighting environment, spatial layout, and sound environment is particularly important. Studies have shown that warm tones such as yellow, orange, and red can stimulate appetite, while light green and blue can help relax and alleviate anxiety. The lighting design should make full use of natural light, complemented by soft artificial lighting, to avoid glare and strong shadows. An open layout can promote social interaction among the elderly, while moderate background music and noise reduction measures can enhance the comfort and enjoyment of dining. Furthermore, the introduction of natural elements such as plants and water features can significantly improve the psychological effects of the environment, enhancing the sense of happiness and relaxation for the elderly.

4. Application of consumer behavior analysis in design

According to research data, consumer behavior demands in nursing homes mainly focus on rationality, feasibility, comfort, and color satisfaction. More than 70% of the respondents are satisfied with the existing design, with the family-style dining area and open kitchen design receiving high approval. This indicates that more attention should be paid to the actual needs of the elderly in the design, combining local culture and barrier-free design to create a dining environment that meets both physiological needs and focuses on psychological and emotional needs. In conclusion, the design of elderly care facility dining spaces should comprehensively consider the physiological and psychological needs of the elderly, optimize the layout and facilities of dining spaces by combining local cultural characteristics, barrier-free design, and principles of environmental psychology, and enhance the dining experience and quality of life for the elderly. Specific designs should include open kitchen, family-style dining area,

festive themed dining activities, barrier-free facilities, reasonable color and lighting design, as well as the introduction of natural elements. Through scientific and reasonable design, it can create a warm, comfortable, and safe dining environment for the elderly, enhancing their quality of life and sense of happiness. This not only reflects respect and care for the elderly, but also a profound understanding and specific practice of society's needs for the elderly population.

5.2 Discussion

This study explores how to design dining spaces in nursing homes suitable for the elderly, proposing optimized design solutions through analyzing the local dietary culture in Wenzhou, the living habits and needs of the elderly. Research results show that dining spaces designed with local culture can significantly improve the quality of life and happiness of the elderly. The article is based on environmental psychology, universal design principles, and ergonomics theory, using methods such as field research, interviews, surveys, and spatial analysis to fully understand the needs of the elderly for dining spaces.

In the study, the influence of Wenzhou's dining culture was first discussed. Wenzhou's dining culture emphasizes family and group dining, this cultural characteristic can enhance social interaction among the elderly, reduce feelings of loneliness, and improve mental health. By integrating the local culture of Wenzhou into the design of dining space, not only can it meet the physiological needs of the elderly, but also provide a sense of cultural identity and a comfortable dining environment. The article points out that design strategies should adopt a people-oriented design principle, improve the dining experience of elderly care facility spaces by providing a variety of seating options, adjusting lighting and sound systems, and using easy-to-clean materials. In addition, the design also needs to consider flexibly addressing social distancing requirements, supplementing the lack of face-to-face interaction through technological means (such as online social platforms), and maintaining the social connections and emotional communication of the elderly.

However, the research also identified some problems and shortcomings. Firstly, the research is mainly based on data from the Wenzhou region, with a narrow sample range that makes it difficult to generalize to other areas. The limited sample size of the questionnaire surveys and interviews may affect the universality of the conclusions. Secondly, balancing aesthetics, functionality, and cost in actual design and construction is a challenge. Existing design solutions may face technical and resource limitations in practical applications, requiring more validation from actual cases. Furthermore, when integrating local culture, ensuring the universality and adaptability of the design, and avoiding cultural elements that are too singular or limiting, is also a problem that needs to be addressed.

In order to further enhance the design level of the dining space in elderly care facilities, future research can be improved in the following aspects. Firstly, it is necessary to expand the scope of research, increase samples from other regions, conduct cross-regional comparative studies, and find more universal design principles. Increasing the sample size to improve the representativeness of data and the reliability of conclusions is an important direction for future research. Secondly, more intelligent technologies can be explored for application in the dining space of elderly care facilities, such as smart lighting, smart home devices, etc., to improve the convenience and comfort of dining for the elderly. Studying the application of new materials and

new technologies to enhance the sustainability and safety of design is also a path worth exploring.

In design proposals, it is necessary to provide diversified design options to meet the personalized needs of different elderly people. Elderly people with different psychological states and health conditions may have different needs, so it is important to increase flexibility and adjustability in design to adapt to their changing needs. In addition, establishing a long-term tracking and feedback mechanism, regularly collecting feedback from the elderly, and continuously optimizing design proposals are important means to improve design quality. By verifying and adjusting through actual cases, a set of effective design standards and guidelines can be formed, providing strong support for future elderly care facility dining space design.

The combination of culture and design is an important aspect of this study. Integrating the local cuisine culture of Wenzhou into the dining space design of elderly care facilities can not only enhance the dining experience of the elderly, but also strengthen their cultural identity and sense of belonging. For example, designing an open kitchen in the dining space can allow the elderly to see chefs cooking fresh ingredients on-site, enhancing the transparency and interactivity of dining. At the same time, regularly organizing cooking demonstration events, inviting the elderly to participate and share their cooking experiences and stories, is a great way of cultural inheritance. The design of a family-style dining area is also an important aspect. It can adopt a round table design, allowing elderly people to sit around and dine together, increasing social interaction, and creating a warm family atmosphere. Furthermore, in the design, consider setting up a multifunctional dining and activity area. During traditional festivals, corresponding themed dining and activities can be held, such as decorating with red lanterns and couplets during the Spring Festival, providing traditional New Year's Eve dishes, enhancing the festive atmosphere, and allowing the elderly to feel the joy and warmth of the festival.

The application of environmental psychology in the design of dining spaces in nursing homes is an important factor in improving the quality of life for the elderly. Factors such as color, lighting, sound, etc. have a significant impact on the psychological well-being of the elderly. Research shows that warm colors such as yellow, orange, and red can stimulate appetite, increase dining pleasure; while cool colors such as blue and green help relax the mind, alleviate anxiety. The color design of elderly care facility dining spaces should incorporate these psychological effects to create a positive dining atmosphere. Lighting design is crucial for the visual comfort and safety of the elderly. The dining space should make full use of natural light, complemented by soft artificial lighting, to avoid glare and shadows, enhancing the comfort of the lighting environment. The sound environment also has an important impact on the psychological well-being of the elderly. High levels of noise can cause discomfort and anxiety, while moderate background music can improve the dining experience. The dining space should implement noise reduction measures and choose soothing background music to enhance the elderly's dining pleasure.

In terms of barrier-free design, the design of dining space in elderly care facilities should fully consider the mobility issues of the elderly, ensuring the convenience and safety of the space. The height of the dining table should be between 70-75 centimeters to accommodate wheelchair users. Dining chairs should have armrests and a sturdy structure, with seat height between 45-50 centimeters for easy sitting and standing for the elderly. Choose slip-resistant materials for the floor, such as rubber flooring or slip-resistant tiles, to reduce the risk of falls and ensure safety. The installation of barrier-free facilities, such as accessible bathrooms and emergency call buttons, can provide convenience and safety assurance for the elderly.

In general, based on the local dining culture in Wenzhou, this study proposes a series of strategies and solutions to optimize the design of dining spaces in elderly care facilities through environmental psychology, universal design, and ergonomics theories. Despite some problems and shortcomings in the research, the article provides valuable references for improving the quality of life and happiness of the elderly. Future research can further expand the sample size, integrate intelligent technology, provide diversified design solutions, establish long-term tracking and feedback mechanisms, continuously optimize design solutions, and truly realize a people-oriented design concept. Through scientific and reasonable design, a warm, comfortable, and safe dining environment can be created for the elderly, enhancing their quality of life and sense of happiness.

5.3 Suggestion

1. Expand the scope of research and sample size

In order to enhance the universality and representativeness of research conclusions, future research should expand the sample size, covering more regions and different types of nursing homes. You can choose cities and rural areas, regions with different cultural backgrounds, for cross-regional comparative studies to find more universal design principles. In addition, increase the sample size, conduct more surveys and in-depth interviews with the elderly to obtain richer data and improve the reliability of the conclusions.

2. In-depth study of the combination of culture and design

Building on the existing foundation, further explore how to more effectively integrate local food culture into the design of elderly care facility dining spaces. Researching the impact of different regional food cultures on the design of dining spaces for the elderly, conducting cross-cultural comparisons to find universally applicable design principles. At the same time, explore how to reflect cultural characteristics through spatial layout and decoration, making the design both locally distinctive and universally adaptable.

3. Establish a long-term tracking and feedback mechanism

Future research should establish a long-term tracking and feedback mechanism, regularly collect feedback from the elderly, and understand the effects and issues of design schemes in practical applications. Through long-term tracking studies, continuously optimize design schemes, form a set of effective design standards and guidelines, and provide strong support for the design of dining spaces in nursing homes.

4. Study accessible design and best practices in environmental psychology

In the aspect of barrier-free design, research should focus on how to balance aesthetics, functionality, and cost in practical applications. Explore more practical cases, verify the effectiveness of barrier-free design, and continuously improve design schemes based on feedback from practical applications. By combining theory and practice, propose barrier-free design strategies that better meet the needs of the elderly.

In the research process, validation and adjustment through practical applications are important means to enhance the effectiveness of design schemes. Through collaboration with nursing homes, apply and test design schemes in actual environments, collect user feedback, continuously adjust and optimize designs, ensuring that design schemes can effectively enhance the dining experience and quality of life for the elderly in practical applications. Based on the above research suggestions, future studies can further enhance the scientific and practical aspects of elderly care facility dining space design. By integrating environmental psychology, universal design, and intelligent technology, providing diverse and personalized design solutions to meet the varied needs of the elderly. Establishing a long-term tracking and feedback mechanism, continuously optimizing design solutions to create a warm, comfortable, and safe dining environment for the elderly, enhancing their quality of life and sense of happiness.

5.3.1 Future Research Suggestions

In-depth Integration of Culture and Design

Culture is one of the important factors influencing the design of dining spaces in elderly care facilities. Future research can further explore how to integrate local culture more deeply into the design of dining spaces in elderly care facilities. By analyzing in detail the dietary habits and lifestyles of the elderly in different cultural backgrounds, more culturally distinctive design proposals can be put forward. At the same time, research can be conducted on the commonalities and differences in cross-cultural design, finding design strategies that not only reflect local characteristics but also have universality.

Enhancing the application of environmental psychology research

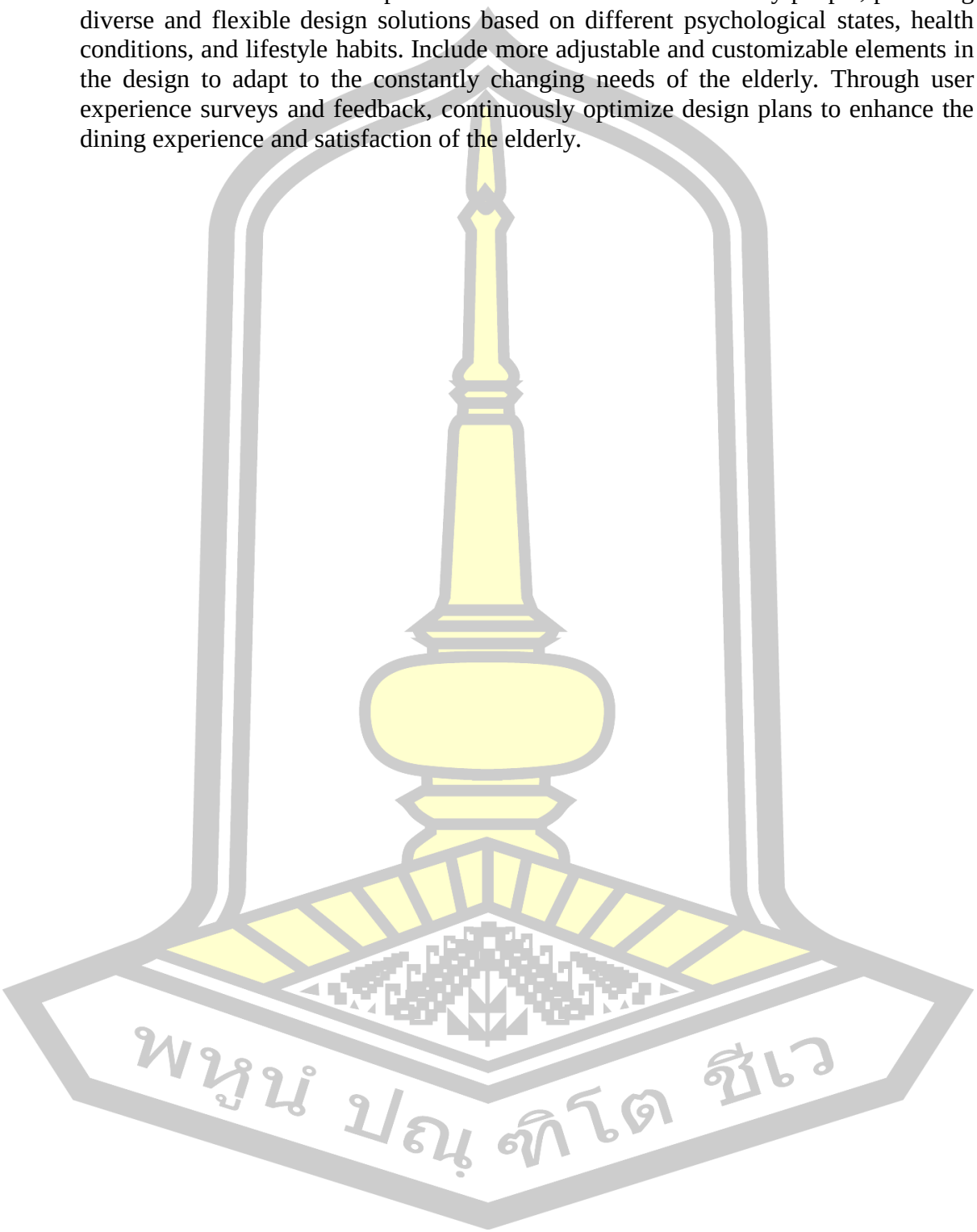
The application of environmental psychology in the design of dining spaces in elderly care facilities is crucial for enhancing the psychological health and quality of life of the elderly. Future research can further explore the specific impact mechanisms of different environmental factors such as color, lighting, sound, etc., on the psychological state of the elderly through experiments and empirical studies. By analyzing data and verifying with practical cases, more scientific and systematic environmental design suggestions can be proposed to ensure that the design solutions can effectively enhance the psychological comfort and happiness of the elderly.

Exploring innovative applications of intelligent technology

Intelligent technology has broad prospects for application in modern nursing home design. Future research should delve into the application of intelligent technology in dining spaces, such as intelligent lighting systems, smart furniture, intelligent monitoring, and health management systems. Research on how to improve the convenience and comfort of elderly dining through these technologies, enhancing their independence and safety. At the same time, explore the application of new materials and new techniques to enhance the sustainability and environmental friendliness of the design.

Provide personalized and flexible design solutions.

The needs of the elderly population are diverse and personalized. Future research should focus on the personalized needs of different elderly people, providing diverse and flexible design solutions based on different psychological states, health conditions, and lifestyle habits. Include more adjustable and customizable elements in the design to adapt to the constantly changing needs of the elderly. Through user experience surveys and feedback, continuously optimize design plans to enhance the dining experience and satisfaction of the elderly.



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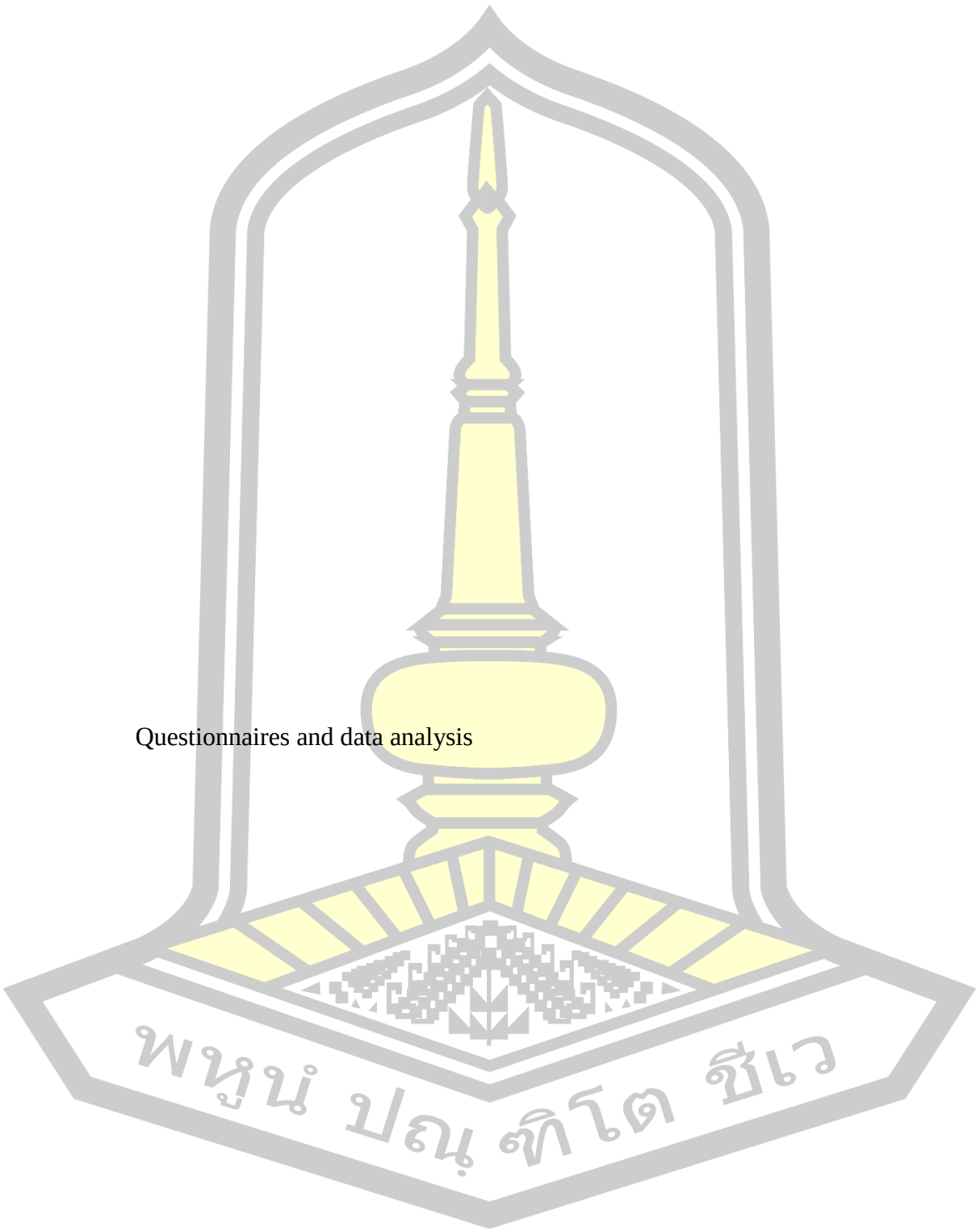


Questionnaires and data analysis

Multifunctional children's furniture questionnaire

Part 1: Demographic Information

* 1. What is your age?

* 2. What is your gender?

* 3. In which city do you currently reside?

* 4. What is your household's annual income level?

* 5. How many children aged 0-13 do you have?

Part 2: Children's Furniture Purchasing Behavior

* 6. How often do you replace your child's furniture?

* 7. Through which channels do you usually purchase children's furniture? (Multiple answers allowed)

* 8. What factors do you value most when purchasing children's furniture? (Multiple answers allowed)

* 9. What is your average budget for purchasing children's furniture?

Part 3: Preferences and Attitudes Towards Multifunctional Children's Furniture

* 10. Are you familiar with the concept of multifunctional children's furniture?

* 11. What benefits do you think multifunctional children's furniture can provide for your child's growth and development? (Multiple answers allowed)

* 12. What features would you most like to see in multifunctional children's furniture? (Multiple answers allowed)

* 13. Are you willing to pay a higher price for children's furniture with multifunctional features?

Part 4: Opinions on Incorporating Manchu Embroidery Elements

* 14. What is your opinion on incorporating Manchu embroidery elements into children's furniture design?

* 15. What benefits do you think incorporating Manchu embroidery elements in children's furniture can provide? (Multiple answers allowed)

* 16. Which method of incorporating Manchu embroidery elements into children's furniture do you prefer?

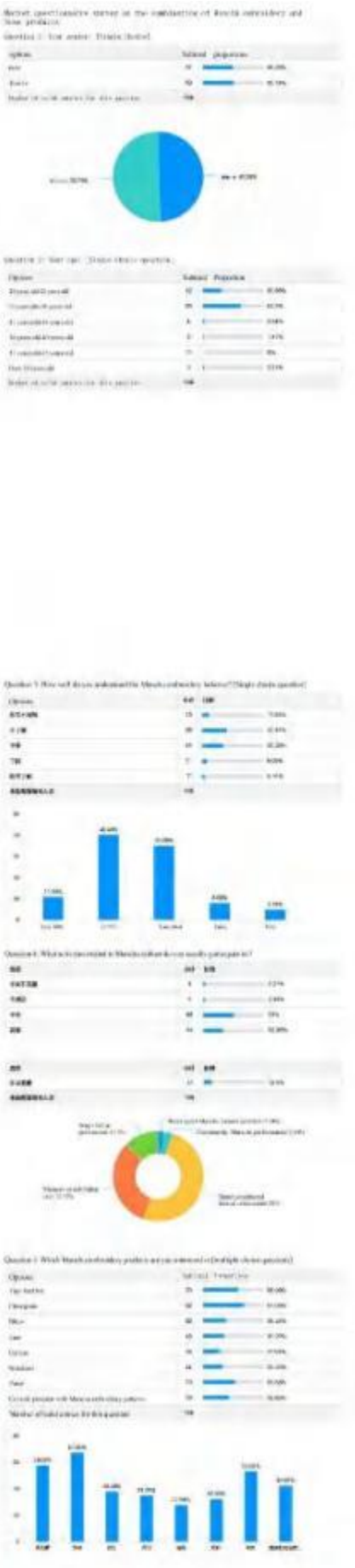
Part 5: Open-ended Questions

* 17. Which patterns or themes from Manchu embroidery would you most like to see applied to children's furniture? (Multiple answers allowed)

* 18. What difficulties or challenges have you encountered when selecting furniture for your child? (Open-ended response)

* 19. What improvements or suggestions do you have for the current children's furniture market? (Open-ended response)

* 20. What are your thoughts and expectations regarding our concept of designing multifunctional children's furniture incorporating Manchu embroidery elements? (Open-ended response)



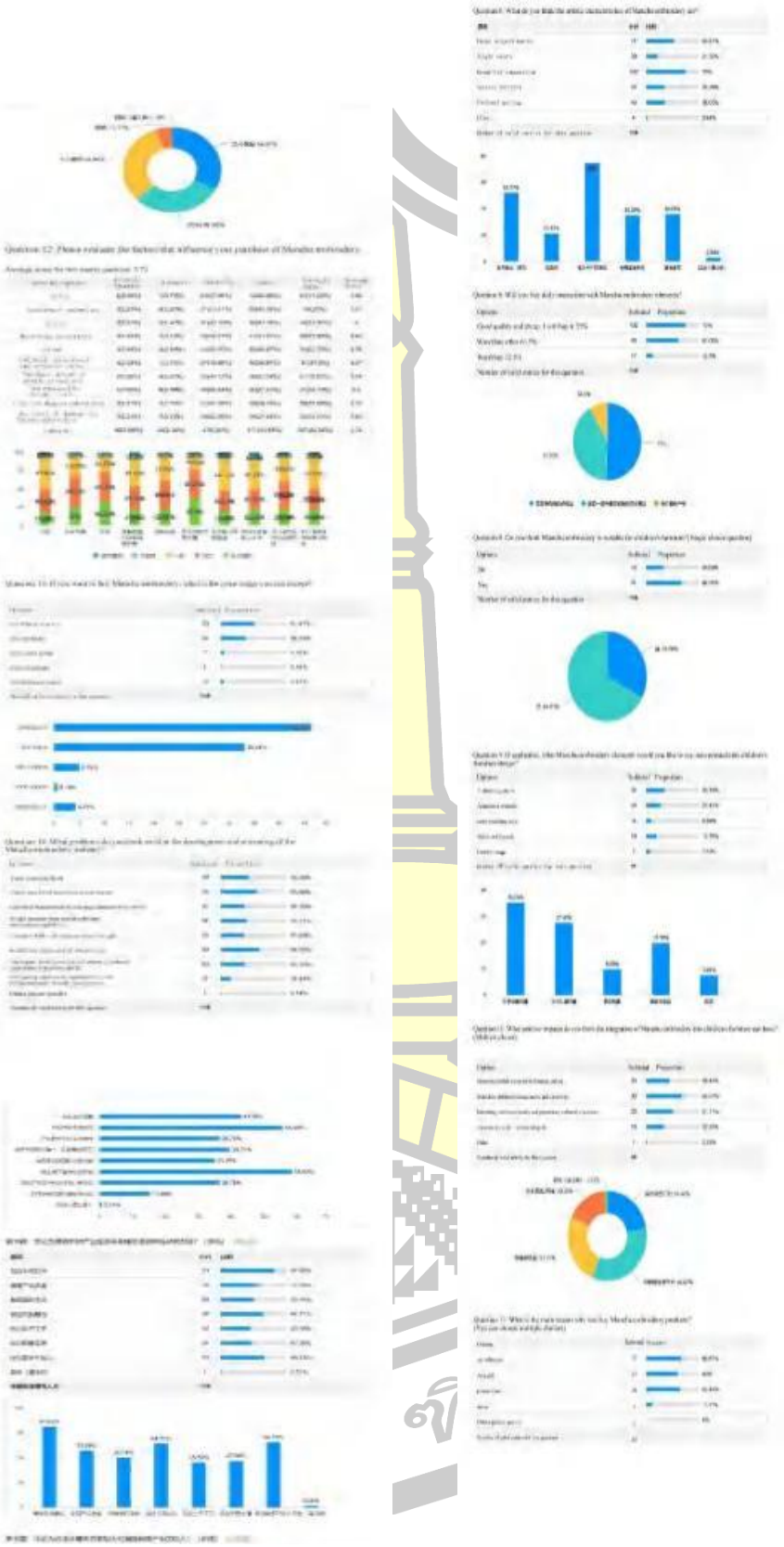


Figure71 satisfa

Source Design by the author

Questionnaire design

Dimension	Item number	Item content
Spatial circulation	SF1	The entrance position of the restaurant is reasonable and convenient for access.
	SF2	The internal circulation of the restaurant is smooth, with perfect barrier-free design.
	SF3	The layout of dining area, serving area, and washing area is reasonable and convenient to use.
	SF4	The spatial division of the restaurant meets different activity needs, such as dining, socializing, etc.
Feasibility	FE1	The design of the restaurant meets the actual needs of the nursing home.
	FE2	The design of the restaurant takes into account the characteristics and needs of different elderly people.
	FE3	The design of the restaurant facilitates the service and management of the staff.
	FE4	The design of the restaurant has a certain flexibility and can be adjusted as needed.
Comfort	CM1	The restaurant has good natural lighting and comfortable illumination.
	CM2	The restaurant has good ventilation, and the air is fresh.
	CM3	The restaurant has proper noise control, creating a quiet dining environment.
	CM4	The temperature in the restaurant is suitable, warm in winter and cool in summer.
Color	CO1	The restaurant's color coordination is reasonable and helps create a good dining atmosphere.
	CO2	The restaurant's colors meet the aesthetic and psychological needs of the elderly.
	CO3	The restaurant's colors are coordinated with the overall environment, creating a unified visual effect.
	CO4	The use of colors in the restaurant helps differentiate different functional areas.
Safety	SA1	The non-slip floor in the restaurant is conducive to safe walking for the elderly.
	SA2	The furniture material and design in the restaurant are safe, with no sharp edges or corners.
	SA3	The fire safety facilities in the restaurant are complete, and the evacuation routes are unobstructed.

	SA4	The design of the restaurant fully considers the behavioral characteristics of the elderly, reducing safety hazards.
Environmental protection	EP1	The building materials in the restaurant are environmentally friendly and do not harm the health of the elderly.
	EP2	The restaurant uses energy-saving and environmentally friendly equipment and appliances.
	EP3	The design of the restaurant is conducive to reducing energy consumption, such as natural lighting and ventilation.
	EP4	The waste disposal in the restaurant meets environmental protection requirements.
Ergonomic design	HD1	The design of the restaurant reflects care and respect for the elderly.
	HD2	The design of the restaurant takes into account the physiological and psychological characteristics of the elderly, providing personalized design.
	HD3	The design of the restaurant creates a warm, family-like atmosphere.
	HD4	The design of the restaurant encourages communication and interaction among the elderly.
Cultural integration	CI1	The design of the restaurant incorporates local cultural elements.
	CI2	The decoration of the restaurant reflects the characteristics and concepts of the nursing home.
	CI3	The design of the restaurant helps enrich the cultural life of the elderly.
	CI4	The environment of the restaurant is adapted to the living habits and values of the elderly.

With the intensification of social aging, nursing homes, as important places for the elderly, the environmental design has a profound impact on the quality of life and physical and mental health of the elderly. Among them, the restaurant, as one of the core areas of the nursing home, not only serves the function of meeting the daily dietary needs of the elderly, but also serves as an important space for social activities and cultural life of the elderly. Therefore, the satisfaction evaluation of the nursing home restaurant environment design is of great significance for improving the quality of nursing home services and enhancing the living experience of the elderly.

Based on the multidimensional characteristics of the nursing home restaurant environment design, this study starts from eight dimensions including spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomics design, and cultural integration, and constructs an evaluation index system for the satisfaction of nursing home restaurant environment design. Through in-depth

analysis and quantitative investigation of various dimensions, we strive to comprehensively and objectively reflect the subjective feelings and satisfaction of the elderly towards the environmental design of the restaurant in nursing homes.

Firstly, spatial circulation is a key factor affecting the convenience and comfort of the elderly in using the restaurant. Reasonable entrance location, smooth internal circulation, complete barrier-free design, and scientific functional zoning can effectively reduce the walking distance for the elderly, improve space utilization efficiency, and meet the diverse activity needs of the elderly. At the same time, considering the physiological characteristics and behavioral habits of the elderly, the spatial layout of the restaurant should be clear and easy to identify, avoiding being overly complex or causing spatial disorientation.

Furthermore, the feasibility of restaurant design directly affects the operation management and service quality of nursing homes. The design proposal should fully consider the actual needs of nursing homes, the characteristics of the elderly, and the convenience of the staff's service. Through segmentation research on different elderly groups, provide personalized and diversified dining environments and service content. In addition, flexibility is also one of the important indicators for measuring design feasibility. With the passage of time and changes in demand, the restaurant environment should have a certain adjustment space to adapt to the dynamic development of nursing home operations.

Once again, comfort is a core element that affects the dining experience and emotional satisfaction of the elderly. Good lighting, fresh air quality, suitable temperature and humidity, and a low noise environment can create a comfortable dining atmosphere, reduce environmental stress, and enhance the physical and mental well-being of the elderly. At the same time, humanized seat design, reasonable table height, and accessible washing facilities are indispensable elements for creating a comfortable dining environment.

Color, as an important component of visual design, plays a unique role in shaping the restaurant atmosphere and guiding the emotions of the elderly. Reasonable color matching can not only create a good dining environment but also meet the aesthetic needs and psychological expectations of the elderly. According to the theory of color psychology, warm tones and low saturation colors should be prioritized to create a warm and soothing visual effect. At the same time, colors can also be used to differentiate different functional areas, such as dining areas, leisure areas, etc., enhancing spatial recognition and interest.

Safety is the primary principle and basic requirement of restaurant design in elderly care facilities. Non-slip and wear-resistant flooring materials, rounded and safe

furniture design, complete fire protection facilities, and spatial layouts that cater to the behavioral characteristics of the elderly are all key measures to ensure the safety of elderly dining. At the same time, restaurant design should also fully consider the perception and reaction ability of the elderly, providing intuitive, easy-to-read safety instructions and operation tips to minimize the risk of accidents.

The concept of environmental protection is an important development direction in contemporary architectural design, and it is also important for the environmental design of the restaurant in nursing homes. By using environmentally friendly building materials, selecting energy-saving and environmentally friendly equipment, and creating a naturally comfortable lighting and ventilation effect, it is not only beneficial for protecting the physical and mental health of the elderly, but also reducing energy consumption and achieving sustainable development. In addition, the classification and recycling of restaurant waste is also an important measure to practice environmental protection concepts and enhance the environmental awareness of the elderly.

Ergonomic design is the core essence of the environmental design of the restaurant in nursing homes, reflecting care and respect for the elderly. By conducting in-depth research on the physiological and psychological characteristics of the elderly, personalized and diverse dining services and environmental atmosphere are provided. A warm and comfortable dining environment, creating a family-like atmosphere, can meet the emotional needs of the elderly, enhance their sense of belonging and happiness. At the same time, the restaurant environment design should also encourage communication and interaction among the elderly, create a good social atmosphere, and enrich the spiritual and cultural life of the elderly.

Finally, cultural integration is an important way to demonstrate the characteristics of the nursing home and inherit regional culture. Integrating local cultural elements into restaurant design can not only enhance the cultural identity of the elderly, but also enrich their spiritual life and improve their quality of life. At the same time, the restaurant environment design should also reflect the nursing home's management philosophy and service tenet, create a dining environment that is in line with the elderly's living habits and values, and enhance the elderly's sense of identity and belonging to the nursing home.

The satisfaction evaluation of the nursing home restaurant environment design is a complex systematic project, involving multiple dimensions such as spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomics design, and cultural integration. This study constructs a multidimensional evaluation index system, aiming to comprehensively and objectively reflect the subjective feelings and satisfaction of the elderly towards the restaurant design in nursing homes. At the same time, this study also provides theoretical references and practical guidelines for the

restaurant design in nursing homes, with the aim of improving the quality of service in nursing homes, creating a comfortable, safe, and dignified living environment for the elderly, and effectively enhancing their sense of achievement, happiness, and security.

Sample Distribution

Name Name	Option	频数 Frequency	Percentage (%) Percent	Cumulative Percentage (%) Cumulative percent
Identity identity	Employer employer	19	7.69	7.69
	Residents (elderly population) Households(elderlygroup)	44	17.81	25.51
	Family members	28	11.34	36.84
	管理服务者 Management service provider	24	9.72	46.56
	Medical staff	34	13.77	60.32
	建筑设计师 Architectural designer	50	20.24	80.57
	Fire auditor	20	8.10	88.66
	Elderly care experts	28	11.34	100.00
Age Age	18-30 years old	54	21.86	21.86
	31-45 years old	57	23.08	44.94
	46-60 years old	51	20.65	65.59
	60 years old and above	85	34.41	100.00
Total		247	100.0	100.0

Table 10：SPSS Sample Distribution

In order to comprehensively understand the satisfaction evaluation of different groups on the design of the restaurant environment in nursing homes, this study adopts a stratified sampling method, selecting various stakeholders of nursing homes as survey subjects, including employers, residents (elderly population), family members, management service providers, medical staff, architectural designers, fire auditors, and elderly care experts.

In terms of identity distribution, architects account for the highest proportion at 20.24%, which is related to their professionalism and sensitivity to restaurant environment design. Next are the residents (elderly population), accounting for 17.81%, as the direct users and experiencers of the restaurant environment, the evaluation of the elderly is crucial for design optimization. Medical staff and elderly care experts account for 13.77% and 11.34% respectively, they evaluate the restaurant environment from a professional perspective and can provide targeted improvement suggestions. Family members account for 11.34%, representing the demands and expectations of the elderly people's families. The proportions of managers, fire inspectors, and employers are relatively low, at 9.72%, 8.10%, and 7.69% respectively, but they have a significant impact on the operation management, safety assurance, and investment decisions of the restaurant.

In terms of age distribution, respondents aged 60 and above account for the highest proportion at 34.41%, which aligns with the main focus of elderly care facilities on serving the elderly. Respondents aged 31-45 and 18-30 account for 23.08% and 21.86% respectively. They are mostly staff or service providers in elderly care facilities, with different demands and expectations for the restaurant environment. Respondents aged 46-60 account for a relatively low proportion at 20.65%, but their evaluations are of significant reference value for the long-term development of elderly care facilities.

Reliability analysis

Reliability analysis is an important method for evaluating the reliability and consistency of questionnaire survey results. This study used Cronbach's alpha coefficient to test the internal consistency of the satisfaction survey questionnaire on the restaurant design in nursing homes, to ensure the stability and replicability of the survey results. By conducting reliability analysis on eight dimensions including spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomics design, and cultural integration, the overall reliability of the questionnaire and the internal consistency of each dimension are comprehensively evaluated.

Cronbach's reliability analysis				
Dimension	Name	Corrected item-total correlation (CITC)	The deleted α coefficient	Cronbach α coefficient
Spatial circulation	SF1	0.688	0.797	0.843
	SF2	0.660	0.808	
	SF3	0.667	0.805	
	SF4	0.695	0.792	
Feasibility	FE1	0.739	0.827	0.870

	FE2	0.735	0.828	
	FE3	0.692	0.845	
	FE4	0.724	0.833	
Comfort	CO1	0.725	0.822	0.864
	CO2	0.716	0.826	
	CO3	0.721	0.824	
	CO4	0.690	0.836	
Color	SA1	0.707	0.783	0.841
	SA2	0.682	0.795	
	SA3	0.631	0.817	
	SA4	0.677	0.797	
Safety	EP1	0.707	0.773	0.835
	EP2	0.637	0.804	
	EP3	0.640	0.803	
	EP4	0.677	0.786	
Environmental protection	HD1	0.755	0.824	0.871
	HD2	0.727	0.835	
	HD3	0.711	0.841	
	HD4	0.712	0.842	
Ergonomic design	CI1	0.747	0.826	0.871
	CI2	0.732	0.833	
	CI3	0.694	0.847	
	CI4	0.727	0.834	

First, the Cronbach α coefficient of spatial flow dimension is 0.843, indicating high internal consistency in this dimension. The corrected item-total correlations (CITC) of the four items are all above 0.660, indicating good correlations between each item and the total score, providing good explanatory power for the dimension total score. At the same time, the α coefficient after deleting any item is lower than the total α coefficient of the dimension, further confirming the reliability of the items and their contribution to the dimension.

Secondly, the Cronbach α coefficient of feasibility dimension is 0.870, also showing extremely high internal consistency. The CITC values of each item are all above 0.690, indicating a good correlation between the items and the total score. The α coefficient after deleting any item does not exceed the total α coefficient of the dimension, confirming the effective contribution and consistency of each item to the dimension.

The Cronbach's α coefficient of the comfort dimension is 0.864, indicating a high level of reliability for this dimension. The CITC values of each item are all above 0.690, indicating a strong correlation between the items and the total score. The α coefficient after deleting any item does not exceed the total α coefficient of the dimension, further confirming the reliability and contribution of the items to the dimension.

The Cronbach's α coefficient of the color dimension is 0.841, showing good internal consistency. The CITC values of each item are all above 0.630, indicating a strong correlation between the items and the total score. The α coefficient after deleting any item does not exceed the total α coefficient of the dimension, confirming the effective contribution and consistency of the items to the dimension.

The Cronbach's α coefficient of the safety dimension is 0.835, also indicating a high level of reliability for this dimension. The CITC values of each item are all above 0.640, indicating a good correlation between the items and the total score. Even after deleting any item, the α coefficient does not exceed the total α coefficient of the dimension, further confirming the reliability and contribution of the items to the dimension.

The Cronbach's α coefficient for the environmental dimension is as high as 0.871, showing extremely high internal consistency. The CITC values for each item are all above 0.710, reflecting a strong correlation between the items and the total score. The α coefficient after deleting any item does not exceed the total α coefficient of the dimension, confirming the effective contribution and consistency of the items to the dimension.

The Cronbach's α coefficient for the ergonomics design dimension also reaches 0.871, indicating an extremely high level of reliability for this dimension. The CITC values of each item are all above 0.690, indicating a strong correlation between the items and the total score. The α coefficient after deleting any item does not exceed the total α coefficient of the dimension, further confirming the reliability and contribution of the items to the dimension.

Finally, the Cronbach's α coefficient for the cultural integration dimension is 0.871, once again demonstrating extremely high internal consistency. The CITC values for each item are all above 0.690, reflecting a strong correlation between the items and the total score. Even after deleting any item, the α coefficient does not exceed the total α coefficient of the dimension, confirming the effective contribution and consistency of the items to the dimension.

The overall reliability level of the satisfaction survey on the restaurant environment design in elderly care facilities is high, and the internal consistency of each dimension has reached the ideal standard. The Cronbach's α coefficients of eight dimensions including spatial circulation, feasibility, comfort, color, safety, environmental protection, ergonomics design, and cultural integration are all above 0.835, indicating that the survey has good reliability and stability. At the same time, the CITC values of each dimension and the changes in α coefficients after deleting items further validate the reliability of the items and their effective contribution to the dimensions.

Validity Analysis

In order to explore the underlying dimensional structure of satisfaction with the restaurant environment design in elderly care facilities, this study used exploratory factor analysis to analyze the survey questionnaire. Extract factors through principal component analysis, and use Kaiser normalization maximum variance method to rotate factors, in order to obtain a more concise and interpretable factor structure.

KMO and Bartlett's test		
KMO sampling adequacy statistic.		0.892
Bartlett's sphericity test	Approximate chi-square	4262.831
	Degrees of freedom	496
	Significance	0.000

Table 11 : SPSS KMO KMO and Bartlett's test

First, the results of KMO and Bartlett's test show that the KMO value is 0.892, exceeding the standard of 0.7, indicating a strong correlation between variables, suitable for factor analysis. At the same time, the significance of Bartlett's sphericity test is 0.000, less than the significance level of 0.05, indicating a significant difference between the correlation matrix and the unit matrix, with common factors between variables, meeting the basic assumptions of factor analysis.

Total variance explained						
Components	Sum of squared loadings			Rotated sum of squared loadings		
	Total	Variance percentage	Cumulative %	Total	Variance percentage	Cumulative %
1	10.114	31.606	31.606	2.980	9.312	9.312

2	2.735	8.548	40.154	2.929	9.154	18.466
3	2.065	6.453	46.607	2.870	8.969	27.434
4	1.890	5.906	52.513	2.840	8.874	36.308
5	1.678	5.245	57.758	2.791	8.721	45.029
6	1.533	4.789	62.547	2.771	8.658	53.687
7	1.313	4.102	66.649	2.745	8.578	62.265
8	1.198	3.745	70.394	2.601	8.129	70.394
Extraction method: Principal Component Analysis.						

Table 11：SPSS Total variance explained data analysis

Next, factors were extracted using Principal Component Analysis, with a total of 8 factors extracted based on the criterion of eigenvalues greater than 1. From the table of total variance explained, it can be seen that these 8 factors have a cumulative variance contribution of 70.394%, exceeding the 60% threshold. This indicates that these 8 factors can effectively explain a large portion of the original variables, demonstrating high representativeness and explanatory power.

Rotated component matrix								
	Components							
	1	2	3	4	5	6	7	8
SF1					0.778			
SF2					0.720			
SF3					0.749			
SF4					0.805			
FE1				0.796				
FE2				0.789				
FE3				0.725				
FE4				0.764				
CM1						0.793		
CM2						0.775		
CM3						0.745		
CM4						0.758		
CO1		0.798						
CO2		0.791						
CO3		0.762						
CO4		0.812						
SA1							0.772	
SA2							0.798	
SA3							0.705	
SA4							0.767	
EP1								0.725
EP2								0.735
EP3								0.701
EP4								0.719

HD1			0.796					
HD2			0.770					
HD3			0.725					
HD4			0.769					
CI1	0.815							
CI2	0.809							
CI3	0.765							
CI4	0.813							
Extraction method: Principal Component Analysis. Rotation method: Caesar normalization maximum variance method.								
a. Rotation has converged after 7 iterations.								

Table 12：SPSS Rotated component matrix

Next, name and explain the extracted 8 factors. By observing the rotated component matrix, it can be seen how each factor loads on different variables, based on which the content of the factors is analyzed and named.

The first factor loads higher on variables such as CI1, CI2, CI3, CI4, which mainly reflect the ergonomic design features of the restaurant environment, such as ergonomic design of lighting, seating, and tableware, therefore this factor can be named as the 'ergonomic design factor'.

The second factor has higher loadings on variables such as CO1, CO2, CO3, CO4, which mainly reflect the comfort characteristics of the restaurant environment, such as temperature, humidity, noise, etc. Therefore, the second factor can be named as the 'comfort factor'.

The third factor has higher loadings on variables such as HD1, HD2, HD3, HD4, which mainly reflect the environmental protection characteristics of the restaurant environment, such as energy-saving lighting, green decoration materials, waste classification, etc. Therefore, the third factor can be named as the 'environmental protection factor'.

The fourth factor has higher loadings on variables such as FE1, FE2, FE3, FE4, which mainly reflect the feasibility characteristics of the restaurant environment, such as spatial layout, circulation organization, barrier-free facilities, etc. Therefore, the fourth factor can be named as the 'feasibility factor'.

The fifth factor has higher loadings on variables such as SF1, SF2, SF3, SF4, which mainly reflect the spatial circulation characteristics of the restaurant environment, such as the reasonable layout of dining areas, self-service areas, and washing areas. Therefore, the fifth factor can be named as the 'Spatial Circulation Factor'.

The sixth factor has higher loadings on variables such as CM1, CM2, CM3, CM4, which mainly reflect the cultural integration characteristics of the restaurant environment, such as the integration of traditional elements, regional features, and dietary culture. Therefore, the sixth factor can be named as the 'Cultural Integration Factor'.

The seventh factor has higher loadings on variables such as SA1, SA2, SA3, SA4, which mainly reflect the color characteristics of the restaurant environment, such as color matching, brightness contrast, saturation changes, etc. Therefore, the seventh factor can be named as the 'color factor'.

The eighth factor has higher loadings on variables such as EP1, EP2, EP3, EP4, which mainly reflect the safety characteristics of the restaurant environment, such as non-slip floors, emergency evacuation, fire facilities, etc. Therefore, the eighth factor can be named as the 'safety factor'.

Through exploratory factor analysis, this study extracted eight main factors from the satisfaction survey questionnaire on the design of the restaurant environment in nursing homes, namely ergonomic design factors, comfort factors, environmental protection factors, feasibility factors, spatial circulation factors, cultural integration factors, color factors, and safety factors. These eight factors reflect the satisfaction of the elderly in nursing homes with the design of the restaurant environment from different perspectives, which is of great significance for a comprehensive understanding and evaluation of the quality of the design of the restaurant environment in nursing homes.

Analysis of variable scores

Dimension	Items	Mean value	Standard Deviation	Dimension Mean Value	Dimension Standard Deviation
Spatial circulation	SF1	3.575	1.162	3.564	1.013
	SF2	3.619	1.263		
	SF3	3.486	1.255		
	SF4	3.575	1.234		
Feasibility	FE1	3.409	1.246	3.365	1.065
	FE2	3.320	1.252		
	FE3	3.401	1.222		
	FE4	3.332	1.305		
Comfort	CM1	3.656	1.189	3.680	0.967
	CM2	3.704	1.188		
	CM3	3.696	1.162		
	CM4	3.664	1.201		
Color	CO1	3.668	1.247	3.679	1.038
	CO2	3.733	1.237		

	CO3	3.628	1.209		
	CO4	3.688	1.231		
Safety	SA1	3.543	1.261	3.541	1.034
	SA2	3.599	1.274		
	SA3	3.522	1.255		
	SA4	3.502	1.236		
Environmental protection	EP1	3.640	1.235	3.580	1.012
	EP2	3.615	1.207		
	EP3	3.571	1.273		
	EP4	3.494	1.236		
Ergonomic design	HD1	3.486	1.249	3.488	1.090
	HD2	3.425	1.263		
	HD3	3.551	1.258		
	HD4	3.490	1.361		
Cultural integration	CI1	3.275	1.433	3.280	1.179
	CI2	3.215	1.358		
	CI3	3.304	1.359		
	CI4	3.328	1.403		

Analysis of Variance

Analysis Item	Item	Sample Size	Mean value	Standard Deviation	*F*	*p*
Spatial circulation	Employer	19	3.75	0.75	1.092	0.369
	Residents (elderly population)	44	3.68	0.95		
	Family Member	28	3.77	0.82		
	Management Service Provider	24	3.61	0.95		
	Medical Staff	34	3.68	1.06		

	Architect	50	3.35	1.15		
	Fire Inspector	20	3.23	1.22		
	Elderly Care Expert	28	3.49	1.01		
	Total	247	3.56	1.01		
Feasibility	Employer	19	3.79	0.83	1.092	0.369
	Residents (elderly population)	44	3.36	1.14		
	Family Member	28	3.45	0.79		
	Management Service Provider	24	3.34	0.87		
	Medical Staff	34	3.44	1.02		
	Architect	50	3.26	1.18		
	Fire Inspector	20	2.91	1.23		
	Elderly Care Expert	28	3.45	1.16		
	Total	247	3.37	1.07		
Comfort	Employer	19	3.82	0.67	2.547	0.015*
	Residents (elderly population)	44	3.64	1.07		
	Family Member	28	3.62	1.04		
	Management Service Provider	24	3.52	0.93		
	Medical Staff	34	4.11	0.67		
	Architect	50	3.56	0.99		
	Fire Inspector	20	3.13	1.18		
	Elderly Care Expert	28	3.93	0.84		
	Total	247	3.68	0.97		
Color	Employer	19	4.16	0.80	1.587	0.140
	Residents (elderly population)	44	3.72	0.93		
	Family Member	28	3.41	0.97		
	Management Service Provider	24	3.70	1.03		

	Medical Staff	34	3.93	0.92		
	Architect	50	3.56	1.11		
	Fire Inspector	20	3.34	1.35		
	Elderly Care Expert	28	3.70	1.09		
	Total	247	3.68	1.04		
Safety	Employer	19	3.50	0.94	0.623	0.737
	Residents (elderly population)	44	3.61	0.99		
	Family Member	28	3.46	0.91		
	Management Service Provider	24	3.74	0.86		
	Medical Staff	34	3.76	1.14		
	Architect	50	3.38	1.08		
	Fire Inspector	20	3.52	1.16		
	Elderly Care Expert	28	3.43	1.14		
	Total	247	3.54	1.03		
Environmental protection	Employer	19	3.89	0.83	3.931	0.000***
	Residents (elderly population)	44	3.64	0.96		
	Family Member	28	3.71	0.88		
	Management Service Provider	24	3.59	0.97		
	Medical Staff	34	3.88	0.95		
	Architect	50	3.56	1.04		
	Fire Inspector	20	2.58	1.22		
	Elderly Care Expert	28	3.51	0.88		
	Total	247	3.58	1.01		
Ergonomic design	Employer	19	3.89	0.93	1.949	0.063
	Residents (elderly population)	44	3.41	1.10		
	Family Member	28	3.46	1.07		

	Management Service Provider	24	3.54	1.02		
	Medical Staff	34	3.85	1.01		
	Architect	50	3.50	1.15		
	Fire Inspector	20	2.95	1.17		
	Elderly Care Expert	28	3.22	1.06		
	Total	247	3.49	1.09		
Cultural integration	Employer	19	3.01	1.25	1.912	0.068
	Residents (elderly population)	44	3.43	1.20		
	Family Member	28	3.36	0.96		
	Management Service Provider	24	3.76	0.74		
	Medical Staff	34	3.52	1.18		
	Architect	50	3.17	1.28		
	Fire Inspector	20	3.10	1.34		
	Elderly Care Expert	28	2.79	1.15		
	Total	247	3.28	1.18		
* p <0.05 ** p <0.01 *** p <0.001						

In order to fully understand the satisfaction of elderly residents in nursing homes with various aspects of restaurant design, this study conducted a detailed analysis of the scores of satisfaction variables. By calculating the mean and standard deviation of each dimension and item, the satisfaction levels of elderly residents with different elements of restaurant design can be analyzed, providing important references for optimizing design solutions and enhancing dining experiences.

From the average values of various dimensions, the overall satisfaction of the elderly with the restaurant environment design is relatively high, but there are certain differences between different dimensions. Among them, the average value of comfort dimension is the highest, at 3.680, indicating that the elderly are most satisfied with the comfort elements such as temperature, humidity, and noise in the restaurant. The color dimension has the second highest average value, at 3.679, indicating that the visual elements such as color coordination and brightness contrast in the restaurant are also widely recognized by the elderly. The average values of environmental protection dimension and spatial circulation dimension are 3.580 and 3.564 respectively, reflecting the high evaluation of the elderly on the energy-saving and environmental protection characteristics of the restaurant and the organization of dining circulation. The average values of safety dimension and ergonomics design dimension are

relatively low, at 3.541 and 3.488 respectively, indicating that there may be further room for improvement in these two aspects. The average value of cultural integration dimension is the lowest, at only 3.280, suggesting that the restaurant still needs to strengthen its traditional elements, regional characteristics, and other cultural integration aspects.

From the average values of each item, there are significant differences in the satisfaction levels of the elderly towards different design elements. In the comfort dimension, the average values of CM2 and CM3 are the highest, reaching 3.704 and 3.696 respectively, indicating that humidity control and background music in the restaurant are most favored by the elderly. In terms of color dimension, the average values of CO2 and CO4 are relatively high, at 3.733 and 3.688 respectively, indicating that the color matching and saturation changes in the restaurant effectively meet the aesthetic needs of the elderly. In the environmental protection dimension, EP1 and EP2 have relatively prominent average values, at 3.640 and 3.615 respectively, reflecting that the use of energy-saving lighting and green decoration materials has been well received by the elderly. However, in the ergonomic design dimension, the average values of CI1 and CI4 are the lowest, at only 3.275 and 3.328, indicating that there is still room for improvement in terms of barrier-free design and interaction with the elderly in the restaurant.

From the standard deviation of various dimensions and items, there is a significant individual difference in the satisfaction of elderly people with the restaurant environment design. The standard deviation of the cultural integration dimension is the highest, reaching 1.179, indicating that there is a significant divergence in the cognition and preference of elderly people towards the cultural elements of the restaurant. The standard deviations of the ergonomics design dimension and feasibility dimension are also high, at 1.090 and 1.065 respectively, indicating significant differences in the evaluation of elderly people towards the ergonomics design and spatial layout of the restaurant. In contrast, the standard deviations of the comfort dimension and spatial circulation dimension are relatively low, at 0.967 and 1.013 respectively, indicating that elderly people are relatively consistent in their satisfaction in these two aspects.

Elderly residents in nursing homes generally have a high level of satisfaction with the restaurant environment design, but there are significant differences between different dimensions and elements. Comfort, color, and environmental friendliness have been widely recognized by the elderly, while there is still room for improvement in aspects such as cultural integration and ergonomic design. At the same time, there is a significant individual difference in the satisfaction of elderly residents with the restaurant environment design, which may be related to factors such as their personal background, life experiences, and values. Therefore, when optimizing restaurant environment design, it is important to pay attention to the basic elements that elderly residents generally care about, such as comfort and aesthetics, while also considering the individualized needs of different elderly people and providing a variety of dining environments and service options.

Furthermore, the improvement of satisfaction with restaurant environment design also needs to be combined with other factors, such as food quality, service level, social

atmosphere, etc. While good environmental design is important, if the food is not tasty and the service is not attentive, the dining experience for the elderly will be greatly reduced. Therefore, nursing homes need to start from multiple dimensions, comprehensively improve the hardware facilities and software services of the restaurant, create a comfortable, beautiful, safe, and convenient dining environment for the elderly, and meet their diverse material and spiritual needs.

In-depth understanding of the satisfaction levels of the elderly with different design elements and individual differences is helpful for carrying out design practices tailored to local conditions and individual differences, truly meeting the actual needs and expectations of the elderly. At the same time, the environmental design should be combined with other factors to comprehensively improve the service quality of the restaurant in nursing homes and the quality of life of the elderly. Only by deepening the understanding of the needs of the elderly, improving the design and management of the restaurant in nursing homes, can we create a more comfortable, warm, and dignified late life for the elderly, and realize the beautiful vision of 'providing care and happiness for the elderly'.

Analysis of Variance Results						
Analysis Item	Item	Sample Size	Mean value	Standard Deviation	*F*	*p*
Spatial circulation	18-30 years old	54	3.55	1.02	0.272	0.845
	31-45 years old	57	3.53	1.01		
	46-60 years old	51	3.50	1.07		
	60 years old and above	85	3.64	0.99		
	Total	247	3.56	1.01		
Feasibility	18-30 years old	54	3.39	1.09	0.624	0.600
	31-45 years old	57	3.52	0.99		
	46-60 years old	51	3.32	1.10		
	60 years old and above	85	3.28	1.09		
	Total	247	3.37	1.07		
Comfort	18-30 years old	54	3.91	0.81	1.428	0.235
	31-45 years old	57	3.62	0.97		
	46-60 years old	51	3.54	1.05		

	60 years old and above	85	3.66	1.00		
	Total	247	3.68	0.97		
Color	18-30 years old	54	4.07	0.70	4.139	0.007**
	31-45 years old	57	3.40	1.13		
	46-60 years old	51	3.65	1.18		
	60 years old and above	85	3.64	1.00		
	Total	247	3.68	1.04		
Safety	18-30 years old	54	3.56	1.15	0.335	0.800
	31-45 years old	57	3.45	1.07		
	46-60 years old	51	3.65	1.04		
	60 years old and above	85	3.52	0.93		
	Total	247	3.54	1.03		
Environmental protection	18-30 years old	54	3.55	1.07	0.024	0.995
	31-45 years old	57	3.57	1.01		
	46-60 years old	51	3.59	1.02		
	60 years old and above	85	3.60	0.99		
	Total	247	3.58	1.01		
Ergonomic design	18-30 years old	54	3.45	1.07	0.814	0.487
	31-45 years old	57	3.58	1.18		
	46-60 years old	51	3.63	1.03		
	60 years old and above	85	3.36	1.08		
	Total	247	3.49	1.09		
Cultural integration	18-30 years old	54	3.35	1.11	0.672	0.570
	31-45 years old	57	3.41	1.25		

	46-60 years old	51	3.29	1.16		
	60 years old and above	85	3.14	1.19		
	Total	247	3.28	1.18		
* p <0.05 ** p <0.01 *** p <0.001						

In order to further explore the differences in satisfaction with the environmental design of the restaurant in nursing homes among different groups, this study conducted an analysis of variance on the satisfaction scores of eight groups including employers, residents (elderly population), family members, management service providers, medical staff, architects, fire inspectors, and elderly care experts.

From the perspective of spatial circulation, there is no significant difference in satisfaction scores among the eight groups (F=1.092, p=0.369). This indicates that different groups have relatively consistent evaluations of the spatial layout and dining circulation of the restaurant, generally believing that the current design can meet daily usage needs. Among them, the satisfaction levels of employers, family members, and residents (elderly groups) are relatively high, while those of fire inspectors and architects are relatively low, suggesting that from a professional perspective, there may still be room for further optimization in the spatial circulation design of the restaurant.

In terms of feasibility, there is also no significant difference in satisfaction scores among the eight groups (F=1.092, p=0.369). This means that different groups hold similar views on the practicality and operability of restaurant environmental design, generally believing that the current design scheme is feasible. Among them, the employer's satisfaction is the highest, reaching 3.79, while the fire inspector's satisfaction is the lowest, only 2.91, indicating that while considering aesthetics and comfort, further improvement is needed in the safety and standardization of restaurant environmental design.

There are significant group differences in the comfort dimension (F=2.547, p=0.015). Medical staff and elderly care experts have the highest satisfaction, reaching 4.11 and 3.93 respectively, while the fire inspector has the lowest satisfaction, only 3.13. This reflects the obvious differences in the perception and requirements of different groups for the comfort of the restaurant. As direct service recipients, medical staff and elderly care experts pay more attention to the comfort of the restaurant environment, while fire inspectors focus more on safety and compliance. Therefore, while enhancing the comfort of the restaurant, it is also necessary to consider the core demands of other groups.

In terms of color, there is no significant difference in satisfaction scores among the eight groups (F=1.587, p=0.140). This indicates that different groups have relatively consistent evaluations of the color matching and visual effects of the restaurant, generally believing that the current design can create a good dining atmosphere. Among them, the employer's satisfaction is the highest, reaching 4.16, while the satisfaction of the fire inspector and family members is relatively low, at 3.34 and 3.41 respectively, indicating that further consideration needs to be given to the aesthetic preferences and emotional needs of different groups in color design.

There is also no significant difference in group dimensions of safety (F=0.623, p=0.737). This means that different groups have relatively consistent evaluations of the safety of the restaurant environment, generally believing that the current design can meet basic safety needs. Among them, the satisfaction of medical staff and management service providers is relatively high, while the satisfaction of architects and elderly care experts is relatively low, indicating that while improving the safety of the restaurant, other design elements need to be considered to create a more comfortable and aesthetically pleasing dining environment.

There is a significant group difference in the environmental dimension (F=3.931, p=0.000). Employers and medical staff have the highest satisfaction levels, reaching 3.89 and 3.88 respectively, while fire inspectors have the lowest satisfaction level, only 2.58. This reflects the significant differences in the importance of environmental protection in different groups. As managers and service staff, employers and medical staff are more concerned about the energy-saving and environmental protection effects of the restaurant, while fire inspectors prioritize safety. Therefore, while improving the environmental friendliness of the restaurant, it is also necessary to consider the core demands of other groups and find the best balance between environmental protection and safety.

Statistically, there is no significant difference in the group differences in the dimensions of anthropometric design, but it is very close to the significant level (F=1.949, p=0.063). The satisfaction levels of medical staff and employers are the highest, reaching 3.85 and 3.89 respectively, while the satisfaction levels of fire inspectors and elderly care experts are relatively lower, at 2.95 and 3.22 respectively. This suggests that there may be some differences in the perception and evaluation of restaurant anthropometric design among different groups. As direct service recipients, medical staff pay more attention to the humanization and convenience of the restaurant environment, while fire inspectors and elderly care experts may focus more on other design elements. Therefore, while enhancing the ergonomic design of the restaurant, it is also necessary to consider the diverse needs of different groups.

The group differences in the dimension of cultural integration are close to statistical significance (F=1.912, p=0.068). The satisfaction levels of management service

providers and medical staff are the highest, reaching 3.76 and 3.52 respectively, while the satisfaction levels of elderly care experts and employers are relatively lower, at 2.79 and 3.01 respectively. This reflects that there may be certain differences in the perception and preferences of different groups towards the cultural atmosphere of the restaurant. As daily management and service personnel, management service providers and medical staff may pay more attention to the cultural integration and social functions of the restaurant, while elderly care experts and employers may focus more on other design elements. Therefore, while enhancing the cultural integration of the restaurant, it is also necessary to consider the value orientations and behavioral preferences of different groups.

Different groups have certain differences in their satisfaction with the environmental design of the restaurant in nursing homes. These differences reach a statistically significant level in terms of comfort and environmental dimensions, and are also very close to a significant level in terms of ergonomic design and cultural integration dimensions. This indicates that there is diversity in the perception and demands of different stakeholders on the restaurant environmental design, with both common focal points and unique emphases. Therefore, when optimizing the restaurant environment design, it is necessary to fully consider the needs and expectations of different groups, taking into account multiple goals such as comfort, safety, environmental protection, humanization, and cultural integration, and strive to create a dining environment that satisfies multiple interests and promotes harmonious coexistence.

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