

**Article**

# Restaurant Design Using Red-brick Culture in Style of Minnan in Fujian

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**Abstract:** We explored the red brick culture of Minnan in Fujian using a 3D interactive technology to integrate a high-tech flavor of the south of Fujian into a restaurant. The local characteristics were signified for the inheritance and continuation of the culture in modern design. For this study, a literature review, the CiteSpace method, and a survey for satisfaction were conducted for the cultural design. Satisfaction with the design and the restaurant was high with a score of 4.511 and 4.494. The satisfaction degree of the researcher and the students were 0.881 and 0.914, which proved the feasibility of the design.

**Keywords:** red-brick culture, theme restaurant design, interaction design

## 1. Introduction

Catering has a long history in China owing to the development of food culture for longer than 5,000 years. With the improvement of living standards, people care for hygiene and tastes and prefer a dining environment and atmosphere for spiritual enjoyment and experience. Various types of themed restaurants have emerged based on China's profound culture, showing geographic, national, and cultural diversities. Thus, the space design industry is growing rapidly with new catering companies emerging and leading the trend. Space designs in themed restaurants contain traditional concepts and innovative elements with creativity as they are favored by young consumers. The success of such restaurants demonstrates changes in society (Liu, 2020) which values the uniqueness of restaurants. Therefore, traditional restaurants are being changed to have a new style.

There are advantages of local culture in traditional catering design, including ethnicity, experience, and regional characteristics, which always reflect the trend in a social environment. Decorative elements that are cultural, tasteful, or distinctive are used in restaurant design for the psychological demands of customers. Based on traditional culture, modernity can be integrated into space design to meet aesthetic needs. The use of modern materials and technology impacts the design of decorative patterns. A dining environment is formed with an urban style and oriental flavor. The red-brick culture originated in Quanzhou, Fujian Province, China, and has influenced the surrounding areas such as Xiamen, Zhangzhou, and Putian. Red-brick culture is important in the traditional architectural culture showing unique features in building materials and decorative elements. Red bricks have a unique aesthetic value as well as the role of protecting the wall. In the southern part of Fujian, bricks are used in exquisite decoration inheriting the culture. Red brick culture has many regional elements that can be used for modern interior design as it delivers the wisdom and value of the previous generation. Therefore, the red brick culture combined with the traditional restaurant design has unique thematic creativity and innovative design and has injected a new way of thinking (Wang, 2011).

Traditional restaurants suffer from many problems such as dirtiness, cramped spaces, old designs, and food. As a result, they fail to attract young people. Under the impact of new restaurants, most of the traditional restaurants are closed or transformed. Especially, they lack a theme with which customers are satisfied. Traditional restaurants can no longer meet the needs of the people and need to be changed (Yang and Liu, 2023). Therefore, by using 3D interactive technology, we investigated how to meet the aesthetic demands of young customers and reflect regional characters using the red brick culture of southern Fujian. The inheritance and innovation of traditional restaurants were also explored. The result can expand the horizons of the theme restaurant of traditional Chinese local culture by integrating regional culture with modern theory. The red brick culture can be understood and appreciated for the sustainable development of the red brick culture with the new designs created in this study.

2. Literature Review

Data for this study was collected from the Web of Science (WoS) and the China Knowledge Network (CNKI) in the field of restaurant design. "Restaurant design" was selected as a keyword for search during 1994–2023 in WoS and 2002–2023 in CNKI. 172 relevant articles including journal articles, conference papers, master's and doctoral dissertations, and others were found. The keyword network was analyzed for the research topics and directions in catering design (Figure 1). The highest frequencies were found for ‘Space design’, ‘Online to offline’, ‘History’, ‘Culture’, and ‘Districts’. A decrease in the number of studies during 2018–2023 was observed, while the number of studies on multiple functions has increased significantly. The preliminary result showed the importance of the restaurant environment with the characters of the local culture.

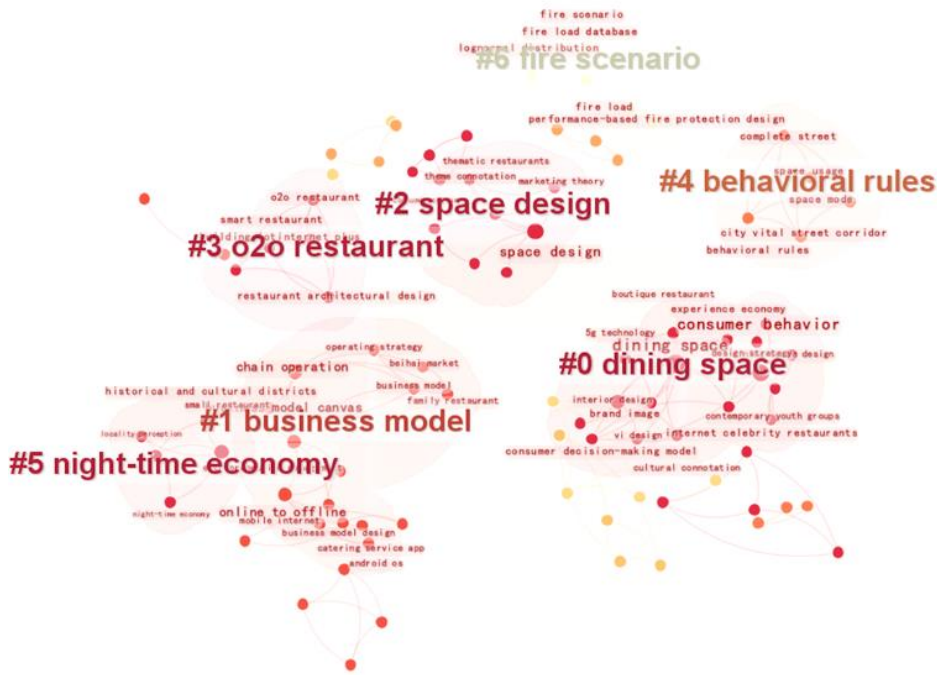


Fig. 1. Structure of keyword clustering network of cited literature.

Recently, space design for restaurants has been researched widely. Sitong Wu pointed out that the elements of traditional Chinese design are unique features and valuable heritage of oriental culture, hardly being replaced. The "International design style" is used often to create diversified design styles (Wu, 2014). Most Chinese restaurant designs are based on Confucianism with the cultural characteristics of various nationalities. It is an inclusive culture with a great influence on contemporary life (Wang, 2015). Liu et al. extracted decorative elements from Hakka architecture through abstraction, mutation, and simplification. The elements were refined, deconstructed, restructured, and reconfigured, and then applied to the renovation of restaurants (Liu et al., 2019). Fu et al. studied the application of traditional patterns of the Miao in restaurant design and described the expansion of the application of national art. New design methods are used to create a dining space with a distinctive national style to promote traditional culture (Fu et al., 2021). However, traditional restaurant design has been researched scarcely even though traditional restaurants suffer from design problems. Therefore, they must adopt new materials and design elements to improve their designs for customers. Several traditional restaurants decorate the space with traditional patterns and motifs to present the traditional culture. However, China's traditional patterns are too complex to select appropriate materials. The traditional patterns and ethnic motifs include flowery wallpaper but it is difficult to express them with their original characteristics. Thus, they lack interactive communication in traditional restaurants and cannot satisfy the needs of customers. Therefore, it is necessary to create a new type of traditional and cultural design elements for restaurants.

Recently, ecological restaurants have been proposed. Hu introduced the design of intelligent catering restaurants where the combination of restaurants with technology was found using intelligent, digital, efficient, and rich concepts with a reduced cost of operation (Hu et al., 2023). Sun and Cao illustrated the interior design of boutique restaurants in the 5G era and proposed the interior design of restaurants (Sun and Cao, 2023). Xu stated that the consumption concept of the new generational consumers has shifted from the pursuit of material enjoyment to both material and spiritual enjoyment. This strengthened the experience process of consumption from three aspects: sensory experience, emotional experience, and cultural thinking (Xu, 2021).

Such study results provided information and guidance to understand the research trends in the design of restaurants. Many studies have been conducted on restaurant designs, but intelligent space design with traditional culture is insufficient. With the use of science and technology, the demands of customers can be met. It is important to provide an interactive dining experience and visual impacts to customers. Therefore, we combined traditional design with modern technology reflecting traditional culture. Using modern materials and technology, a space design with cultural significance was created for an intelligent dining environment with urban fashion and oriental flavor.

### 3. Research Methods

#### 3.1 Research Method

We explored the design and its significance of restaurants regarding recent technology. Case studies were reviewed for in-depth study, and a questionnaire survey was conducted on a Likert scale to evaluate the attitudes of customers toward the red-brick culture of the south of Fujian (Fig. 2). We used 3D interactive technology to design the interior of restaurants with the cultural element. CiteSpace was used for the literature review in this study to define the existing problems of traditional restaurants. We analyzed their current situation to propose new design ideas and solutions for their problems. Specifically, the "Taste of Minnan in Fujian" design was carried out based on the survey results that indicated the necessity of the inheritance and innovation of traditional restaurant designs.

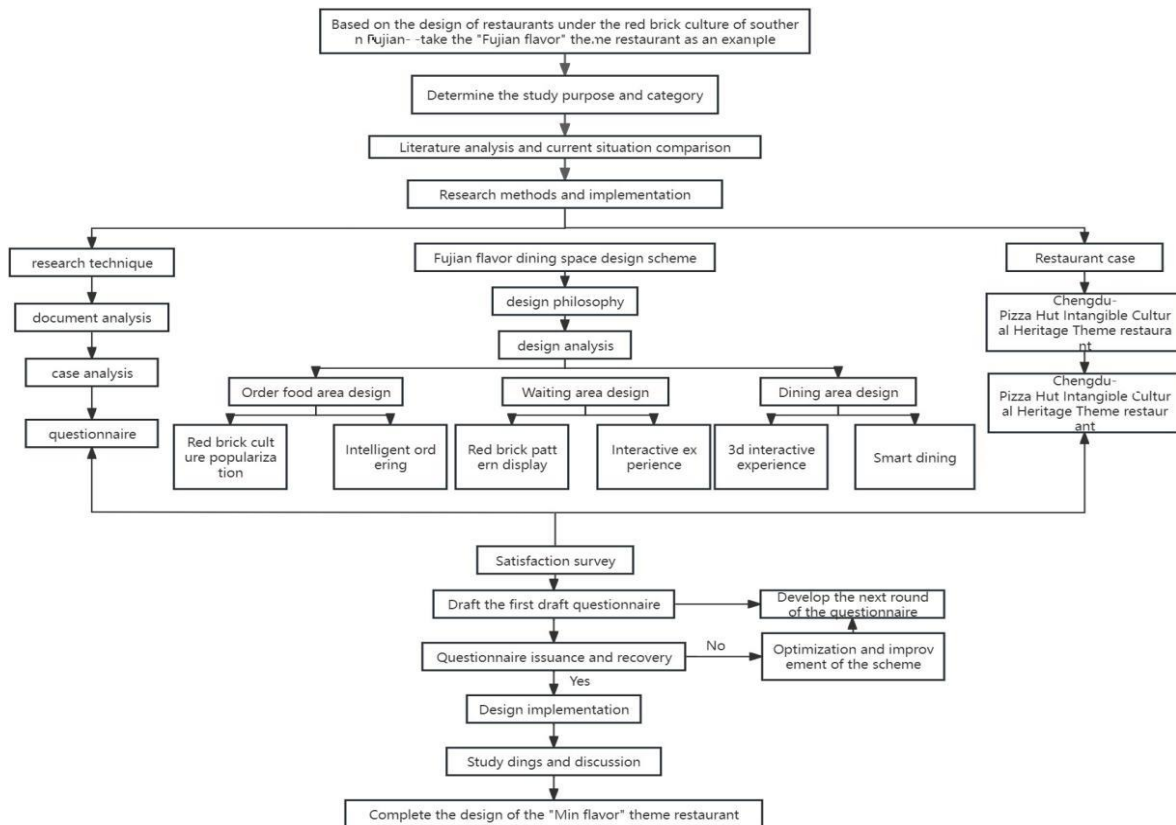


Fig. 2. Flow chart of theme restaurant design based on red brick culture of Minnan in Fujian.

#### 3.2. Case Study

##### 3.2.1 Pizza Hut Theme in Chengdu

Recently, new designs of ecological restaurants have been proposed. Pizza Hut designed an immersive light and shadow environment in Chinese traditions (Fig. 3). The "embroidery of the Qiang ethnic group" was used as it has been inherited for thousands of years. It was regarded as the best in embroidery with intangible cultural heritage. Vivid patterns of Qiang decorations are presented with bold colors and profound significance. The patterns reflect natural scenes in real life and the prayers and blessings of the Qiang people for their lives. The traditional motifs of Qiang embroidery are classical styles with strict, neat compositions,

and strong decorations which are shown in clouds, marionettes, geometrical shapes, ram's horns, roses, sunflowers, pomegranate flowers, characters, and peonies. Figure 3(a) shows the peony pattern of the background material used for the decoration of the restaurant. Qiang motifs are vivid, bold, and subjective. The peony around the plates coincides with the color of the dining room decoration (Fig. 3(b)). Such decoration makes the dish on the table more delicious. The Qiang embroidery pattern presents the national style and characteristics and the unique treasures of the Qiang people. Pizza Hut presents the "Qiang embroidery" using the peony motif which is a symbol of family reunion and happiness. It is a combination of reality and illusion which help to enjoy a feast. In addition, an interactive device was used on the wall to reveal a large butterfly dancing or a large peony in full bloom. It shows a blend of tradition and technology with a strong sense of experience (Zhu, 2023).



**Fig. 3.** Pizza Hut non-heritage theme restaurant in Chengdu (a) the "Qiang embroidery" pattern for decorating the dining room (b) peony motif pattern for the dining table.

### 3.2.2 Pearl Spring in Nanjing

The elements of the architecture of the Pearl Spring culture of Nanjing were used in the restaurant design (Fig. 4). The structure of the building is made of wood, in which the horse head, eaves, and tiles were used. The pendant lamp with white style and the dark wood grain on the aluminum plate on the top present a visual impact on the material and color as the finishing touch in the foyer (Fig. 4(a)). Figure 4b shows the tethered horse stakes in the corner of the lounge area, while the window sills are made of city wall bricks of the Ming Dynasty. Figure 4(c) shows the background wall of the dining room decorated with Chinese landscape paintings which reflects the geographical features of Pearl Spring and the regional cultural elements. The accessories in the dining room reflect the unique Buddhist culture of Pearl Izumi (Fig. 4(c)). Such space design presents the cultural elements of rich tendency that correspond to cultural promotion (Ma et al., 2023).



(a)



(b)





(c)



(d)

**Fig. 4.** Restaurant design of the theme culture of the Pearl Spring in Nanjing (a) Foyer, (b) Recreation zone,(c) Main dining area, and (d) Secondary dining area.

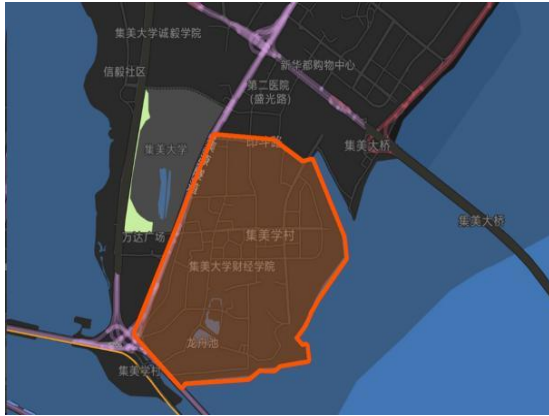
### 3.3. Design of Theme Restaurant in Minnan Style

Six steps for the design of the “Taste of Minnan” are described in Table 1 including marketing research, establishing a conceptual theme, space planning and design, selection of decorative style, integrating cultural elements, and survey and feedback for satisfaction. A restaurant was designed with a large number of red bricks as red bricks are important in the traditional architectural culture and have been used as building materials and decorative elements (Yang, 2012). The restaurant is located in the academic village of Jimei, Xiamen, China (Fig. 5(a)). The floor plan of the restaurant is shown in Fig. 5. The area of the restaurant is about 225 m<sup>2</sup>. Figure 5((b) shows the layout of the project including an ordering area, a waiting area, a catering area, a kitchen, and a warehouse according to the customer’s preference. Figure 5(c) shows the waiting area in the entrance area which provides diners with a spacious space. The design of the waiting area incorporates a graphic display of Minnan red-brick products, including tea, food, and bric-a-brac, and attracts the attention and interest of diners to the space. The dining space is an open area where red-brick elements are displayed with 3D interactive technology. Customers can gain knowledge about red bricks by touching the interactive devices on the red-brick wall as shown in Fig. 5(d). It introduces the origins of red bricks, patterns, famous red-brick buildings, and Jimei’s tourism area. It provides comfort and an understanding of the history of red-brick culture. The unique themed restaurant in Minnan disseminates the heritage of red-brick culture.

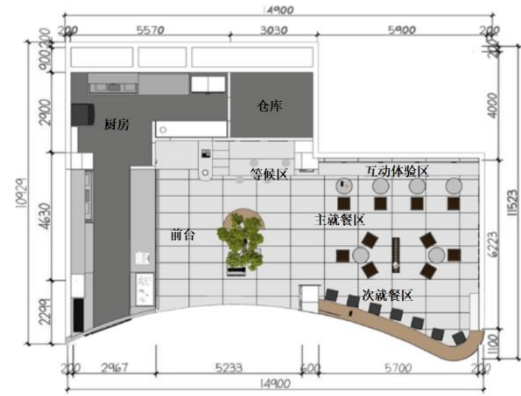
**Table 1.** Steps in design of "Taste of Minnan" theme restaurant.

Steps of design	Contents of design	Time(week)
Step 1: Marketing Research	(1) Analyse the intended audience to understand their needs and preferences. (2) Investigate competitors to understand the characteristics and potential opportunities of the local catering market.	1
Step 2: Developing the conceptual theme	(1) Determine the conceptual theme of the restaurant based on the results of the research. (2) Ensure that the entire restaurant design and decoration can reflect the theme restaurant style.	2
Step 3: Space planning and design	(1) Design the overall layout of the space of the restaurant, including the dining area, lounge area and service counter. (2) Consider the arrangement of seating in the dining area to ensure comfort and ventilation. (3) Consider the exterior design of the restaurant so that it is attractive to customers and consistent with the theme concept.	4
Step 4: Selection of decorative Style	(1) Determining the decorative style of the Minnan restaurant, which combines red-brick cultural elements with modern technology. (2) The selection of appropriate colours, materials and furniture to reflect the theme concept and create a unique dining experience.	4
Step 5: Integration of cultural elements	(1) Introduce cultural elements of Minnan region, such as traditional handicrafts, artefacts or decorations. (2) Displaying local history and customs in the space so that customers can feel a strong local cultural atmosphere.	5
Step 6: Survey and feedback on work satisfaction	(1) Conducting satisfaction surveys for "Taste of Fujian" restaurants.	2

- (2) Collect customer feedback and make adjustments and improvements based on demand.
- (3) Keeping track of market changes and updating concepts and services to keep the freshness of the restaurant.



(a)



(b)



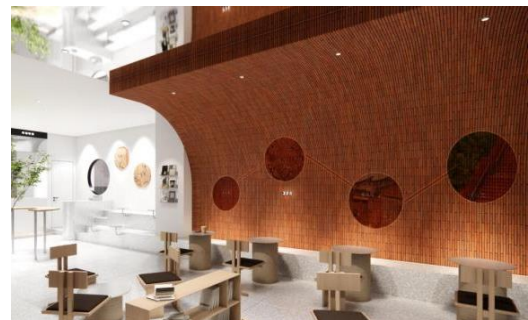
(c)

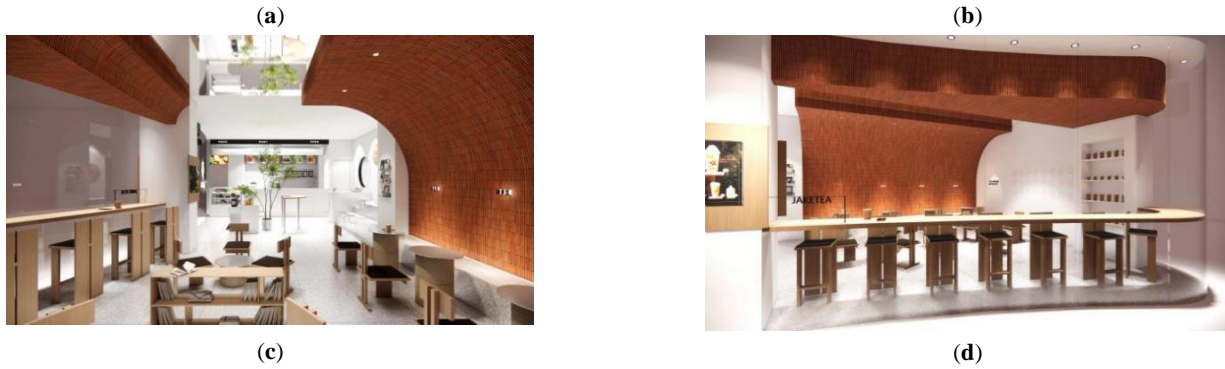


(d)

**Fig 5.** Restaurant design based on red-brick culture of Minnan in Fujian: (a) Designed area, (b) layout of space, (c) ordering area and (d) waiting area.

The dining area (Fig. 6(a)) adopts the popular open dining format, i.e. non-enclosed space dining format. In the design, a large number of red bricks were used with 3D interactive technology to allow customers to understand the knowledge of red bricks by touching the interactive devices on the wall. The interactive wall shows introduce Minna red bricks, red-brick patterns, famous red-brick buildings, and red-brick tourism in the Jimei district. Customers can appreciate the red-brick culture of Minnan while dining. The inheritance and innovation of the red-brick culture in Minnan can be performed through the creation of themed restaurants with cultural designs. The main dining area was designed to bend the red brick wall with mirrors that reflect space and enhance the quality of the entire environment (Fig. 6(c)) to mitigate the dullness caused by straight lines. Figure 6(d) presents the second dining area designed with floor-to-ceiling windows with a red brick wall. This makes the restaurant more eye-catching and allows customers to have a wider view while dining, thus gaining spiritual enjoyment and experience.





**Fig. 6.** Restaurant design based on the red-brick culture of theme restaurants in the style of Minnan in Fujian (a) Dining area, (b) Interactive wall (c) Main dining area, and (d) Sub-dining area

### 3.4. Survey of Satisfaction

We conducted a questionnaire survey for students and experts on the designs of the restaurants. 22 questions were included in the questionnaire and were scored on a Likert scale with five scores: 1-very satisfied; 2-satisfied; 3-neutral, 4-dissatisfied; and 5-very dissatisfied. Cronbach’s alpha coefficients for experts and students were 0.881 and 0.914, indicating the reliable result of the survey. Table 2 shows the questions and results of the survey. The mean values of students and experts were 4.511 and 4.494 with similar values of standard deviation. Most respondents were satisfied with the designs. Significant differences were found in the score of question 1 ( $t=2.236, p<0.05$ ) and question 14 ( $t=-2.882, p<0.05$ ). The scores of the students on questions 14 and 16 were lower than those of the experts. As the students did not have professional backgrounds, such significant differences were observed. Based on their experience and knowledge, the experts provided recommendations and advice on design, space planning, and process optimization. Table 3 shows the experts’ suggestions for the design of the themed restaurant using the red-brick culture in Minnan.

**Table 2.** Questions of the questionnaire and results of the questionnaire survey.

Questions	Student (n=15, $\alpha=0.880$ )		Expert (n=15, $\alpha=0.914$ )		T-test
	M	SD	M	SD	
1. Are you satisfied with the curved design compared to straight lines?	4.47	0.640	3.47	1.506	2.236
2. Are you satisfied with the use of red bricks to highlight the characters of Minnan?	4.53	0.640	4.27	0.799	1.169
3. Are you satisfied with the mirrored design of the ceiling that visually enlarges the dining space?	4.40	0.737	3.73	1.534	1.540
4. Are you satisfied with the overall coloured palettes of the design?	4.60	0.507	4.53	0.743	0.269
5. Are you satisfied with the design of the furniture in wood and natural colours?	4.53	0.640	4.47	0.640	0.292
6. Are you satisfied with the implementation of intelligent ordering in the restaurant?	4.53	0.640	4.73	0.458	-1.146
7. Are you satisfied with seats and interactive display screens in the waiting area to reduce boredom while waiting?	4.60	0.507	4.80	0.414	-1.146
8. Are you satisfied with the design of the red-brick wall incorporating interactive screens?	4.53	0.640	4.47	0.640	0.367
9. Are you satisfied with the design of the service area which is equipped with warehouses and food storage ?	4.47	0.640	4.35	0.640	-0.269
10. Are you satisfied with the separation wall between the operating and dining areas?	4.47	0.516	4.60	0.507	-0.695
11. Are you satisfied with the adjustability of the tables and chairs that meet the requirements of different groups of people?	4.67	0.488	4.60	0.632	0.323
12. Are you satisfied with the table displaying the ingredient list of the drinks, which saves your dining time?	4.80	0.414	4.67	0.488	1.000
13. Are you satisfied with the design of the equipped high and low washbasins?	4.60	0.507	4.60	0.632	0.000
14. Are you satisfied with the voice recognition system in your restaurant?	3.53	1.522	4.73	0.458	-2.882
15. Are you satisfied with your natural style of decorative materials?	4.73	0.458	4.47	0.640	1.468

16. Are you satisfied with the green planting in your dining room?	3.87	1.457	4.53	0.516	-1.673
17. Are you satisfied with the environmentally friendly materials used in tableware?	4.80	0.414	4.73	0.458	0.435
18. Are you satisfied with the use of energy-saving and environmentally friendly lighting in the restaurants?	4.80	0.414	4.67	0.671	0.691
19. Are you satisfied with the introduction of the concept of combining Minnan red bricks with technology?	4.47	0.516	4.60	0.507	-0.695
20. Are you satisfied with the use of intelligent communication for the red-brick elements in Minnan?	4.53	0.640	4.47	0.640	0.435
21. Are you satisfied with the adoption of intelligent design for red-brick culture in Minnan?	4.60	0.632	4.60	0.507	0.000
22. Are you satisfied with the integration of decorative elements of red bricks into the interior design ?	4.73	0.458	4.60	0.632	0.564

**Table 3 .** Experts' suggestions on the design of restaurants under the theme of "Taste of the Minan".

Contents of Design	Recommendations of the Experts
Selection of colours	(1) Making use of the main colours of red brick culture in Minnan, such as red brick colour and dark brown, to create a warm and rustic atmosphere. (2) Matching with light green or other natural colours to highlight the natural environment of Minnan region.
Incorporation of red brick elements	(1) Introducing the architectural elements of red bricks in Minnan into the interior design, such as the use of red brick walls and brick arches, to create a strong atmosphere of local culture. (2) Use red bricks for partition walls and decoration to make the whole space more textured.
Activities and experiences	(1) Providing some traditional cultural experiences so that customers get a flavour of the local culture during their meal. (2) Integrating with technology to enhance interactivity.
Environmental Atmosphere and Sensorial Feelings	Choosing music with local characteristics as background music allows customers to feel a strong regional atmosphere while dining.

#### 4. Conclusions

By combining the red-brick culture of Minnan with 3D interactive technology, The designs, interior decorations, restaurant layouts, decoration, and furnishings were created for the red-brick cultural heritage. The designs present the inheritance of traditional restaurants and guidance and provide references for future themed restaurant design. The survey results on the satisfaction level of the designs showed average scores of 4.511 and 4.494 for students and experts. In addition, Cronbach's alpha coefficients were 0.881 and 0.914 for expert and student satisfaction, showing the reliability of the survey. The design of the restaurants in Minnan inherits the local culture and uniqueness and provides a high-quality dining environment and promotional effect of the red-brick culture of Minnan in Fujian.



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**Conflicts of Interest:** The authors declare no conflicts of interest.

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