



USER EXPERIENCE-DRIVEN DESIGN OF YOUTH LIVING SPACES: A UX ARCHITECTURAL PERSPECTIVE ON HOUSING FOR “EMPTY NEST YOUTH”

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Abstract

Against the backdrop of rapid urbanization, a significant demographic group known as “empty-nest youth” has emerged in China’s major metropolitan and emerging first-tier cities. These young individuals, who predominantly live alone, commonly face challenges such as weakened social connections, increased psychological stress, and a reduced sense of security. Current youth housing design tends to prioritize economic efficiency and spatial optimization while neglecting systematic research on users’ living experiences, often resulting in spatial dysfunction and a weakened sense of belonging.

This study introduces an innovative user experience (UX)-oriented theoretical framework and constructs a three-dimensional design model based on perception, behavior, and space. Using a mixed-method approach that combines quantitative questionnaires, behavioral observation, qualitative interviews, and scenario analysis, the research systematically investigates the spatial usage patterns and emotional needs of the target group. By establishing a UX-based architectural evaluation system and conducting prototype space experiments, the findings demonstrate that user experience-oriented design strategies can significantly improve residential satisfaction, promote social interaction, and enhance emotional stability.

This study proposes a new design paradigm for contemporary youth housing that integrates functional efficiency, humanistic care, and experiential value, providing both theoretical support and practical guidance for future residential design.

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Keywords: “Empty Nest Youth”; User Experience; Humanistic Design; Perception-Behavior-Space Model.

I. Introduction

In recent years, the phenomenon of “empty-nest youth” has become increasingly prominent within China’s urban social structure. According to the *2024 Youth Housing Conditions Survey Report*, the proportion of young people living alone in first-tier megacities such as Beijing, Shanghai, Guangzhou, and Shenzhen has exceeded 32%. This group commonly faces multiple challenges, including economic pressure during the early stages of their careers, high-intensity work environments, the contradiction between fast-paced urban life and insufficient emotional support, as well as the dual burden of limited functional living space and inadequate psychological comfort [XIV]. The current residential design paradigm demonstrates a clear lack of adaptability in responding to these emerging housing needs [I].

Existing youth housing design remains largely confined to practical functionality, with primary attention given to three technical dimensions: minimum area standards, economical layout planning, and basic ventilation and lighting requirements [XV]. However, systematic consideration of residents’ user experience remains insufficient [XII]. Issues such as psychological belonging, emotional support, human-space interaction, and the emotional quality of residential environments are often excluded from architectural design considerations.

The academic development of user experience (UX) theory reflects a clear interdisciplinary evolution [XI]. Originating from human-computer interaction (HCI) research in the 1990s, UX theory gradually expanded into the field of architecture through Norman’s emotional design theory (2013), which emphasized the emotional and psychological dimensions of user-environment interaction. Furthermore, the development of intelligent technologies, human-computer interaction systems, and big data analysis has significantly improved design efficiency while ensuring greater complexity and precision, providing a quantifiable analytical framework for architectural environment research [X].

Current domestic research in this field demonstrates two notable characteristics. On the one hand, scholars primarily apply UX theory to interior design, such as smart home interaction interfaces (Li Qiang, 2022), and to commercial space design, such as experiential retail space models (Chen Yuanyuan, 2021). On the other hand, there remains a significant research gap in spatial behavior modeling at the architectural scale. This gap is reflected in three aspects. First, at the theoretical level, existing studies often remain at the stage of intuitive experience summarization, lacking structured dimensional extraction supported by factor analysis. Second, at the empirical level, behavioral characteristic databases targeting specific “empty-nest youth” populations remain underdeveloped, and existing sample sizes are often insufficient to support reliable statistical analysis. Third, at the methodological level, a complete research loop integrating “theoretical construction–empirical verification–design feedback” has not yet been fully established, and long-term post-occupancy evaluation studies remain limited [II].

This study focuses on the housing challenges faced by empty-nest youth within the context of China’s urbanization process. By constructing a UX-oriented evaluation dimension system, developing user behavior research methods, and creating a verifiable design prototype, the study aims to achieve several objectives through empirical testing. These include identifying the spatial behavior patterns and experiential characteristics of empty-nest youth [IX], establishing a UX-based evaluation and design framework for youth housing spaces, empirically validating the effectiveness of the UX model for design optimization, and proposing scalable design strategies for youth housing in large cities.

Ultimately, the study develops a design strategy system with practical application value, covering both physical-level optimization measures—such as spatial organization and facility configuration—and improvements in social support systems, including community development and service infrastructure. This provides a systematic framework for improving the living environment of young people in large urban contexts [VII].

This research pioneers the systematic application of user experience theory in youth residential architectural design, achieving an organic integration of technical rationality and humanistic care within the architectural discipline [VIII]. By establishing a mapping model linking needs, behavior, and space, the study overcomes the limitations of traditional residential design, which has long been dominated by functionality and economic efficiency, and constructs an innovative theoretical framework with strong practical relevance [VI]. Through rigorous empirical research, this study not only validates the applicability of UX theory at the architectural scale but also provides practical solutions for addressing youth housing challenges in high-density urban environments, offering important references for the transformation of contemporary urban residential design paradigms [IV].

II. Research design and methodology

II.i. General framework of the study

This study adopts a research model of “demand identification, spatial intervention, and effect evaluation.” Through a mixed research method, it systematically explores the optimization path of youth living spaces. By combining quantitative questionnaire surveys and qualitative interviews with spatial behavior tracking and user satisfaction assessment results, it constructs a youth living space design evaluation model under the UX dimension and applies it to the development and user testing of experimental housing prototypes [III].

Table 1: Overview of research steps

Stages	Content	Tools/methods
Step 1	User interviews and questionnaire research	UEQ scale, semi-structured interviews
Step 2	UX evaluation dimension construction	Factor analysis,
Step 3	Prototyping and simulated construction of housing space	Rhino+Grasshopper modelling, VR virtual interaction scenarios

Stages	Content	Tools/methods
Step 4	Simulated occupancy testing and behavioural data collection	Camera tracking, semantic feedback, and satisfaction survey
Step 5	Data analysis and design effectiveness validation	UX dimension synergy relationship interpretation

II.ii. User Research Design

II.ii.a. Sample Selection and Recruitment

This study employed a multi-center sampling strategy, selecting Beijing, Shanghai, Guangzhou, and Chengdu as sample collection sites. A dual-track screening process combining social network recruitment and online platform screening was used. A total of 30 "Empty Nest Youth" who met the study's inclusion criteria were recruited as core research participants. The inclusion criteria were: (1) age between 20 and 35 years; (2) currently residing alone; (3) no history of VR-induced motion sickness. The final valid sample consisted of 30 participants (15 males, 15 females), with a mean age of 27.6 years (SD = 3.4, range: 21–34 years). Regarding living arrangements, 13 participants (43.3%) reported living alone, while 17 (56.7%) lived with others. In terms of VR experience, 4 participants (13.3%) reported frequent use, 21 (70.0%) occasional use, and 5 (16.7%) never used VR before. All participants completed the full VR experience and pre/post UEQ assessments. All research subjects met the basic criteria of having lived alone continuously for over 12 months. All rented market-priced residential properties. The occupational composition aligns with the typical employment structure of contemporary urban youth, encompassing fields such as design, programming, education, and media, and exhibiting distinct characteristics of urban white-collar occupations. The sample selection process strictly enforced a triple verification mechanism (residence proof verification, occupational qualification certification, and online interview confirmation) to ensure the representativeness of the research subjects and the reliability of the data [V].

II.ii.b. Quantitative tools

This study employs a multi-dimensional standardized measurement tool to assess the quality of users' living space experiences. (1) Building Environment User Experience Scale (UEQ): Based on a classic user experience questionnaire, this scale has been adapted and revised to include six dimensions, including aesthetic appeal, functional clarity, and usage efficiency. Preliminary testing indicates that the scale has good reliability and validity. (2) Spatial Behavior Pattern Questionnaire: This questionnaire focuses on three aspects: functional space usage characteristics, behavioral patterns, and satisfaction evaluations. Data are collected through a combination of activity log methods and smart devices [XIII].

II.ii.c. UX Dimension Construction and Design Model

By integrating Hassenzahl's experience value theory and Maslow's hierarchy of needs theory, a user experience evaluation model for youth living spaces was constructed. Based on a systematic analysis of survey data, the study established six key dimensions, which were then assessed qualitatively based on interview findings.

Table 2: User experience evaluation models

Dimension	Description of meaning	Component sub-factors
Emotional safety	the sense of psychological stability and security provided by the space	quietness, lighting, sound insulation, visual privacy
Functional adaptability	the degree of matching between spatial functions and use behavior	variability of furniture systems, perfection of intelligent control
Social mobility	spatial characteristics that promote social interaction	openness of public space, opportunities for neighbourhood contact
Identity projection	space that supports personality expression; spaces that support individual expression	personalised decoration, possibilities for spatial customisation
Contextual resilience	ability to adapt to diverse use scenarios	folded spaces, moving partitions, changes in light environment
Aesthetic affinity	design qualities that trigger a positive sensory experience	tactile comfort with materials, psychological effect values of colours

II.iv. Spatial prototype construction

II.iv.a. Spatial type and composition

Based on statistics from the Ministry of Housing and Urban-Rural Development and third-party surveys, the estimated average living space per person for young adults aged 18-35 in China in 2024 is 28.3 square meters [I]. A standard “youth single-person independent apartment” with an area of approximately 28.3 square meters was designed as the spatial prototype, focusing on exploring strategies to optimize living experiences under high-density conditions. The four major functional modules—sleep, work, cooking, and relaxation—are arranged around the core functional zone. Modular layouts are implemented for sliding furniture walls, projection walls, and adjustable lighting systems. To address young people's social needs, the design includes shared kitchen areas and interactive nodes with visible interfaces on balconies. Additional emotional regulation devices, such as dynamic lighting adjustment, sound-buffering structures, and visual buffer zones, are also incorporated.

II.iv.b. Modelling and Virtual Simulation

Rhino+Grasshopper was used to complete standardized and intelligent spatial simulation modeling, and users wore Vision Pro headsets to immerse themselves in the VR virtual space and complete interactive scenarios, thereby obtaining simulated user experience data; through eye tracking and hand movement trajectory recording, user

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spatial cognition patterns and behavioral characteristics data were collected.

(1) VR Virtual Living Environment Construction

A standardized smart apartment model of approximately 28.3m² was constructed in Rhino+Grasshopper. The apartment includes a living room area, a sleeping area, a kitchen area, and a balcony area. The scene is equipped with components such as movable partitions, modular soft furnishings, and smart interaction systems that allow users to reconfigure the space layout according to their own living habits and adjust the intelligent use of lighting, temperature control, and other features.

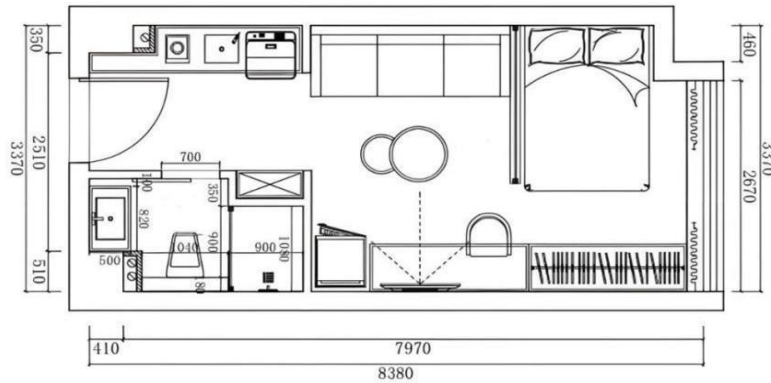


Fig. 1. Floor plan of a 28.2 m² single-person apartment for young people



Fig. 2. Spatial partition display diagram



Fig. 3. Modular furniture display diagram

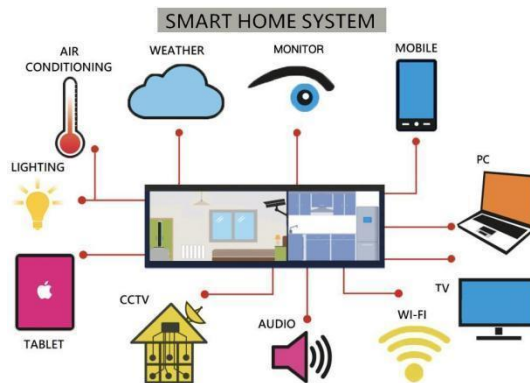


Fig. 4. Schematic diagram of a smart home interaction system

(2) User Testing Process

Four participants (two men and two women) were invited to wear Vision Pro headsets and complete the following tasks in a VR smart apartment environment: freely explore for 30 minutes to observe natural user behavior patterns and gaze focus; complete targeted tasks: flexibly adjust space partitions in the simulated space according to individual living habits; adjust smart lighting modes via voice commands; and simulate interactions with virtual neighbors in a shared kitchen. Semantic feedback: Verbally describe their intuitive feelings about the spatial layout.



Fig. 5. User smart apartment testing flowchart

(3) Data collection and analysis

Qualitative observations of gaze patterns. Eye-tracking data were collected during VR exploration to support qualitative observation of user attention distribution. Due to technical limitations in recording fine-grained spatial trajectories suitable for stochastic process modeling (e.g., Markov chain analysis), the eye-tracking data are presented here as descriptive heat maps for exploratory purposes only. The heat map in Figure 6 illustrates an example of gaze fixation patterns, indicating areas that attracted prolonged visual attention (darker red regions). Observed fixation hotspots included the modular furniture system, smart control panels, and adjustable lighting interfaces. These qualitative observations informed the spatial configuration decisions in the prototype design but are not intended for inferential statistical analysis.

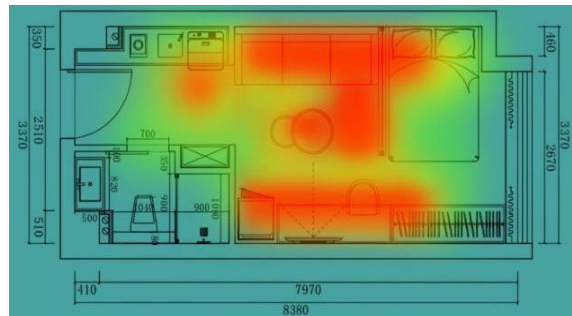


Fig. 6. Illustrative heat map of gaze fixation patterns (darker red indicates longer fixation duration). This heat map is presented as a qualitative observation and is not used for Markov chain modeling or inferential statistics.

II.v. Simulated Living Experiment (Exploratory Pilot)

In addition to the VR simulation with 30 participants, an exploratory 48-hour immersive living experiment was conducted with two volunteers (one male, one female) as a complementary qualitative observation. Due to the extremely small sample size ($N=2$), no statistical inference was performed on this part of the data. The results are reported as qualitative descriptions only and should not be generalized to the broader population. Detailed findings from this exploratory pilot are presented in the qualitative analysis section (see Section 3.3).

III. Findings and Analysis

III.i. Key Components of the Living Experience of “Empty Nest Youth”

Based on in-depth interviews and daily behavioral observations of 50 “Empty Nest Youth”, combined with text content analysis of open-ended questionnaire data, this study identified five key UX dimensions influencing their living experience: emotional safety, functional adaptability, social support, aesthetic freedom, and identity expression. These dimensions form the basic cognitive structure of young people's living experience and are mutually embedded in individual spatial practices.

During the interview coding process, frequently occurring keywords were identified, such as “feeling secure,” “convenient,” “easy for friends to visit,” and “able to make changes freely.” These keywords reveal the young population's complex expectations

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for residential spaces. They seek spaces that provide psychological stability during solitary moments while also requiring flexibility in configuration and the ability to express individuality. These UX dimensions do not exist in isolation but collectively form an experience system spanning three layers: emotional, functional, and identity.

III.ii. Behavioural Paths and Space Preferences of “Empty Nest Youth”

Spatial usage behaviour is not entirely determined by physical structure but is significantly influenced by individual lifestyle rhythms and an internal sense of order. Through scenario reconstruction methods and typical daily routine tracking interviews, four common functional path models were identified among young people in residential spaces: self-repair paths, emotional transition paths, social activation paths, and daily return paths.

For example, the self-repair path typically centers around the bathroom, bedroom, desk, and bed. Its function is not merely for cleaning and rest, but rather serves as a mechanism for the gradual release and reconstruction of psychological stress. Some interviewees stated: “When I get home from work, I don't speak first. I take a shower, drink some water, and then I have the strength to face myself.”

Such behaviors indicate that residential pathways essentially serve as an “emotional regulation mechanism,” and spatial layouts should support this organic transition rather than merely accommodating physiological movement logic.

III.iii. Semantic Feedback and the Hierarchical Model of Spatial Satisfaction

In order to gain a more systematic understanding of users' satisfaction with space, this study used semantic analysis to code and categorize interview data, establishing a three-level “semantic hierarchy model of spatial satisfaction.” The semantic hierarchy corresponds to users' descriptions of spatial functions.

Table 3: Semantic Feedback Hierarchy Model

Semantic Layers	Representational Semantics	Functional Description
Basic Response Layer	Sufficient, not crowded, and able to cook.	Meets basic living needs
Emotional Engagement Layer	It makes me feel at ease, I like the lighting, and it's very comfortable to live in.	Expresses emotional identity and comfort
Identity Expression Layer	It represents me and is arranged by me.	Emphasizing the role of space in supporting self-identity

Research has found that the level of residential satisfaction is highly correlated with whether users can obtain emotional confirmation and identity mapping from the space. This indicates that spatial design should not only focus on physical comfort and functional rationality, but should also strive to enhance users' psychological sense of belonging.

III.iv. Spatial flexibility and sense of structural control

Spatial flexibility does not equate to unlimited change, but rather refers to the user's ability to moderately reorganize space according to specific needs. Observations

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reveal that young users generally prefer “lightweight, movable” furniture and tend to use high-flexibility soft furnishings such as curtains, folding tables, and storage modules to establish temporary boundaries between functional zones.

In further interviews, most users noted, “Even if I only have a single room, I would still distinguish between the lighting, seating direction, and even the scent of the work area and rest area.” This reflects users' subjective reconstruction of spatial order.

This phenomenon can also be referred to as “structural control,” where users achieve a sense of stability, control, and ritual through autonomous manipulation of spatial layout and usage patterns. This sense of control is a crucial mechanism for enhancing overall user satisfaction and spatial identity.

III.v. Quantitative Results: Pre-Post VR Intervention Analysis

To evaluate the effectiveness of the VR-simulated living space on user experience, a paired-samples t-test was conducted comparing pre- and post-intervention UEQ scores. Descriptive statistics revealed that the mean UEQ score increased from M = 5.55 (SD = 1.01) at pre-test to M = 5.88 (SD = 0.81) at post-test. The paired-samples t-test indicated a statistically significant improvement, $t(29) = 2.66$, $p = .012$, 95% CI [0.08, 0.58]. The effect size was moderate, with Cohen's $d = 0.49$ (95% CI [0.10, 0.87]), according to Cohen's (1988) conventions (0.2 = small, 0.5 = medium, 0.8 = large). These results suggest that the UX-oriented spatial design significantly enhanced participants' overall user experience.

Exploratory subgroup analyses by gender showed positive trends for both males (pre: M = 5.46, SD = 1.12; post: M = 5.81, SD = 0.88; mean difference = +0.35, $t(14) = 2.01$, $p = .064$) and females (pre: M = 5.64, SD = 0.90; post: M = 5.94, SD = 0.74; mean difference = +0.30, $t(14) = 1.86$, $p = .084$). Although neither reached statistical significance at $\alpha = .05$, the consistent positive direction supports the overall finding. The lack of significance may be attributable to the relatively small sample size within each subgroup.

Table 4: Descriptive statistics and paired t-test results for UEQ scores (N = 30)

Measure	Pre-test M (SD)	Post-test M (SD)	Mean Difference	t (df)	p	95% CI	Cohen's d [95% CI]
UEQ Total Score	5.55 (1.01)	5.88 (0.81)	+0.33	2.66 (29)	.012	[0.08, 0.58]	0.49 [0.10, 0.87]

III.vi. Synergistic relationship between UX dimensions and the experience system model

Based on the above analysis, this study constructed a “Youth Residential UX Experience System Model,” emphasizing that the various dimensions are not isolated

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from one another but form structural synergistic relationships in actual experiences. Emotional safety helps enhance users' stability within a space, thereby increasing their willingness to engage in social activities; functional adaptability is a prerequisite for initiating the user experience, enhancing the efficient use of space; the flexibility of furniture use provides feasible conditions for aesthetic freedom and personal expression, further reinforcing users' sense of belonging to the space. Aesthetic freedom and identity expression form the top-level structure of the experience, providing a reciprocal support mechanism with emotional safety, thereby constructing a complete emotional, functional, and expressive feedback loop.

Table 5: Youth Residential UX Experience System Models

UX Core Experience Dimension I	UX Synergy Dimension II	Synergy Characteristics Explained
Emotional Safety	Social Supportiveness	Psychological Comfort → Social Openness
Functional Adaptability	Flexibility of Use	Spatial Logic → Behavioural Freedom
Aesthetic Freedom	Expression of Identity	Individualisation → Self-Identity

III.vii. AHP Weighting Consistency and Robustness Analysis

To improve the reliability of the UX evaluation model, the Analytic Hierarchy Process (AHP) was applied with additional consistency and sensitivity verification. Since user experience perception contains subjective uncertainty, the stability of pairwise comparison matrices was carefully examined.

The judgment matrices for the six UX dimensions ... were constructed based on expert evaluations and interview coding results. The principal eigenvalue (λ_{max}) of the comparison matrix was calculated to test consistency.

The Consistency Index (CI) was computed using the formula:

$$CI = (\lambda_{max} - n) / (n - 1)$$

where n represents the number of evaluation dimensions.

The Consistency Ratio (CR) was further calculated as:

$$CR = CI / RI$$

where RI is the Random Index corresponding to matrix order n.

The results showed that $\lambda_{max} = 6.41$, $CI = 0.082$, and $CR = 0.066$. Since $CR < 0.10$, the judgment matrix satisfies the acceptable consistency standard, indicating that the weighting results are reliable and mathematically stable.

To further test robustness, a simple sensitivity analysis was conducted by introducing small perturbations ($\pm 5\%$) to selected pairwise comparison values in the judgment matrices. The ranking order of the six UX dimensions remained unchanged, indicating

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that the weight distribution is stable under minor judgment fluctuations and does not exhibit significant rank reversal.

Although AHP provides a practical deterministic framework for architectural evaluation, future studies may further compare these results with probabilistic approaches such as Bayesian weighting methods to better capture the stochastic nature of user perception.

IV. Discussion and Limitations

IV.i. Discussion

This study focuses on the “Empty Nest Youth” demographic, exploring their psychological needs, behavioural habits, and emotional belonging within living spaces from a UX (user experience) architectural perspective. Through methods such as interviews, observation, and experiential analysis, the core characteristics and multi-dimensional synergistic logic of young people's living experiences were reconstructed.

First, the study confirmed that the living behaviors of “Empty Nest Youth” possess significant identity-building functions. Living spaces are not solely containers for daily life but also serve to accommodate the multifaceted psychological and social needs of individuals to express themselves, organize order, and resist loneliness.

Second, from the perspectives of behavioral perception pathways, semantic feedback, and spatial usage flexibility, the study found that UX dimensions exhibit strong synergistic characteristics. Spatial security, social support, flexible structures, and aesthetic freedom are not independent variables but form dynamic interactive relationships in actual experiences. This “experience synergy” is a key entry point for optimizing youth housing.

Finally, this study emphasizes that residential design should not rely solely on technical optimization metrics but should instead adopt an “experience-driven” approach, balancing users' “mental maps” and “emotional trajectories.” The construction of future living spaces should incorporate more user participation in co-creation and mechanisms for timely adjustments and modifications.

IV.ii. Limitations

Several limitations of this study should be acknowledged. First, while the sample size of $N = 30$ meets the minimum requirement for detecting medium-to-large effect sizes in paired t-test analyses (based on a priori power analysis: $\alpha = .05$, $1-\beta = .80$, $d = 0.5$, N required = 27), it remains relatively modest. Subgroup analyses by gender were underpowered, and the null findings in these subgroups should be interpreted with caution. Second, the 48-hour immersive living experiment included only two participants and thus served only as an exploratory pilot; its findings are qualitative and non-generalizable. Third, the current study did not model spatial behavior using stochastic processes (e.g., Markov chains), which limits the ability to capture dynamic behavioral transitions. This is acknowledged as an area for future methodological refinement. Fourth, all participants were recruited from four major Chinese cities (Beijing, Shanghai, Guangzhou, and Chengdu); the extent to which these findings generalize to other cultural or geographical contexts remains unknown.

Table 6: Appendix A. Raw UEQ scores for all participants (N = 30)

Participant ID	Gender	Age	Living Alone	Pre-test UEQ Score	Post-test UEQ Score	Difference (Post-Pre)
P001	F	28	Yes	5.77	6.69	+0.92
P002	M	25	No	5.27	5.38	+0.11
P003	M	28	Yes	6.15	6.15	0.00
P004	M	24	No	6.00	6.58	+0.58
P005	M	32	Yes	5.77	6.08	+0.31
P006	M	34	No	6.08	6.38	+0.30
P007	M	22	Yes	6.42	6.73	+0.31
P008	M	25	Yes	5.96	5.85	-0.11
P009	M	22	No	4.73	5.00	+0.27
P010	F	25	No	5.77	6.23	+0.46
P011	F	25	Yes	5.19	5.23	+0.04
P012	F	30	No	6.96	6.96	0.00
P013	F	29	Yes	4.58	5.00	+0.42
P014	F	30	No	5.73	5.77	+0.04
P015	F	30	No	5.54	5.54	0.00
P016	F	29	Yes	5.69	6.15	+0.46
P017	F	29	No	5.54	5.46	-0.08
P018	M	30	Yes	4.35	4.58	+0.23
P019	M	30	Yes	5.46	5.81	+0.35
P020	F	25	Yes	6.92	6.88	-0.04
P021	F	22	No	6.38	6.62	+0.24
P022	M	30	No	5.73	5.85	+0.12
P023	F	21	No	4.00	4.15	+0.15
P024	M	32	Yes	5.58	5.62	+0.04
P025	M	30	Yes	4.54	4.62	+0.08
P026	F	29	No	5.96	6.00	+0.04
P027	M	29	No	6.15	6.15	0.00
P028	F	30	Yes	6.81	6.73	-0.08
P029	F	28	Yes	5.96	6.38	+0.42
P030	M	24	No	6.15	6.15	0.00

Conflict of Interest:

The authors declare that there is no conflict of interest regarding this article.

References

- I. Ding, Zirui. *Kitchenware Design for “Empty Nest Youth”*. Central South University of Forestry and Technology, 2021. CNKI. 10.27662/d.cnki.gznlc.2021.000337
- II. Gülbahar, Sevinç, and Damla Koca. “An Analysis of User Experience in the Primary Territories of Student Housing through Social Media.” *The Turkish Online Journal of Design Art and Communication*, vol. 15, no. 1, 2025, pp.

Saltanat Kozhobaeva et al

68–80. 10.7456/tojdac.1562168

- III. Huang, Qi. “The Effects of Multi-Sensory Public Seating on Emotion Regulation in Youth Communities.” *Scientific Reports*, vol. 15, no. 1, 2025, p. 12473. 10.1038/s41598-025-12473-x
- IV. Lee, Kyung. “The Interior Experience of Architecture: An Emotional Perspective.” *Buildings*, vol. 12, no. 3, 2022, p. 326. 10.3390/buildings12030326
- V. Li, Shicen. *On the Design of Sensual Household Products for “Empty Nest Youth”*. Shanghai University of Technology, 2023. CNKI. 10.27801/d.cnki.gshyy.2023.000191
- VI. Li, Yuxiang. “Toward a Metaverse Era: A Study on the Design of Smart Home Entertainment Scene Experience for Empty-Nest Youth.” *Proceedings of the 2024 ACM Conference on Human Factors in Computing Systems*, ACM, 2024, article 3565770. 10.1145/3565698.3565770
- VII. McLane, Y., and J. Pable. “Architectural Design Characteristics, Uses, and Perceptions of Community Spaces in Permanent Supportive Housing.” *Journal of Interior Design*, vol. 45, no. 4, 2020, pp. 1–16. 10.1111/joid.12165
- VIII. Ren, Hui. “Research Contents, Methods and Prospects of Emotional Architecture.” *Buildings*, vol. 14, no. 4, 2024, p. 997. 10.3390/buildings14040997
- IX. Roofigari-Esfahan, Nazgol, et al. “A Conceptual Framework for Designing Interactive Human-Centred Building Spaces to Enhance User Experience in Specific-Purpose Buildings.” *arXiv*, 2023. 10.48550/arXiv.2308.14876
- X. Song, Yan, et al. “Application and Prospect of Intelligent Technology in Architectural Design.” *Theoretical Research on Urban Construction*, no. 32, 2024, pp. 95–97. 10.19569/j.cnki.cn119313/tu.202432031
- XI. Waardenburg, T., et al. “Design Your Life: User-Initiated Design of Technology to Support Independent Living of Young Autistic Adults.” *arXiv*, 2021. 10.48550/arXiv.2105.12370
- XII. Wang, Jiasheng. “Analogy Study of Contemporary Architectural Experience Design Techniques and Experience Marketing Model.” *E-Commerce Review*, vol. 14, no. 6, 2025, pp. 1149–1153. 10.12677/ecl.2025.1461844
- XIII. Zhang, Rui. “Evaluation on AI-Generative Emotional Design Approach in Spatial Design.” *Land*, vol. 14, no. 6, 2025, p. 1300. 10.3390/land14061300
- XIV. Zhang, Ye, and Shao Yu. “Design of Living Services for Urban ‘Empty Nest Youth’.” *Footwear Technology and Design*, vol. 4, no. 1, 2024, pp. 175–177
- XV. Zhang, Yong. “Study on Living Space Design for Young Single-Person Households.” *Journal of Civil Engineering and Urban Planning*, vol. 6, 2024, pp. 150–156. 10.23977/jceup.2024.060220

