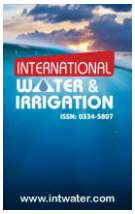

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Volume 43 Issue 2 (2024)
ISSN: 0334-5807
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Creative Practice in a Sustainable Green Village? Connection of Service Design Identity and Pro-Environmental Behavior

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Abstract Harmonious coexistence between human beings and nature is a priority for the sustainable development of rural communities in the global South, and the cultivation of pro-environmental behaviors in communities based on service design for green village construction is undoubtedly one of the most important initiatives. Starting from the perspective of service design identity of rural community residents, based on the research data of 380 rural community residents in Jiangsu, Zhejiang and Fujian Provinces, the structural equation method and hierarchical regression method were used to explore the factors influencing the pro-environmental behaviors of rural community residents and reveal the mechanism of cultivating pro-environmental behaviors of rural community residents. The results show that: design philosophy identity and design space identity have a significant positive effect on the pro-environmental behavior of rural community residents; Risk identity has a significant negative effect on the pro-environmental behavior of rural community residents; Value perception plays a mediating role in the influence of design philosophy identity, design space identity and risk identity on the pro-environmental behavior of rural community residents, and community interaction plays a moderating role in the influence process. Strengthening the value perception of pro-environmental behaviors among rural community residents is the key to fostering pro-environmental behaviors. This will contribute to the building of green villages where humans and nature coexist in harmony.

Keywords- sustainability, rural communities, pro-environmental behavior cultivation, service design identity, green development

1. Introduction

High-quality development of rural communities is an intrinsic requirement of Chinese path to modernization and a necessary approach to common prosperity. The green development of agriculture, countryside and farmers is a profound change from "quantity" to "quality" in rural communities, and is an inevitable requirement for implementing the new development philosophy and promoting rural supply-side structural reform (Shao and Li, 2023). China's agricultural surface pollution is becoming increasingly severe, factor inputs are tightening, the ecological dividend is becoming more and more overdrawn, and the crude production method driven by reliance on chemical products such as pesticides and fertilizers poses a challenge to China's sustainable agricultural development (Ma, 2023). The construction of farmers' ecological values has a long way to go, and the low recognition of the service design based on green village construction, the imbalance of ecological affection, the unsoundness of ecological literacy as well as the insufficient practice of ecological behaviors are the typical common problems of most of the farmers. In the process of promoting rural revitalization, in order to realize the unity of economic, social and ecological benefits, it is urgent to respect the ecological law as a prerequisite, cultivate and shape the ecological personality, and rebuild the harmonious relationship between human beings

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and nature (Bi, 2023). To mitigate the multiple constraints on the development of rural communities caused by environmental pollution, resource shortages and farmers' lack of ecological awareness, the report of the nineteenth National Congress of the Communist Party of China (CPC) explicitly pointed out that it was imperative to accelerate the reform of the ecological civilization system in rural communities and to fully integrate all types of resources in order to enhance the comprehensive capacity for rural development. However, the long-term top-down based governance model alone has neglected the key role of farmers' participation, leading to a general lack of pro-environmental behavioral initiative and low participation of rural community residents in rural community production practices and adherence to the inherent rural production and life style (Huang, 2023). As the subject of agricultural production and micro-decision-making unit, the perception and attitude of rural community residents towards green countryside determines the effectiveness of China's green countryside transformation. Therefore it is indispensable to deeply construct the service design identity of rural community residents towards green countryside and explore the influencing factors of pro-environmental behaviors in order to promote the high-quality development of rural communities.

Existing research on the pro-environmental behavior of rural community residents focuses on three levels: policy circumstances, agricultural benefits, and individual psychology. At the policy level, Wang and Gao (2022) used a multivariate ordered logistic model to analyze the effect of government regulations on farmers' biopesticide application behavior, and the results showed that incentive-type government regulations and constraint-type government regulations have a positive effect on farmers' biopesticide application behavior. Zhang et al. (2022) found that pro-environmental behavioral subsidies can cultivate the adoption of pro-environmental agricultural technologies by rural community residents and mitigate rough agricultural production behavior. In addition, some scholars have confirmed that agricultural credit and agricultural insurance have an incentive effect on the pro-environmental behavior of rural community residents (Yang and Li, 2022; Chen and Shen, 2022; Xie et al., 2023). At the benefit level, rural community residents are particularly concerned about production costs, and the price of agricultural products affects the environmental behavior of rural community residents in the agricultural production process; the higher the agricultural cost input, the weaker the pro-environmental behavior (Xu et al., 2022). Conversely to cost, high agricultural prices and high economic returns are the main motivators for fostering pro-environmental behaviors among residents of rural communities (Chu and Li, 2019). At the individual level, gender, age, education, production experience, and new media use among the individual characteristics of rural community residents all influence pro-environmental behaviors (Yang et al., 2023), with pro-environmental actors tending to be younger, more educated, and more experienced (Lu, 2023). Apart from individual characteristics, the scale of agricultural operations, labor force size and household income of rural community residents' families are also key factors influencing pro-environmental behaviors (Chu, 2023).

To propel the sustainable development of rural communities, it is a matter of strong support from policies and regulations, etc., and more importantly, it is also a need for comprehensive green design of rural community spaces to guide residents to identify with the services of a green countryside (Zhang et al., 2023; Yu et al., 2023; Sun et al., 2023a). Although the research findings on pro-environmental behaviors are relatively abundant, there are still areas for further development: 1) the lack of research on pro-environmental behaviors of rural community residents at the level of micro-service design and identity; 2) the neglect of the influence of community interactions on pro-environmental behaviors of rural community residents in the context of the unique rural community social network. Therefore, the article takes micro rural community residents' service design identity as the research entry point, and through in-depth interviews with rural community residents in the preliminary stage, adopts the open coding and spindle coding in the rooted theory research method to exploratively classify the service design identity into the three dimensions of design philosophy identity, design space identity and risk identity. To examine the effects of the three dimensions of service design and identity on the pro-environmental behaviors of rural community residents, and to analyze the mechanism of pro-environmental behaviors of rural community residents by integrating community interactions as a

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moderating variable. The conclusion of the study provides theoretical support for understanding and interpreting the behavioral laws of pro-environmental behaviors of residents in rural communities, and provides decision-making references for facilitating green transformation and high-quality development of villages.

2. Research Hypothesis

2.1 The effect of service design identity on pro-environmental behaviors (PB) of residents in a rural community

The Theory of Planned Behavior (TPB), an inter-sectional theory in psychology that combines cognition and emotion, focuses on the fact that an individual's attitudes toward the design of a rural community service, subjective norms, and perceived intentions to control behavior work together to shape pro-environmental intentions, and that intentions can be inferred that an individual will engage in pro-environmental behaviors (Fu and Li, 2023). Li and Li (2019) applied the Theory of Planned Behavior to the study of agricultural waste recycling in farming households, and the analysis showed that the clearer the rural community residents' knowledge of agricultural waste recycling technology, the higher the perceived value of agricultural waste, and the higher the inclination to agricultural waste recycling. Based on the Theory of Planned Behavior, this paper divides service design identity into three dimensions, namely, design philosophy identity (DPI), design space identity (DSI), and risk identity (RI), and explores their effects on pro-environmental behaviors respectively. Design philosophy identity is the extent to which rural community residents understand the effectiveness of policy development, implementation and enforcement of green rural service design (Zhang et al., 2023). Improving rural community residents' acceptance of the service design philosophy of green villages is conducive to strengthening their understanding of green village compensation policies, incentive policies and pro-environmental behavioral guidelines, discovering and acquiring the hidden benefits that pro-environmental behavior brings to rural community residents, and consciously forming the mindset of pro-environmental behavior. Design space identity is the perception of rural community residents of the advantages and disadvantages of design space and its changes (Zhang, 2023). The cultivation of design space identity quality is instrumental in strengthening the psychological awareness of rural community residents of current environmental pollution, stimulating their awareness of environmental protection, trying to adopt pro-environmental behavioral approaches, and cultivating pro-environmental behaviors. Risk identity is the perception and identification of risk factors faced by rural community residents, whose primary response is risk avoidance when the expected outcome is in a state of uncertainty (Qu et al., 2023).

Green villages as the ultimate purpose of service design as a new rural development paradigm with inter-period benefits, rural community residents generally have information cognitive asymmetry in understanding pro-environmental behaviors, questioning the expected effects of pro-environmental behaviors and deepening the risk perception of pro-environmental behaviors among rural community residents, and tending to avoid risks and weakening pro-environmental behaviors through traditional agricultural production methods. Based on the above analysis, the hypotheses are formulated as follows.

H11: Design philosophy identity significantly and positively influences the pro-environmental behavior of rural community residents.

H12: Design space identity significantly and positively influences rural residents' pro-environmental behaviors.

H13: Risk identity significantly and negatively influences rural residents' pro-environmental behaviors.

2.2 The mediating role of value perception (VP)

Value perception is an individual's subjective trade-off between payoffs and benefits based on pre-existing perceptions, and it is a key variable in exploring an individual's willingness and behavior (Zeng et al., 2023). Value perception theory clarifies the path paradigm and logical mechanism of individual behavioral intention,

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i.e., service design identity→value perception→behavioral intention (Li and Zheng, 2021). Residents of rural communities retain the rational economic nature of pursuing benefits in the process of rural development. When residents of rural communities have a high degree of identification with the design philosophy and design space, it is favorable for the residents of rural communities to fully form the ideas related to the green countryside, comprehend the long-term benefits of pro-environmental behaviors, and improve the value perception of the green countryside, and then cultivate and practice pro-environmental behaviors. When rural community residents have a high level of risk identification with the green countryside, they will be resistant to the green countryside, reducing the perceived value of the green countryside and weakening pro-environmental behaviors. Hypotheses are:

H21: Value perception mediates the relationship between design philosophy identity and pro-environmental behaviors of rural community residents.

H22: Value perception mediates the relationship between design space identity and pro-environmental behaviors of rural community residents.

H23: Value perception mediates the relationship between risk identity and pro-environmental behaviors of rural community residents.

2.3 The moderating role of community interaction (CI)

The Community Interaction Theory, developed in Habermas, suggests that individuals are embedded in a network of social relationships and that individual decisions and behaviors are influenced by the interactions of members of the same group/community (Deng and Cheng, 2023). Rural community is a typical humanistic society based on kinship and geography, and rural community residents, as nodes in the social network, are susceptible to the mutual influences of family, friends, and neighbors, and are characterized by homogeneity in their wills and behaviors (Wang and Meng, 2023; Ding, 2023). When the degree of community interaction among rural community residents is high, it is advantageous for the infiltration and dissemination of service design information based on green village construction among the groups, which further strengthens the rural community residents' identification with the design philosophy and awareness of the design space, eases the resistance of rural community residents to pro-environmental behaviors, reduces the risk perception of green villages, and fosters pro-environmental behaviors. The hypotheses are as follows.

H31: Community interaction plays a moderating role in the relationship between design philosophy identity and pro-environmental behaviors of rural community residents.

H32: Community interaction moderates the relationship between design space identity and pro-environmental behaviors of rural community residents.

H33: Community interaction moderates the relationship between risk identity and pro-environmental behaviors of rural community residents.

Theoretical analysis framework is shown in Figure 1.

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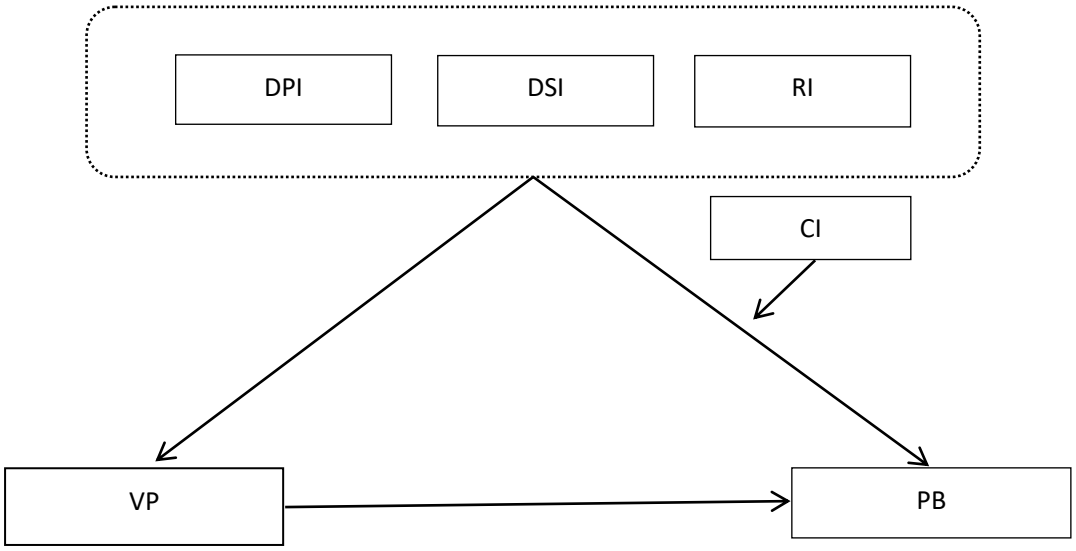

Figure 1 Theoretical analysis framework

3. Methodology

3.1 Data

Based on the previous research results (Liu and Wang, 2023; Ge et al., 2023), the research questionnaire was designed and pre-survey was conducted in Wenzhou City, Zhejiang Province, for the residents of green rural communities that have been service-designed, and combined with the cognitive situation of the residents of the rural communities and the actual problems of the rural production, the experts in the field of service design were invited to validate and improve the content of the questionnaire. The survey data comes from field research conducted by the research team in Suzhou, Nantong and Yancheng cities in Jiangsu Province, Huzhou and Wenzhou cities in Zhejiang Province, and Fuzhou city in Fujian Province. By stratified sampling method, one sample district and county were selected from each of the above prefecture-level cities, 1-2 sample towns were selected from each district and county, and 2-3 sample villages were selected from each town. The research team conducted six large-scale field studies from December 2022 to February 2024, interviewing a total of 402 rural community residents from 30 administrative villages in 10 townships face-to-face. 380 valid questionnaires were finalized through sample verification and data correction, with a validity rate of 94.52%. Descriptive statistical analysis of the samples showed that the gender ratio of men and women was close to 1:1, the age group was concentrated in the age group of 30-60 years old, accounting for 85.78%, and the education level was mostly elementary school and junior high school, accounting for 35.26% and 20.26%, respectively.

3.2 Variable

The questionnaire consisted of seven sections: design philosophy identity, design space identity, risk identity, value perception, community interaction, pro-environmental behavior, and demographic variables. In which the design philosophy identity refers to the study of Xu et al. (2021), which measured the three design parameters of compensation policy, incentive policy and guidance policy for green villages; design space identity with reference to Song et al.'s (2023) study, which measured three aspects of design space functions, design space activities and the importance of design space to the countryside; risk identity referred to Hu and Mo's (2023)

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study, measured in three dimensions: expenditure risk, technological risk and social risk; value perception draws on Zhang and Zhang's (2023) study to measure both economic value perception and ecological value perception; community interaction was referred to Shen and Luo's (2021) scale, and 3 items were designed for measurement; pro-environmental behavior was referred to Wang and Wu's (2015) scale, and 3 items were designed for measurement, and the specific measurement items are shown in Table 1.

Table 1. Confirmatory factor analysis and reliability test results

Variable	Item	SFL	Cronbach's α	CR	VE
DPI	PI1 I am well aware of the Green Countryside Compensation Policy	0.732	0.764	0.777	0.537
	PI2 I'm well aware of the Green Countryside Incentive	0.781			
	PI3 I have a good understanding of the Green Countryside Guidance Policy	0.683			
DSI	SI1 I understand the function of design space	0.816	0.814	0.843	0.640
	SI2 I understand the activities of design space	0.827			
	SI3 I understand the importance of design space for rural communities	0.757			
RI	RI1 I'm concerned pro-environmental behavior will reduce farm income	0.763	0.751	0.794	0.563
	RI2 I'm concerned that the pro-environmental behavioral technology system is not yet mature	0.681			
	RI3 I'm worried that my friends and family won't support pro-environmental behavior	0.803			
VP	VP1 I think service design fosters pro-environmental philosophy	0.847	0.757	0.861	0.607
	VP2 I think service design promotes pro-environmental behavior	0.736			
	VP3 I believe that service design can improve the quality of life in rural communities	0.722			
	VP4 I believe that service design can improve the ecology of rural communities	0.807			
CI	CI1 Design space strengthens my connection to the people of this village	0.714	0.716	0.796	0.566
	CI2 Using design space to discuss rural green development with neighbors	0.804			
	CI3 Take friends and family on a tour of the design space	0.736			
PB	PB1 I am willing to commit labor to pro-environmental behavior	0.733	0.803	0.826	0.613
	PB2 I am willing to invest time in pro-environmental behavior	0.846			
	PB3 I am willing to invest money in pro-environmental behavior	0.767			

Note: Standardized factor loading=SFL, Composite Reliability=CR, Variance extraction=VE

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3.3 Formula

In order to test the complex causal relationship between the variables, the study used Structural Equation Modeling (SEM) for empirical analysis. Compared to other models, structural equation modeling has the advantage of dealing with multiple latent variable relationships simultaneously and is suitable for testing the hypothetical model proposed in the paper. The formula is:

$$Y = \Lambda_y \eta + \varepsilon \quad (1)$$

$$X = \Lambda_x \xi + \sigma \quad (2)$$

$$\eta = B_\eta + \Gamma \xi + \zeta \quad (3)$$

(1) and (2) are measurement equations reflecting the relationship between observed and latent variables, Y represents the vector of observed variables for the endogenous latent variables, X represents the vector of observed variables for the exogenous latent variables, and Λ_y and Λ_x denote the correlation coefficients matrices of the endogenous latent variables and the exogenous latent variables with their respective observed variables, respectively. (3) is the structural equation, where ηis the endogenous latent variable, ξis the exogenous latent variable, and B andΓ denote the coefficient matrices corresponding to the endogenous and exogenous latent variables, respectively; ζis the residual term of the structural equation, andεandσ represent the error terms.

3.4 Reliability testing

Using SPSS22.0 software, Cronbach's α coefficient was used to test the reliability of the scale (Table 1). The analysis showed that the Cronbach's α values of the six latent variables of design philosophy identity, design space identity, risk identity, value perception, community interaction, and pro-environmental behavior were all greater than the standard value of 0.700, and the scale had good reliability. AMOS25.0 statistical software was used to test the validity of the scale, and the analysis showed that the standardized factor loading coefficients of all latent variables were between 0.600 and 0.900, the average variance extracted (AVE) was greater than the standardized value of 0.500, and the combined reliability was greater than 0.600, and the scale had good convergent validity. The AVE square root values of each latent variable were greater than the correlation coefficients between the latent variables (Table 2), and the discriminant validity was good for further analysis.

Table 2. Discrimination validity test results

Variable	PI	SI	RI	VP	CI	PB
PI	0.733					
SI	0.373	0.800				
RI	0.386	0.215	0.751			
VP	0.403	0.353	0.237	0.779		
CI	0.499	0.269	0.468	0.275	0.753	
PB	0.226	0.350	0.254	0.209	0.307	0.783

4. Result

4.1 Direct effect of service design identity on pro-environmental behaviors of rural community residents

With four variables introduced, namely, design philosophy identity, design space identity, risk identity and pro-environmental behavior, a structural equation model I was constructed to verify the direct influence of

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design philosophy identity, design space identity and risk perception on the pro-environmental behavior of rural community residents in green villages. The structural equation model I was fitted using AMOS 25.0 (Table 3), and the model fit the sample data well, with the tests satisfying the fit criteria.

Table 3. Overall fitness test results of structural equation model

Testing Indicator	CMIN/DF	GFI	AGFI	NFI	CFI	IFI	RMSEA
standardized	＜3.000	＞0.900	＞0.900	＞0.900	＞0.900	＞0.900	＜0.080
SEMI	2.226	0.916	0.919	0.927	0.913	0.909	0.047
SEMII	1.966	0.924	0.923	0.931	0.919	0.923	0.027

Path coefficients and hypothesis testing results (Table 4). Design philosophy identity has a significant positive effect on the pro-environmental behavior of rural community residents (β= 0.329, P < 0.05), and the clearer the rural community residents' identity of the green village design philosophy is, the stronger the pro-environmental behavior is. Service design space identity has a significant positive effect on pro-environmental behaviors (β= 0.297, P < 0.05), the higher the level of rural community residents' knowledge of design space, the greater the sense of urgency about the hazards of agricultural surface pollution, and the more inclined they are to engage in pro-environmental behaviors. Risk identity has a significant negative effect on pro-environmental behaviors (β= -0.252, P < 0.05), and rural community residents have cognitive bias towards service design based on green village construction, are skeptical of the effects of pro-environmental behaviors, and are unwilling to invest money, time, and labor to participate in pro-environmental behaviors. Hypotheses H11, H12 and H13 were tested.

Table 4. Fitting results of structural equation model

Path	SEMI		SEMII	
	Path coefficient	result	Path coefficient	result
H11	0.329＊＊	TRUE	0.207＊＊	TRUE
H12	0.297＊＊	TRUE	0.195＊＊	TRUE
H13	-0．252＊＊	TRUE	-0.147＊＊	TRUE
PI→VP			0.233＊＊	TRUE
SI→VP			0.219＊＊	TRUE
RI→VP			-0.137＊＊	TRUE
RI→PB			0.316＊＊	TRUE

Note: ** indicates significant at the 5% statistical level.

4.2 The mediating effect of value perception

Value perception is integrated into the model and SEMII is constructed to investigate the mediating effect of value perception in the process of design philosophy identity, design space identity and risk identity on the pro-environmental behavior of rural community residents. The fit of each of the SEM II tests was enhanced after the introduction of value perception (Table 3). The results of the path coefficients and hypothesis tests are shown in Table 4. After the introduction of value perception, the test results of the effects of design philosophy identity, design space identity and risk perception on the pro-environmental behaviors of rural community residents are basically consistent with the above analysis, and once again, the hypotheses H11, H12 and H13 are verified to be valid. Meanwhile, the positive effect of design philosophy identity and design space identity on value perception (β= 0.233, P < 0.05;β= 0.219, P < 0.05), the negative effect of risk identity on value perception (β= -0.137, P < 0.05) and the positive effect of value perception on pro-environmental behaviors (β= 0.316, P < 0.05).

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The mediating role of value perception can be further tested. The study used the Bootstrap method to examine the mediating role of value perception using the Process plug-in in SPSS, and the results were analyzed by determining the mediating effect by whether or not the confidence interval contained a value of "0" (Table 5). The indirect effect values of design philosophy identity, design space identity and risk identity on the influence of pro-environmental behaviors of rural community residents were 0.074, 0.070 and -0.044, respectively, and the confidence intervals of the indirect effects were [0.013, 0.099], [0.027, 0.126] and [0.036, 0.173], respectively. None of the confidence intervals contained 0, indicating the existence of mediating effects of value perception. Hypotheses H21, H22 and H23 were validated. The analysis confirms that value perception has a pivotal role in improving green countryside pro-environmental behavior of rural community residents. The research process found that the value perception of rural community residents towards service design based on green village construction is still at a low level, and the relevant rural revitalization departments can improve the value perception of rural community residents towards service design for green villages through the identification of design philosophy, the construction of design space for green villages, and the relevant technical support to cultivate pro-environmental behaviors.

Table 5 Testing the mediating effect of value perception

Path	Effect value	Indirect effect	
		Lower	Upper
H21	0.074	0.013	0.099
H22	0.070	0.027	0.126
H23	-0.044	0.036	0.173

4.3 The moderating role of community interaction

Stratified regression was used to test the moderating effect of community interaction. The continuous variable community interaction was first centered to reduce multicollinearity. Using pro-environmental behavior as the dependent variable, control variables (Model 1), independent and moderating variables (Model 2), and interaction terms between independent and moderating variables (Model 3) were gradually introduced into the regression equation. The significance of the coefficient of the interaction term between the independent variable and the moderator variable was used to determine whether the moderator variable had a moderating effect. Design philosophy identity, design space identity, and risk identity were used as independent variables, and community interaction was used as a moderating variable, respectively, and stratified regression analyses were conducted sequentially, and the results are shown in Table 6. The coefficients of the interaction terms of design philosophy identity and community interaction, design space identity and community interaction, and risk identity and community interaction were all significant. The analysis confirmed that community interaction plays a moderating role in the influence of design philosophy identity, design space identity, and risk identity on the pro-environmental behaviors of rural community residents, and hypotheses H31, H32, and H33 were tested.

Table 6 The moderating effect of community interaction

Variable	PI			SI			RI		
	Mode 1	Mode 2	Mode 3	Mode 1	Mode 2	Mode 3	Mode 1	Mode 2	Mode 3
Gender	0.036*	0.033	0.026	0.036*	0.029	0.021	0.036*	0.031	0.020
Age	0.033*	0.027	0.036	0.033*	0.032	0.025	0.033*	0.029	0.023

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Education	0.050**	0.037*	0.009	0.050**	0.083*	0.064	0.050**	0.039*	0.022
PI		0.403**	0．366**						
SI					0.357**	0.325**			
RI								-0.329**	-0.316**
CI		0.313**	0.286**		0.265**	0.249**		-0.063**	-0.044**
PI×CI			0.159**						
SI×CI						0.126**			
RI×CI									-0.107**
R2	0.083	0.326	0.525	0.083	0.317	0.502	0.083	0.299	0.497
△R2		0.244	0.200		0.235	0.186		0.217	0.199
F	7.315**	16.626**	20.753**	7.315**	14.974**	18.653**	7.315**	12.906**	17.983**

Note: × denotes an interaction term

The moderating effect results were further calculated with reference to Fan et al. (2023). The continuous variable community interaction was divided into high community interaction group (one standard deviation larger than the mean) and low community interaction group (one standard deviation smaller than the mean) to depict the effects of design philosophy identity, design space identity, and risk identity on pro-environmental behaviors of residents in rural communities under different levels of community interaction, and the results are shown in Table 7. For rural community residents in the high community interaction group, significant increases in pro-environmental behaviors were seen as the level of design philosophy identity and design space identity increased, with risk identity being a key factor hindering pro-environmental behaviors. For rural community residents in the low community interaction group, increased levels of design philosophy identity and design space identity did not have a significant effect on their pro-environmental behaviors, and risk identity negatively affected pro-environmental behaviors, and the negative effect was stronger than that of the high community interaction group. Residents of rural communities have less access to green countryside information, and information is seriously lagging behind. Enhancing group interaction among residents of rural communities through green countryside service design space helps to increase the frequency of exchange of green countryside information, crack the problem of information lagging behind, weaken the resistance of rural community residents to pro-environmental behaviors, and improve pro-environmental behaviors.

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Table 7. Group results of moderating effect of community interaction

Variable		DPI	DSI	RI
High CI	Low	2.46	2.46	3.29
	High	3.89	3.92	2.99
Low CI	Low	2.45	2.45	3.28
	High	2.98	2.96	2.11

5. Discussion

Based on the Theory of Planned Behavior, pro-environmental behaviors are studied from the perspective of service design identity of rural community residents, combining the social network background of rural communities, which is linked by kinship and geography, and considering that rural community residents' willingness and behaviors are susceptible to the mutual influences of family, friends, and neighbors, and then introducing community interactions as a moderating variable to explore the mechanism of influencing pro-environmental behaviors of rural community residents. Service design identity was found to be a key factor influencing the pro-environmental behaviors of residents in rural communities, a finding that is consistent with the findings of existing studies (Liu and Wang, 2023; Ge et al., 2023), suggesting that the introduction of service design identity is necessary in research on the construction of green villages. The difference is that the article combines the actual research and exploratory refinement of service design identity into three dimensions, revealing that there are significant differences in the influence of different dimensions of service design identity on pro-environmental behaviors, with design philosophy identity having the strongest influence. The study indirectly confirms that the service design identity of rural community residents cannot be tested on a single level, but rather on the superimposed effect of multiple perceptions. value perception plays a mediating role in service design identity and pro-environmental behaviors of rural community residents, a finding consistent with Wang et al.'s (2021) conclusion that value perception is a central variable in promoting pro-environmental behaviors of rural community residents. The core essence of service design based on green village construction is to guide the greening of production and living styles in rural communities and the greening of the concepts of rural community residents (Cai and Chen, 2023), and only by letting rural community residents feel the core value of service design based on green village construction can we break the inherent production and living habits of rural community residents, and effectively crack the bottleneck of green village development. Community interaction moderates the effect of service design identity on pro-environmental behaviors of rural community residents. Introducing rural community residents' community interaction into the study of pro-environmental behavior is more suitable for the research characteristics of rural communities and rural community residents, and is a good complement to the existing research results that explore the influence of the external environment on pro-environmental behavior. There is a lag in the effect of service design, and the asymmetry of information about the green countryside has exacerbated the fear of rural community residents, and risk aversion has forced them to give up pro-environmental behaviors. Through service design space based on the construction of green villages, enhancing community interaction among residents of rural communities can not only crack the problem of information asymmetry, but also enhance the value perception of green villages and pro-environmental behaviors of residents of rural communities.

6. Conclusion

Using structural equation modeling to systematically analyze the mechanism of service design identity on the pro-environmental behaviors of rural community residents, taking into account the mediating role of value perception and the moderating role of community interaction, the empirical analysis concludes as follows.

(1) The pro-environmental behavior of rural community residents is not influenced only by external variables as studied by previous scholars, but more by the role of individual service design identity of rural community residents, and by the heterogeneous influence of design philosophy identity, design space identity and risk identity.

(2) Cultivating the value perception of pro-environmental behavior among rural community residents is the core path to improving pro-environmental behavior.

(3) Community interaction plays a moderating role in the influence of design philosophy identity, design space identity and risk identity on pro-environmental behavior.

Based on the above findings, the following insights are proposed. 1) Fully consider the service design identity of rural community residents, and utilize the service design space based on the construction of green villages to carry out community environmental education (Zheng et al., 2023) to rural community residents at different levels and with different contents, such as public lectures on green agricultural policies and environmental protection, highlighting the publicity on the long-term economic benefits of green villages, and strengthening the perception of the value of green villages by rural community residents. 2) Make good use of the design space to carry out a diversified list of green village services (Sun et al., 2023b), such as field guidance and technical training, to improve the accessibility of green village technology to residents of the rural community, and to bring the residents of the rural community to participate in pro-environmental behaviors. 3) Setting up green village design space demonstration households, fully guiding community interactions between the demonstration households and rural community residents, and through exchanges and learning, increasing the pro-environmental behavioral motivation of rural community residents and fostering pro-environmental behaviors.

Declarations

Data sharing agreement

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, author-ship, and/or publication of this article.

Acknowledgments

The authors would like to thank all members who were involved in the research upon which this paper is based.

Authors' contributions

Haizhou Liu, Feihan Sun and Li Ding contributed to the conception of the study, wrote the first draft of the manuscript and worked on the coding of tables and figures. Bingyou Ai and Shuwei Zhang contributed to the conception and design of the study. Haizhou Liu, Feihan Sun and Li Ding helped perform the analysis with constructive discussions. All the authors read the manuscript and approved the final manuscript.

Funding

This research was funded by Huzhou Vocational & Technical College (grant number :2023ZS12), and the First Teaching Reform Program of 14th Five-Year Plan for Higher Vocational Education in Zhejiang Province (grant number: jg20230493).

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Volume 43 Issue 2 (2024)
ISSN: 0334-5807
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Volume 43 Issue 2 (2024)
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