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Research article

การศึกษาเชิงทดลองการออกแบบที่อยู่อาศัยดั้งเดิมแบบ 'Yikeyin' ในลักษณะการแปลงสภาพสู่ความเป็นสมัยใหม่ โดยกระบวนการเชิงปฏิบัติการแบบมีส่วนร่วม

An Experimental Design Study on the Modern Transformation of the "Yikeyin" Traditional Dwelling through Participatory Action Research (PAR)

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บทคัดย่อ

การทำให้ที่อยู่อาศัยพื้นถิ่นทันสมัยเผชิญกับความท้าทายในการสร้างสมดุลระหว่างอัตลักษณ์ดั้งเดิม ความยืดหยุ่นของพื้นที่ใช้สอย และความยั่งยืนทางวัฒนธรรม งานวิจัยนี้มุ่งเน้นไปที่เรือนแบบ "Yikeyin" ในพื้นที่ตอนกลางของมณฑลยูนนาน ประเทศจีน โดยใช้การวิจัยเชิงปฏิบัติการแบบมีส่วนร่วม (Participatory Action Research: PAR) เพื่อศึกษาว่าคุณลักษณะดั้งเดิมได้รับการรับรู้ ปรับเปลี่ยน และแสดงออกในบริบทสมัยใหม่อย่างไรผ่านกระบวนการ PAR แบบวนซ้ำ 4 รอบ ที่ผสานการออกแบบร่วม การสังเกต และการวิเคราะห์แบบสอบถาม งานวิจัยได้ระบุปัจจัยสำคัญที่ประชาชนใช้ในการประเมินแบบบ้าน ได้แก่ ความเป็นประโยชน์ ค่าใช้จ่าย และความยืดหยุ่นของพื้นที่ควบคู่ไปกับความกังวลด้านความเป็นท้องถิ่นและการจดจำลักษณะดั้งเดิม

งานวิจัยพบความท้าทายหลัก 3 ประการ ได้แก่ 1) การรักษาอัตลักษณ์ทางวัฒนธรรมไว้ในงานออกแบบร่วมสมัย 2) การปรับผังดั้งเดิมให้ตอบสนองต่อความต้องการของพื้นที่ที่หลากหลายในปัจจุบัน และ 3) การแก้ไขปัญหาการรับรู้ที่จำกัดของสาธารณชนต่อมรดกทางสถาปัตยกรรม งานวิจัยเสนอว่าการปรับเปลี่ยนที่มีประสิทธิภาพควรผสมผสานองค์ประกอบที่จับต้องได้และจับต้องไม่ได้เข้าด้วยกันเพื่อรักษาความต่อเนื่องทางวัฒนธรรม และเน้นย้ำบทบาทของการมีส่วนร่วมของประชาชนในการเชื่อมโยงระหว่างประเพณีและนวัตกรรม ซึ่งจะช่วยส่งเสริมการพัฒนาอย่างยั่งยืนของสถาปัตยกรรมพื้นถิ่นในระยะยาว

คำสำคัญ: สถาปัตยกรรมพื้นถิ่น ยี่เคอยิ่น การวิจัยเชิงปฏิบัติการแบบมีส่วนร่วม การแปลงสภาพสู่ความเป็นสมัยใหม่

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Abstract

The modernization of vernacular dwellings poses challenges in balancing traditional identity, spatial adaptability, and cultural sustainability. Focusing on the Yikeyin Traditional Dwelling in central Yunnan, China, this study employs Participatory Action Research (PAR) to explore how traditional features are recognized, transformed, and expressed in contemporary contexts. Through four iterative PAR cycles combining Co-Design, observation, and survey analysis, the study identifies key public evaluation factors—practicality, cost, and spatial adaptability—alongside concerns for locality and traditional recognizability. Three major challenges emerge: 1) maintaining cultural identity in modern design, 2) adapting traditional layouts to diverse spatial needs, and 3) addressing limited public understanding of architectural heritage. The study argues that effective transformation must integrate both tangible and intangible elements to ensure cultural continuity. It highlights the role of public participation in bridging tradition and innovation, contributing to the sustainable evolution of vernacular architecture.

Keywords: Traditional Dwelling, Yikeyin, Participatory Action Research (PAR), Modern Transformation

1. Introduction

The Yikeyin (一颗印) traditional dwelling, whose Chinese name literally means “a seal”, can be traced back to the Ming and Qing dynasties and is a distinctive form of vernacular residence found in the central region of Yunnan Province, China. The name derives from its compact single-courtyard layout, which resembles a seal (Yang & Zhu, 2009). In terms of spatial configuration, this dwelling centers on a courtyard, surrounded by three principal rooms, four subsidiary rooms, and a “Dao Zuo” (entrance hall) directly facing the main rooms (Figure 1), effectively meeting a household’s diverse needs while also integrating closely with the local natural environment and cultural traditions. Because this architectural form is widely distributed throughout central Yunnan, it is regarded as a representative architectural prototype in the region and has become an important subject of subsequent scholarly research (Liu, 1944; Liu, 1956).

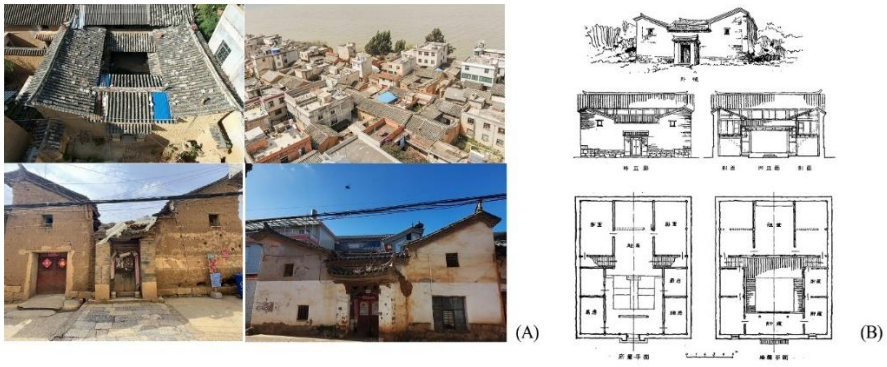


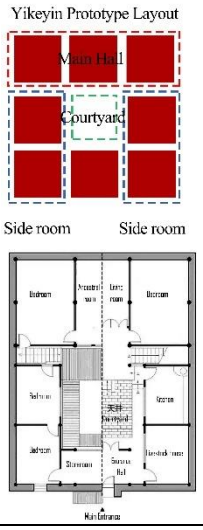
Figure 1 Yunnan Yikeyin Dwelling

(A: Yikeyin Photo; B: Plan, Elevation and Section of Yikeyin Dwelling)

Source: B: Adapted from Liu (1956)

Traditional Yikeyin dwellings adopt a timber frame as the main structural system, and mainly use earth, wood, brick, and stone as building materials. The overall spatial layout is in the form of a nine-grid pattern (Table 1). Compared with modern houses, their functional configuration does not include indoor bathrooms, and sanitary facilities are mostly set up collectively within the village. This phenomenon was mainly based on agricultural considerations: at that time, human waste could be used as fertilizer for farmland irrigation, and centralized facilities made collection and transportation more convenient. On the other hand, Yikeyin was usually used as a family-based residence with a large number of members, so more bedrooms were often arranged in the spatial layout to meet the daily living needs of large families.

Table 1 Traditional Yikeyin Architectural Prototype

Architectural Diagram	Structural Diagram		Layout	Materials
				- Wood - Earth - Bricks - Stone -Ceramic

In recent years, the construction of rural housing in China has been increasingly affected by homogenization, with regional characteristics gradually weakening and a declining sense of cultural identity. Scholars in Chinese architecture have keenly recognized this issue and generally believe that the revival and continuation of traditional architecture may offer a possible solution (A & Wu, 2017). However, in actual research and design practice, most existing approaches focus on the visual reproduction of traditional architectural prototypes (Wu, 2014). This form-driven approach, emphasizing aesthetic reconstruction, often overlooks the real needs and changing perceptions of the users.

This study takes the traditional Yikeyin dwelling as its subject and conducts design experiments through public participation. It aims to explore the real needs of contemporary villagers regarding spatial functions, and to identify the key elements related to aesthetics and identity that are necessary for the transformation and regeneration of traditional architecture in a contemporary context, based on changes in lifestyle and values.

The study adopts Participatory Action Research (PAR) as its methodology, inviting residents, design teams, and other stakeholders to participate in the entire process, from problem identification and plan

formulation to actual construction (Cornish et al., 2023). Compared with the top-down decision-making mechanisms typical of urban planning (Wu et al., 2017), rural housing is more often led by individual homeowners, who are seen as “anonymous architects” with a deeper understanding of the constraints and potentials of their houses (Rudofsky, 1987). By deeply integrating local knowledge, PAR not only respects the cultural value of traditional architecture but also pays closer attention to the contemporary villagers’ practical needs for functionality, aesthetics, and identity. Through continuous cycles of action and reflection, it promotes the contemporary expression and adaptive transformation of traditional architectural prototypes.

2. Research Objectives

2.1 To identify the key factors considered by the public when evaluating dwelling designs during the PAR process.

2.2 To identify and analyze the primary challenges faced by the Yikeyin Traditional Dwelling in its modern transformation through a Participatory Action Research (PAR) intervention.

3. Literature Review and Related Theories

3.1 Literature Review

Research on the Yikeyin Traditional Dwelling in China's architectural academia began with Liu (1944). Until the early 21st century, studies primarily focused on data collection, mapping, and supplementation to establish a foundational understanding (Jiang, 1997; Zhu, 1997). From the early 2000s to 2020, research expanded to explore spatial construction logic (Mao & Wang, 2019), decorative arts (Dong & Zhang, 2021), and cultural significance (Jiang et al., 2016), with growing attention to conservation and adaptive reuse driven by traditional village protection policies (Liu, 2007). In recent years, scholarly interest has shifted towards tracing its origins and analyzing its architectural evolution (Yang & Wang, 2022; Dong et al., 2023), aiming to understand its morphological changes and adaptive transformations over time. Although research on Yikeyin Traditional Dwellings has a long history in Chinese architectural academia, studies on integrating its architectural elements into contemporary residential design remain absent. Furthermore, due to its strong regional specificity and niche subject matter, research on Yikeyin dwellings remains limited in the international academic sphere.

The modernization of the traditional Yikeyin dwelling prototype has been rarely explored in existing research. This study originates from the author's design experience in Wulong Village (Figure 2), where, despite initial efforts to solicit villagers' needs, the conventional top-down design process failed to elicit effective feedback or foster a sense of cultural recognition. This highlights a disconnect between designers and the community. As Amos Rapoport (1969) emphasized, understanding the generative process of vernacular dwellings is crucial for revealing their cultural significance and aligning with user needs.

Figure 2 Experience in Wulong Village

3.2 Related Theories

This study draws on the construction practice of Hassan Fathy in the village of New Gourna, as well as the community-based participatory construction methods advocated by Diébédo Francis Kéré in rural Africa. Their design intentions were not limited to providing living spaces for the community but aimed to transfer professional knowledge to community members during the process of co-construction, thereby promoting the future construction and development of the village. Both practices demonstrate that participatory design, as a platform for sharing local cultural knowledge and building experience, holds a social significance that goes far beyond architectural form itself (Fathy, 2010; Park & Sung, 2024).

Carrera Díaz et al. (2022) also emphasized that participatory design is not only a design method, but also a cognitive and constructive process centered on the community. By granting the community a leading role in design and decision-making, it promotes the sharing and dissemination of knowledge, which not only enhances residents' understanding of the value of traditional architecture and their sense of cultural belonging, but also stimulates their initiative to participate in its preservation and continuation.

In addition, some scholars have pointed out that the participatory design process does not rely solely on the villagers' direct expression, but also requires designers and researchers to understand villagers' spatial cognition, emotional needs, and actual building abilities through in-depth observation and repeated reflection (Wu et al., 2017). Through public participation, collaborative discussion, and phased feedback, it helps stakeholders identify real problems in rural construction that have long been neglected.

As the methodological foundation of this study, PAR is defined as a research orientation that emphasizes the juxtaposition of practice, collaboration, and reflection. Cornish et al. (2023) regard it as an open, collaborative, unpredictable, and highly iterative process, emphasizing the continuous generation of new understanding and knowledge through multiple rounds of "planning–action–observation–reflection" practice. The relationship between researchers and participants is no longer a one-way extraction of information, but a collaborative relationship of knowledge co-creation. Its essence is not to validate a predetermined plan, but to continuously identify problems through dynamic feedback, promote adjustments, and form new community consensus.

4. Research methods

This study adopts Participatory Action Research as its research framework. According to MacDonald (2012), focus groups, participant observation and field notes, interviews, diaries and personal logs, and questionnaires are common research methods in PAR studies. This study mainly uses observation, focus groups, interviews, and questionnaires as specific methods, combining both qualitative and quantitative approaches to conduct the research.

A complete cycle of practice and research includes three main stages: 1) Co-Design, 2) Data Collection, and 3) Reflection (Figure 3). The multi-round iterative design and research process together form a complete PAR practice framework. A total of four rounds were conducted in this study.

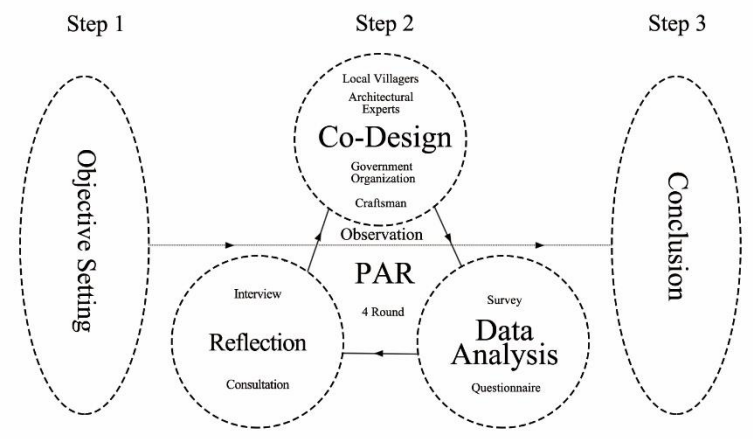


Figure 3 Research Frame

4.1 Co-Design

4.1.1 The Participants in Co-Design Process

The participants involved in Co-Design mainly consisted of three groups: 1) local villagers, 2) researchers, and 3) experts.

1) Local villagers: 1) Mr. Yang's family; 2) Ms. Chen's family; 3) Mr. Xiao's family

In the four rounds of co-creation practice in this study, Mr. Yang's family were the main designers in the first and second rounds, Ms. Chen's family were the main designers in the third round, and Mr. Xiao's family were the main designers in the fourth round. All three families participated in all four rounds of co-design processes, serving as discussion group members in the non-leading rounds to provide feedback and suggestions for other design proposals.

Regarding the selection of co-creators, the three families were all recommended by the local government and had a clear intention to build a house. Among them, Mr. Yang had actual building experience; Ms. Chen had no building experience and represented the typical situation of most villagers; while Mr. Xiao's family had more family members, and their participation provided more reference dimensions for the design of multi-generational co-living spaces.

2) Researchers

Researchers, as design facilitators, participated in the four rounds of co-design together with local villagers. During the design process, researchers minimized their dominant role and only took on a guiding function, leaving the final decision-making power to the villagers to ensure that the design truly aligned with local needs. At the same time, researchers encouraged villagers to express their preferences, opinions, and expectations regarding the architecture, and served as knowledge supporters by providing necessary professional guidance. In addition, researchers collected relevant data through observational records during the process, which were used for subsequent analysis and reflection.

3) Experts: 1) Architectural researchers from local universities; 2) Related Scholars; 3) Craftsmen who have long been engaged in building construction

In the Co-Design process, experts provided guiding suggestions and assisted researchers in analyzing and understanding the phenomena observed during the process.

4.1.2 Sites Selection for the Design

For this study, two residential sites in Haiyan Village, Kunming, Yunnan Province, have been selected as experimental design locations (Figure 4).

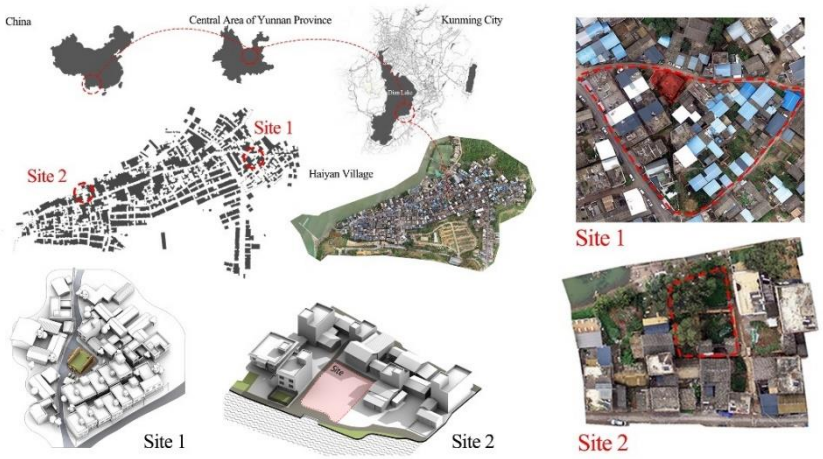


Figure 4 Design Sites

Figure 5 Characteristics of the Two Types of Sites

Reason for Sites Selection:

Site 1: After the demolition of traditional buildings in the village, a large number of ruins were left behind (Figure 5). Designing on these ruins not only has practical feasibility for implementation, but also constitutes an attempt to respond to the traditional Yikeyin prototype. This type of design can further test the villagers' acceptance and sense of identification with traditional architectural forms and spatial structures. (Site 1 is owned by Mr. Yang's family)

Site 2: Building houses on more open plots represents the mainstream trend in current rural housing construction and has strong representativeness (Figure 5). Such plots offer greater freedom in spatial scale and functional layout, providing more possibilities for design exploration and expansion. (Site 2 is owned by Ms. Chen's family)

4.1.3 Observation

In the Co-Design process, the researcher mainly used unstructured observation to collect data, focusing on villagers' preferences and responses in aspects such as material selection, functional arrangement, spatial layout, spatial scale, decoration, architectural style, construction cost, and acceptance of traditional architectural prototypes (Table 2).

Table 2 Observation Strategies and Recording Focus in Co-Design Process

Observation Focus	Description	Recording
Material Preference	Observe the changes in villagers' acceptance of traditional and modern materials across different rounds; record feedback and attitude shifts.	Record feedback and verbal expressions, focusing on attitude changes before and after adjustments.
Functional Arrangement	Encourage villagers to define functions themselves and discuss with the group; record key ideas and disagreements.	Record key opinions and discussion highlights, noting consensus or disagreement that emerges during discussion.
Spatial Layout Acceptance	Observe villagers' cognitive path when designing spatial layouts—whether they refer to traditional prototypes or life experience; record their evaluations and adjustment suggestions.	Record reasoning basis, prototype references, and attitude changes throughout the design process.
Cost Concern	Encourage villagers to express concerns about cost; record emotional reactions and key concerns regarding different budget components.	Record frequency of cost-related issues and typical expressions; observe emotional reactions and intensity of feedback.
Decorative Preference	Guide villagers to discuss decorative preferences and traditional patterns; record expressions of preference and level of acceptance.	Record intuitive evaluations and semantic expressions toward illustrated design options.
Prototype Acceptance	Observe villagers' attitudes toward traditional layouts and spatial organization; record comparisons and evaluations with modern styles.	Record villagers' logic and evaluations in choosing between traditional and modern styles.

Observation Focus	Description	Recording
Spatial Scale (Round 3)	In Round 3, guide villagers to discuss spatial scale and sense of proportion; record their understanding and preferences.	Record villagers' descriptive language and emotional responses regarding spatial scale perception.
Architectural Style (Round 3)	In Round 3, explore villagers' preferences and attitudes toward roof, façade, and other stylistic elements.	Record preference selections and reasoning for stylistic illustrations.

Although the villagers' feedback often carried strong subjectivity, influenced by personal experience and emotional preferences, they were usually able to respond immediately to the spatial concepts and element suggestions proposed by the designers. Through continuous observation, the researcher could preliminarily identify key variables influencing design decisions and, based on this, propose quantitative analysis hypotheses for subsequent questionnaire surveys, thereby further verifying the specific impact of different design adjustments on villagers' recognition and acceptance (Figure 6).

Figure 6 Observations During the Co-Design Process

4.2 Design Proposal Representation

The design proposals are presented through hand-drawn sketches, on-site digital simulations (Figure 8), and final physical models (Figure 9), to visually demonstrate the evolution of the design process. Among these, AIGC is mainly used during the communication phase as a supporting tool to quickly and intuitively respond to co-creators' feedback on style and materials, but it is not used as the final form of design presentation (Figure 10).

After each round of design is completed, the research team forms a focus group with relevant scholars, government organizers, and craftsmen to discuss the content of the proposal, in order to further optimize the design and assess its practical feasibility.

Figure 7 The Process of Co-Design

(A: Co-Design with Local Villagers; B: Workshop Participants Including Government Organizers, Experts, and Craftsmen)

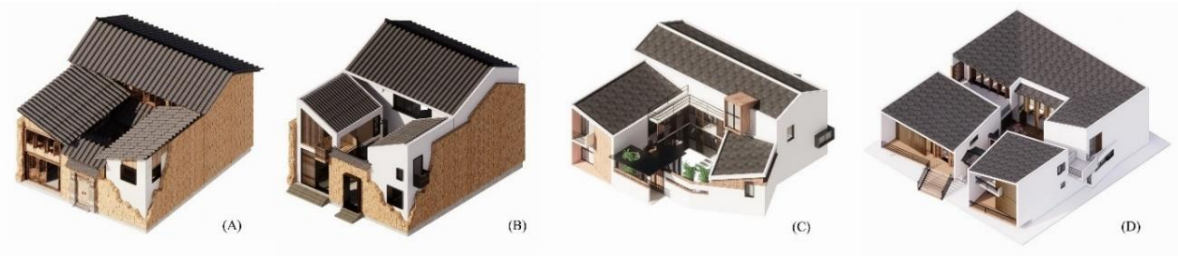


Figure 8 Digital Simulation of Design Plan

(A: First Round Design; B: Second Round Design; C: Third Round Design; D: Fourth Round Design)

Figure 9 Physical Models

Figure 10 AIGC Technology in Consultation

4.3 Data Collection and analysis

The data collection in this study was mainly conducted through questionnaires, and the collected data were analyzed using descriptive statistics.

At the end of each Co-Design process, the research team distributed 50 additional questionnaires, focusing on 9 questions, to collect data on the public's satisfaction with the design proposal, as well as their willingness to adopt and promote the proposal (Table 3). It should be noted that due to the small population size of the village, the survey participants remained relatively stable to a large extent, with the vast majority being repeat participants over multiple rounds. This allowed the researchers to more effectively capture the direct impact of different design adjustments during the iterative process on the same group, and thus to more clearly assess the changes in cognition and attitude triggered by different design strategies.

All questionnaires used a five-point Likert scale (1–5), where 1 indicates the lowest level of satisfaction or the lowest willingness to adopt and promote, and 5 indicates the highest level.

Table 3 Survey Questions

Variables	Questions
Similarity to Yikeyin	Q1: Do you think the design proposal resembles Yikeyin?
Overall Satisfaction	Q2: Are you satisfied with the overall design proposal?
Satisfaction (Construction Costs)	Q3: Are you satisfied with the construction cost?
Satisfaction (Decoration)	Q4: Are you satisfied with the decoration of the design proposal?
Satisfaction (Functionality)	Q5: Are you satisfied with the functionality of the design proposal?
Satisfaction (Spatial Layout)	Q6: Are you satisfied with the spatial layout of the design proposal?
Satisfaction (Material Selection)	Q7: Are you satisfied with the material selection of the design proposal?
Willingness to Adopt	Q8: Are you willing to adopt this design proposal?
Willingness to Recommend	Q9: Are you willing to promote this type of design proposal?

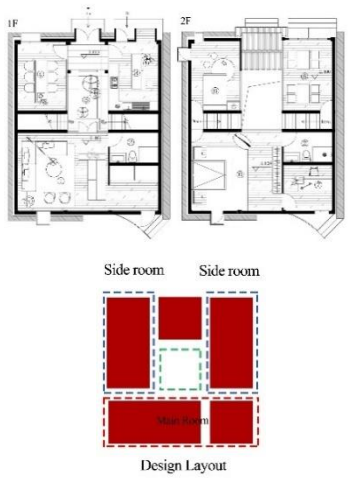
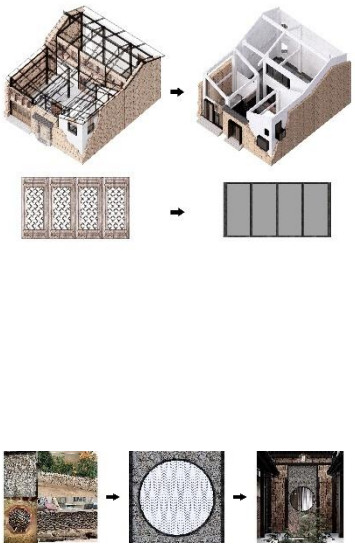
Following the questionnaire analysis, the research team conducted interviews to verify the validity of the quantitative data and to gain a deeper understanding of the reasons and motivations behind the villagers' evaluations.

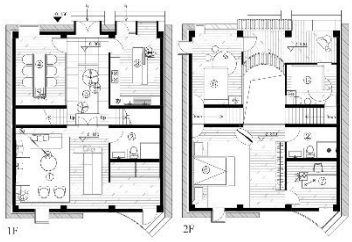
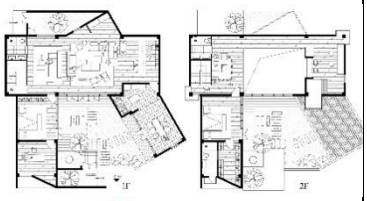
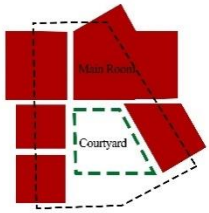
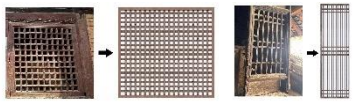
5. Results and Discussion

5.1 Results of PAR

The table below presents the design adjustments made during the four rounds of PAR practice and their impact on changes in public evaluation (Table 4)

Table 4 Design Proposal, Adjustments and Impact on Evaluation

Design Proposal	Design Adjustments	Impact on Evaluation
Round 1		
	- Design on original site - Modern Materials Used for Structure and Partial Walls - Continuation of Traditional Material Application - Continuation of Yikeyin Decorations ((Wooden Windows and Doors with Patterns and Carvings) - Spatial Integration - Functional Expansion (Toilet and Snack Bar)	- High Recognizability of Yikeyin Characteristics - High Ratings in Terms of Decoration, Functionality, and Spatial Layout - Moderate Willingness to Adopt and Promote the Overall Design Scheme -Low Satisfaction with Construction Costs and Material Selection
Architectural Rendering		
Round 2		
	- Material Adjustments (Structure, Walls, and Partial Windows and Doors) - Reduction of Traditional Decorative Elements - Use of Local Decorative Techniques (Shell-Inlaid Screen Door, Clay Tiles) - Layout Adjustment (Platform Added) - Functional Adjustment (Addition of Children's Room)	- The recognizability of Yikeyin has relatively declined, but it remains identifiable. - There has been an overall improvement in satisfaction with construction cost, material selection, functionality, overall proposal, and willingness to adopt and promote. - Evaluation of decorative elements slightly declined but still remained at a relatively satisfactory level overall.

Design Proposal	Design Adjustments	Impact on Evaluation
		
Architectural Rendering	 	
Round 3		
  	- Site Adjustment (No Building Ruins, Flatter Terrain) - Significant Change in Building Layout (Traditional Plan Disrupted) - Larger Spatial Scale - Change in Building Massing (Right Wing Reduced from Two Floors to One) - Increased Use of Traditional Decorative Windows	- The similarity to the Yikeyin prototype has significantly decreased, and recognizability has clearly declined. - Overall satisfaction and willingness to promote the design have decreased. - Satisfaction with construction cost, decorative elements, material selection, and willingness to adopt have all improved.
Architectural Rendering	 	
Round 4		
	- Massing Adjustment (Responding to the Square Plan of Yikeyin) - Material Adjustment (Use of Bamboo as a More Affordable Alternative to Wood)	- All evaluation variables have increased compared to the third round. -The recognizability of Yikeyin remains lower than in the first and second rounds.

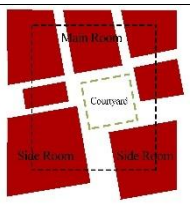
Design Proposal	Design Adjustments	Impact on Evaluation
  	- Functional Adjustment (Addition of Coffee Bar and Two Bedrooms) - Spatial Scale Adjustment (Increased Interior Area, Reduced Courtyard Area) - Decorative Element Update (Redesigned Main Gate)	- Except for satisfaction with decorative elements and spatial layout, all other variables reached their highest values among the four design rounds.
Architectural Rendering		

Table 5 Data of the 4 Rounds design proposal

No.	Category	Mean			
		Round 1	Round 2	Round 3	Round 4
1	Similarity to Yikeyin	4.73	4.38	2.20	3.12
2	Overall Satisfaction	3.28	4.08	3.68	4.45
3	Satisfaction (Construction Costs)	2.38	3.95	4.49	4.84
4	Satisfaction (Decoration)	4.73	4.05	4.29	4.65
5	Satisfaction (Functionality)	4.33	4.53	4.43	4.84
6	Satisfaction (Spatial Layout)	4.93	4.63	4.61	4.80
7	Satisfaction (Material Selection)	2.05	3.98	4.32	4.71
8	Willingness to Adopt	3.33	4.18	4.43	4.73
9	Willingness to Recommend	3.77	4.43	4.27	4.57

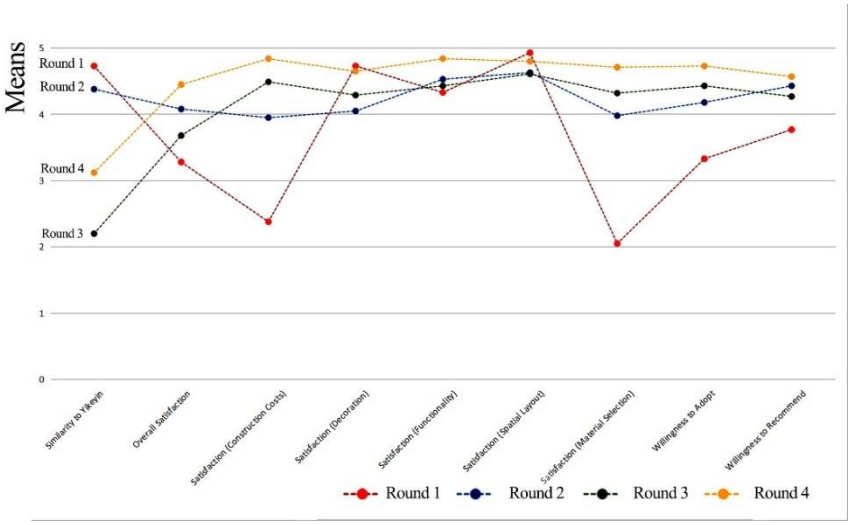


Figure 11 Changes in Evaluation Variables Across Four Rounds of PAR

5.2 Interviews for Data Analysis

The research team conducted interviews based on the data analysis of each round. The following are the interview themes and summarized responses for each round (Table 6).

Table 6 Interviews for Data Analysis

Round 1	Themes	- Main reasons for the relatively low overall satisfaction - Specific types of dissatisfaction in material selection and key factors contributing to high construction costs - Specific reasons for unwillingness to adopt and promote the design proposal
	Responses	- The relatively low overall satisfaction was mainly due to the mismatch between material selection and expectations, as well as the high construction cost. - Light steel structures were costly and required advanced construction techniques. Although wooden walls were recognized, their cost was too high. Villagers tended to prefer brick walls coated with white architectural paint. - The low willingness to adopt and promote the design was primarily due to construction and labor costs exceeding the acceptable range.
Round 2	Themes	- Reasons for the decline in Yikeyin recognizability - Is the increase in overall satisfaction related to material adjustments? - Reasons for the decline in decorative satisfaction - What are the main factors influencing willingness to adopt and promote? **New Finding:** Why did satisfaction not exceed the mean score of 4.5?

	Responses	- The replacement of materials and the modernization of overall style and color weakened the response to traditional forms, which were the main factors leading to the decline in recognizability. - The adjustment of building materials and the reduction of construction costs directly improved overall public satisfaction. - Villagers generally showed a stronger preference for traditional carvings and patterns, believing that traditional decorations are more aesthetically pleasing, while modern decorative styles do not meet their aesthetic expectations. - The acceptability of building materials and the cost of construction are the core factors affecting the willingness to adopt and promote the design. **New Finding:** The reason lies in the relatively small interior space of the traditional Yikeyin, which fails to meet the current villagers' demand for more spacious living environments.
Round 3	Themes	-Reasons for the sharp decline in recognizability - Reasons for the decline in overall satisfaction - Why did willingness to adopt and promote not decline significantly, or even increase, despite lower satisfaction?
	Responses	- The design broke away from the traditional square floor plan, and the architectural form no longer resembled the "seal-like" shape of Yikeyin. The modernization of materials and style further weakened its traditional identifying features. - Villagers felt that the design lacked continuity with traditional architecture and no longer represented the essence of Yikeyin, thus failing to serve the purpose of cultural inheritance and preservation. - Villagers placed greater emphasis on the functionality and practicality of the building. Even if traditional features were diminished, a design that meets actual living needs still holds considerable value for adoption.
Round 4	Themes	- Reasons for the increase in recognizability - Is the increase in satisfaction related to recognizability?
	Responses	- The design returned to the spatial logic of the traditional Yikeyin, using a square massing and symmetrical layout to respond to the traditional prototype. Although the materials and style were relatively modern, villagers were still able to recognize its connection to tradition. - When the design is recognizable to the public, it is perceived as a continuation of tradition. This enhances cultural identity, which in turn leads to increased satisfaction.

5.3 Discussion

5.3.1 Discussion of the First Round of PAR

From the analysis of the first-round questionnaire data and interview results, it can be seen that although the public generally recognized the traditional architectural style and decorative elements of Yikeyin, the selection of building materials and the overall construction cost were still the main factors influencing their evaluation.

Villagers generally did not accept light steel structures, mainly because the current rural house-building model in China has shifted from the earlier mutual-aid construction mode to a contract-based form with local construction workers (Wang, 2013). These workers are mostly experienced in reinforced concrete construction and lack sufficient experience with light steel structures. In addition, although villagers held a positive attitude toward traditional materials, craftsmen pointed out during the discussions that the processing and transportation costs of traditional materials were much higher than those of modern building materials, resulting in a relatively high overall cost.

Therefore, it is evident from the first round of practice that in the modern transformation of Yikeyin, the public is more concerned about the economic feasibility of the architecture.

5.3.2 Discussion of the Second Round of PAR

From the changes in the data, it is clear that the adjustment of building materials did improve public satisfaction with the overall design proposal as well as their willingness to adopt and promote it. This result further confirms the key viewpoint obtained from the first-round interviews: the economic feasibility of the building is a crucial factor influencing public evaluation.

Feedback on decoration shows that the public generally believes traditional decorations are more aesthetically pleasing, indicating that traditional elements still hold aesthetic value and cultural identity in the contemporary context.

In addition, with the functional adjustments and optimization, public satisfaction with building functionality also increased significantly. This indicates that although the traditional prototype was partially broken in the design, the newly added spatial functions better met the practical needs of modern life, reflecting a positive response to contemporary usage scenarios.

Although spatial scale was not formally included as an evaluation variable, in the interview process, the vast majority of villagers mentioned the spatial limitations brought by traditional structural systems. They believed that structural adjustments should result in larger interior spaces to better meet the practical needs of contemporary life.

Another point revealed in the interviews was that, for many villagers, spatial scale was regarded not only as a matter of practicality, but also as a symbol of social status and economic capacity. This reflects a shift in perception: space has gradually acquired symbolic meanings beyond its physical or functional attributes. It is no longer merely a container for daily life, but has become a medium of socio-cultural expression, carrying villagers' visions of life, sense of identity, and understanding of modernity.

5.3.3 Discussion of the Third Round of PAR

Feedback from the third round indicated that the public primarily identified the Yikeyin prototype through visual comparison of tangible elements, focusing mainly on traditional visual features such as materials, overall form, and color. These intuitive external elements served as the core basis for their judgment of whether a building possessed traditional attributes.

Interview results showed that the reduction in similarity between the design and the traditional prototype was the main reason for the decline in overall satisfaction. The public generally believed that the design broke away from the traditional characteristics of the Yikeyin prototype, lacked traditionality, and therefore could not achieve the goal of preserving traditional architecture. In the workshop discussions, experts provided the following explanations:

1) Long-term living experience in Yikeyin dwellings has built up a collective emotional memory. This emotional connection not only reinforced the identification with and pride in local traditional architecture but also contributed to a sense of cultural belonging.

2) This sense of cultural belonging has led villagers to view the preservation of traditional architecture as their own responsibility. Throughout multiple rounds of PAR practice, this cultural identity and vague understanding of architectural preservation were gradually reawakened. In the process of participation, villagers subconsciously assumed the role of protectors.

3) The public's understanding of "preservation" still mainly stays at the level of replicating the prototype characteristics of Yikeyin, and they tend to evaluate the design proposal based on the degree of visual similarity in form, color, and other features compared to the prototype.

This cognitive feature indicates that in actual design practice, designers need to selectively respond to the tangible elements of Yikeyin, such as form, materials, and color.

Another point worth discussing is the contradiction between overall satisfaction and willingness to adopt. Although overall satisfaction declined due to reduced recognizability, villagers still expressed willingness to adopt the design. Feedback from the interviews explained this phenomenon: When facing a choice between emotional identification with traditional architectural culture and the comfort and functionality provided by modern architecture, villagers tended to prioritize the latter.

5.3.4 Discussion of the Fourth Round of PAR

In the fourth round, the design responded to the Yikeyin prototype in terms of architectural form. Although its similarity to the traditional prototype was not as strong as in the first and second rounds, the overall public satisfaction significantly increased, and other evaluation indicators were also at a relatively high level.

This also confirmed the viewpoint from the fourth-round discussion. However, the aesthetic features embodied in traditional forms and the cultural memory they carry still hold value in terms of aesthetic preference and identity recognition and should be regarded by designers as important aspects to be addressed in the process of transformation. Therefore, the modern transformation of Yikeyin should respond to the needs of contemporary life while also considering formal expression and cultural inheritance. A balance between the two is essential to gaining broader public recognition.

5.4 Reflections on the Study

Participatory design not only enables researchers to identify the public's genuine attitudes and perceptions toward traditional architecture in a contemporary context, but also captures the public's actual needs regarding the functionality, economic feasibility, and adaptability of modern architecture. Compared with conventional design models, participatory design allows the design process to go beyond drawings and architectural forms, truly integrating into the community and responding to real conditions. It transforms knowledge transmission from a one-way process into multi-party collaborative co-creation, making design not only a spatial solution, but also a process through which the public understands, expresses, and reconstructs their cultural identity.

Although researchers intentionally weakened their dominant role during the process, the discursive power implied by their identity as "researchers" may still have subtly influenced the direction of the design. The implementation of some design suggestions was still inevitably guided by the research team. In the early stages of collaboration with villagers, co-creators often tended to accommodate the designers' opinions out of politeness and withheld their true thoughts, which could lead to judgment bias or misguidance in the design direction. Therefore, how to establish a long-term, stable, and equal trust mechanism is a critical issue that needs to be addressed in the PAR process.

This project was funded solely by academic research support. Although the local government provided coordination and logistical facilitation, it did not deeply intervene in the design process. Thus, it remains uncertain whether, under real construction conditions, the actual involvement of government authorities would redistribute decision-making power and pose potential intervention in the realization of the co-creation mechanism.

6. Conclusion and Suggestions

6.1 Conclusion

This study adopts Participatory Action Research (PAR) as its methodology and systematically explores the transformation path of the traditional Yikeyin dwelling in contemporary expression through four rounds of co-creation practice, focusing on two core objectives: first, to identify the key concerns of the public in evaluating residential design proposals; second, to analyze the main challenges faced in its modern transformation.

In the evaluation process, it was found that the public paid more attention to practicality, economic feasibility, and constructability in design assessment. Material use, construction costs, and spatial adaptability are key factors influencing their willingness to adopt and promote the design. At the same time, the public also places high value on locality and the recognizability of tradition, believing that traditional features serve as important carriers that connect memory and cultural belonging. Therefore, design should respond to real-life needs while strategically integrating traditional elements to balance rational functionality with emotional identification.

The study identified three main challenges: 1) how to sustain the recognizability and cultural identity of traditional architecture in modern design. As materials and forms are updated, the public increasingly relies on visual elements to judge whether something is “traditional.” Design must find a balance between formal language and cultural symbols and explore paths beyond form to deepen a sense of identification; 2) under the shift in public perceptions of living, traditional spatial models struggle to address diverse modern demands. Villagers care not only about functionality, but also pursue comfort, flexibility, and the symbolic meaning of space, while traditional layouts are limited in terms of scale and functional integration; 3) limited public understanding of traditional architectural culture restricts its contemporary expression. Villagers mostly judge traditionality based on visual elements, ignoring the underlying cultural structure and spatial logic, leading design to lean towards formal restoration, which hinders the renewal and communication of cultural connotation.

Compared with conventional design approaches, PAR not only helps researchers identify the public’s real attitudes toward traditional and modern dwellings, but also enables design to better align with their diverse needs. Future design and policy practices should continue to promote trust-building mechanisms and platforms for knowledge co-creation, while ensuring technical and construction feasibility, to provide a more resilient foundation for the contemporary expression of traditional architecture.

6.2 Suggestions

The path of rural architectural renewal should not be separated from the coordinated advancement of cultural identity, economic reality, and public participation. As an effective mechanism for communicating the real needs of the public and promoting cultural heritage, participatory design should be institutionalized and receive policy and financial support in the future, becoming a strong foundation for the modern transformation of traditional dwellings. Based on practical experience, this study proposes the following three types of suggestions, providing references for future rural architectural design and institutional construction from the perspectives of cultural communication, policy and economic support, and technical tools.

1) Cultural Communication and Cognitive Enhancement

Strengthen the educational value of participatory design: Participatory design is not only a process of co-construction, but also a platform for cultural dissemination and cognitive enhancement. Designers should take this opportunity to guide villagers to understand the philosophy, culture, and spatial logic behind traditional architecture, filling the gap in public knowledge and enhancing cultural identity.

Establish a continuous co-creation mechanism: Participation should not end with a one-time design intervention but should be institutionalized as a community-led regular mechanism. Local design teams can be established, or local craftsmen can be trained in co-creation methods to ensure that community participation can continue after the project ends.

2) Policy Support and Economic Guarantee

Include co-creation mechanisms in policy systems: It is recommended that Co-Design be institutionalized into rural construction policies at both local and national levels. For example, by promoting

traditional architecture preservation and renewal through community-led approaches, and by formalizing the process, expand the coverage and continuity of public participation.

Explore diversified economic support mechanisms: Cost factors directly affect material selection and construction feasibility. In the future, efforts should be made to establish diversified mechanisms such as special loans for traditional architecture preservation, government subsidies, or cooperative construction, to reduce the cost of preservation and renewal and improve the practical operability of traditional architectural transformation.

3) Supportive Application of Technical Tools

Use technologies such as AIGC reasonably: AIGC has shown good performance in visual expression and feedback communication in the early stages of the project, especially in efficiently responding to villagers' opinions. However, its role as a tool should be clearly defined—it should serve only as an auxiliary method for design communication and not as a substitute for the final design outcome.

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