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Interior comfort performance and improvement approaches of temporary housing units in disaster zones

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Abstract

Temporary housing units are developed to meet the urgent shelter needs emerging after disasters, and container structures are widely used due to their features such as low cost, rapid production, and portability. However, in post-disaster housing processes, quantity and speed often take precedence; the indoor quality and comfort conditions of the provided temporary units are largely ignored. Yet, in the post-trauma recovery processes of disaster victims, the physical quality and indoor spatial characteristics of the space they live in play a determining role. The aim of this study is to evaluate the indoor comfort of temporary housing units in container cities established after the February 6, 2023 Kahramanmaraş earthquakes based on user experiences, to reveal the main indoor spatial problem areas, and to develop improvement strategies in line with human-centered interior architecture approaches. The research was conducted in the Osmangazi Neighborhood container city established in the İslahiye district of Gaziantep province. As a method, field observations were conducted along with a survey study involving 90 users. Within the scope of the survey, thermal comfort, visual comfort and lighting, auditory (acoustic) comfort, indoor air quality, and ergonomics and spatial design parameters were evaluated. In the analysis of the obtained data, alongside descriptive statistics, One-Way Analysis of Variance (ANOVA) was used to determine the effect of demographic variables on comfort perception. The findings prove that noise, odor, inadequate air conditioning, and spatial limitations reduce the quality of life; ANOVA results prove that as household size increases (especially in families of 6-7 people), comfort satisfaction decreases, and education level is a determining factor in perception. The study contributes to the field by presenting a holistic interior architecture and improvement framework that prioritizes indoor quality and user comfort for post-disaster temporary housing units.

Keywords: anova analysis, comfort performance, disaster, indoor environment, temporary housing units

1. Introduction

The need for shelter that emerges after natural disasters represents a multi-layered problematic that cannot be reduced merely to providing physical security. Post-disaster temporary housing solutions are often developed in line with the priorities of rapid response, logistical speed, and cost-effectiveness; design-oriented parameters such as spatial quality, indoor comfort, and user experience remain secondary (Quarantelli, 1995; Johnson, 2007). However, this approach falls short both conceptually and practically in the face of the reality that temporary housing spaces effectively turn into long-term residences. Indeed, numerous empirical studies reveal that post-disaster housing units are used for months or even years, and during this period, they form the main spatial framework of the users' daily lives (Lizarralde et al., 2010; Félix et al., 2013).

The strong relationship between the built environment and the physical and psychological well-being of individuals has long been emphasized in the environmental psychology and architecture literature (Ulrich, 1984; Evans, 2003). In this context, indoor quality is not limited to measurable environmental parameters such as thermal, visual, and acoustic comfort, but also includes subjective dimensions such as spatial organization, ergonomics, privacy, sense of security, and

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belonging (Vischer, 2007; Bluyssen, 2015). It is argued that these dimensions play a determining role, especially in the post-disaster context, in terms of post-trauma recovery processes, the re-establishment of daily routines, and the nature of the relationship individuals establish with the space (Corsellis & Vitale, 2005; Sanderson, 2012).

A portion of the post-disaster housing literature addresses temporary housing units through engineering performance, structural safety, durability, speed, and cost-effectiveness; positioning indoor comfort and user-centered design principles as a secondary issue (Davis, 1978; Asfour, 2019; Kalkan, 2025). This approach leads to the inadequate visibility of the effects of temporary housing spaces on users' physical health, psychological well-being, and quality of life during long-term uses. However, the fact that post-disaster housing solutions are not merely "shelters" but indoor spaces where users continue their daily lives necessitates the evaluation of these structures within the framework of the interior architecture discipline.

In this context, the interior architecture discipline has the potential to address post-disaster temporary housing units from a human-centered perspective and to evaluate parameters such as indoor comfort, spatial adequacy, and ergonomic suitability in a holistic manner. Indoor comfort is not only about environmental conditions meeting certain standards but also the entirety of qualities that make users feel safe, comfortable, and a sense of belonging to the space (Vischer, 2008). Therefore, in terms of the sustainability and humane quality of post-disaster temporary housing solutions, indoor quality and user experience must be addressed as a central design criterion.

The starting point of this research is the spatial problems observed in container cities established in different regions of Turkey following the February 6, 2023 Kahramanmaraş earthquakes. Although container units were initially designed for short-term use, in practice they have transformed into long-term living spaces. During this process, serious problems have emerged in topics such as indoor comfort, ergonomics, privacy, and spatial adequacy. This situation clearly reveals that post-disaster temporary housing solutions need to be re-evaluated not only from an engineering and logistics perspective but also with a focus on interior architecture and user experience. This study aims to respond to this need for reevaluation by proposing a multi-parameter, user-centered interior comfort framework.

The aim of this research is to evaluate the indoor comfort of temporary housing units in container cities established after the February 6, 2023 Kahramanmaraş earthquakes based on user experiences; to reveal the main problem areas concerning thermal comfort, visual comfort and lighting, auditory (acoustic) comfort, indoor air quality, and ergonomics and spatial design parameters, and to develop improvement strategies in line with human-centered interior architecture approaches. In this respect, the study aims to contribute to the interior architecture literature by presenting a holistic evaluation and design framework that prioritizes indoor quality for post-disaster temporary housing units.

2. Literature Review

Post-disaster housing is defined in the literature as a time-spanning and multi-stage process that includes the transition from emergency shelter to permanent housing (Quarantelli, 1995). Although the temporary housing solutions developed in this process are mostly designed with the assumption of short-term use, in practice, a significant portion transforms into long-term living spaces (Johnson, 2007). This situation makes it necessary to approach temporary housing units not only on the axis of structural safety, speed, and cost-effectiveness but as qualified indoor spaces where users can maintain their daily life practices.

The post-disaster housing literature, especially since the 2000s, has begun to focus more on the social, spatial, and cultural dimensions of housing solutions. Indeed, Felix et al. (2013) emphasize that the time factor is ignored in most cases in post-disaster housing designs; structures defined as "temporary" practically turn into permanent living spaces. Similarly, Lizarralde et al. (2010) reveal that the prioritization of speed and cost pressure in post-disaster projects pushes spatial quality, user requirements, and long-term habitability criteria to the background. This approach leads to temporary housing units being treated as short-term technical solutions; qualities such as indoor comfort and user experience are often evaluated in a limited manner.

A significant portion of temporary housing solutions are developed based on standardized typologies and generally show limited adaptation to different climatic, cultural, and socioeconomic contexts. Although the historical roots of this approach trace back to Davis's (1978) early critiques, recent reviews and meta-analyses show that this problem still maintains its relevance today (Bilau et al., 2015; Davidson et al., 2007; Opdyke et al., 2018). This situation makes it difficult for housing units to be adopted by users and used sustainably. Davis (1978) argues that ignoring user participation and cultural appropriateness in post-disaster housing projects is one of the main reasons for the failure of the spaces. Sanderson (2012) emphasizes that post-disaster housing spaces do not only serve a sheltering function; they also assume a symbolic and psychosocial role in identity, belonging, and social reconstruction processes. In this context, temporary housing is handled as a spatial and social component of the post-disaster recovery process, not just a physical one.

When Turkey-specific post-disaster housing research is examined, it is seen that the 1999 Marmara Earthquake constituted a radical breaking point in the literature and provided a rich empirical accumulation regarding the local context. The comprehensive literature analysis conducted by Baradan (2008) reveals that the architecture and design community in Turkey underwent a more "human-centered" shift in its approach to disaster housing after the 1999 earthquake. Building science studies empirically examining the post-occupancy processes, material vulnerabilities, and disassembly/reuse potentials of temporary prefabricated or container structures built during this period have found a wide place in the local literature (Arslan, 2007; Arslan & Coşgun, 2008). However, researchers such as Balamir (2001) and Dikmen (2005) have examined site selection policies, limits of spatial flexibility, and user satisfaction in post-disaster permanent and temporary housing applications in Turkey, emphasizing that ignoring local identity, traditional living practices, and socio-cultural needs directly and negatively affects the functional success of the spaces. Therefore, although housing production, disaster policies and spatial adaptation processes have been widely discussed historically in the local literature, the need to address interior comfort parameters based on user experience from a holistic interior architecture perspective remains current.

The indoor comfort literature reveals that the concept of comfort has a multidimensional structure and cannot be explained solely by measurable physical environmental parameters. Bluyssen (2015) defines indoor environmental quality (IEQ) through the components of thermal comfort, visual comfort, acoustic comfort, and indoor air quality; emphasizing the determining effects of these components on user health and satisfaction. Frontczak and Wargocki (2011) showed that IEQ parameters are directly effective on user satisfaction, space perception, and productivity; especially temperature, ventilation, and noise levels determine the perceived space quality.

From the perspective of the interior architecture discipline, comfort is handled as a holistic concept that is not limited to meeting environmental performance criteria but includes functional, psychological, and experiential dimensions. Vischer (2007, 2008) defines comfort as a multi-layered structure consisting of physical, functional, and psychological components; revealing that design decisions at the interior architecture scale, such as spatial organization, ergonomics, furniture layout, and privacy, play a determining role in the relationship users establish with the space. Altomonte et al. (2019) stated that user-perception-based IEQ evaluations in green-certified buildings are as important as analyses based on objective measurements and can provide direct input to design processes. These studies show that user experiences play a central role in assessing indoor comfort.

It is seen that studies focusing on indoor comfort and user experience in the post-disaster context are relatively limited. Corsellis and Vitale (2005) emphasize that qualities such as human dignity, privacy, and cultural appropriateness often remain secondary in post-disaster housing solutions. Furthermore, it is pointed out that the sustainability discourse in temporary housing projects is predominantly shaped by structural safety and environmental performance indicators; indoor quality and user satisfaction are not sufficiently considered (Gkoumas et al., 2025; Montalbano & Santi, 2023). This situation demonstrates that technical and engineering-focused approaches dominate the post-disaster shelter literature, while the interior design perspective is underrepresented.

The environmental psychology literature clearly demonstrates the effect of the physical environment on individuals' stress levels, mental health, and overall well-being. Ulrich (1984) showed that restorative environments reduce stress levels and support psychological recovery. Evans (2003) reveals that environmental stressors such as crowding, noise, spatial inadequacy, and lack of environmental control create negative effects on individuals' psychological health. These findings show that indoor air quality in temporary shelters after disasters is not limited to comfort levels; it is a matter directly related to psychosocial well-being and public health.

Despite this, empirical studies in the current literature addressing the indoor comfort of temporary housing units with a multi-parameter and user-centered approach are notably limited. Systematic reviews published especially in the last decade show that user experience, indoor environmental quality, and spatial design dimensions are mostly addressed at a secondary level in post-disaster housing research (Kim et al., 2025). Previous studies measured temporary housing as technical or structural "shells"; however, they largely ignored how these shells shape indoor quality in cases where they actually transform into long-term living spaces. Furthermore, there are very few studies that empirically address the relationship between user perception-based evaluations and spatial design decisions.

When the building science literature is examined, it is seen that there are various empirical studies investigating the indoor environmental quality (IEQ) in container or prefabricated temporary housing through objective measurements, simulations, and experimental methods. The material and shell vulnerabilities of these light steel or sandwich panel structures, which are deployed rapidly after disasters, have been documented through field measurements. For example, in their empirical research conducted in prefabricated temporary housing used after the Great East Japan Earthquake, Shinohara et al. (2014) determined that indoor temperatures in winter months remained well below acceptable comfort limits, and furthermore, indoor air pollutants such as acetaldehyde and NO_2 exceeded guideline values due to inadequate ventilation capacity and the heating practices of the users. Similarly, experimental and numerical simulation studies conducted by Tan and Tan (2021) confirmed with empirical data that the structural shell characteristics of temporary housing units fell short against climatic conditions; especially during hot periods, indoor temperatures and thermal dissatisfaction rates reached critical levels due to the limits of natural ventilation. Furthermore, Shinohara et al. (2018) empirically demonstrated that microclimatic insulation deficiencies and high humidity rates in prefabricated units led to intense mold and fungus formations that directly threaten indoor air quality and user health.

Although these studies in the building science literature profoundly document the material, shell, and engineering-oriented performance problems of temporary housing, there is a sharp methodological distinction in the post-disaster housing literature regarding what is measured and what is not. Existing empirical research has predominantly focused on measuring; (i) disaster policies at the macro scale, logistical speed, entitlement, and site selection decisions (Balamir, 2001; Lizarralde et al., 2010), or (ii) pure physical and quantitative parameters at the micro scale, such as the thermal conductivity of the building shell, moisture balance, and singular indoor air pollutants (Shinohara et al., 2014; Tan & Tan, 2021). In contrast, the fundamental area that previous empirical research has not holistically measured and left as a chronic gap in the literature is the collective evaluation of the relationship between these physical/environmental parameters and interior architectural components such as the functional organization of the interior space, furniture layout, flexibility, ergonomics, and privacy, through user experience (Kim et al., 2025). Previous studies measured temporary housing merely as technical or structural "shells"; however, they largely ignored how these shells shape indoor quality in cases where they effectively transform into long-term living spaces.

In the context of Turkey, although there are important studies examining the performance and user satisfaction of temporary housing after the 1999 Marmara and Düzce earthquakes (Arslan, 2007; Dikmen, 2005), these researches have mostly remained focused on structural recycling, settlement decisions, or general spatial satisfaction. In the international literature, on the other hand, there are empirical studies (Shinohara et al., 2014; Tan & Tan, 2021) directly measuring indoor environmental quality (IEQ) in modular and temporary housing. However, the vast majority of these studies either focused solely on singular parameters such as thermal performance/air quality or were conducted in laboratory/simulation environments. Although the existing literature is successful in measuring the physical shell performance of container units; a holistic interior architectural perspective that evaluates IEQ parameters (acoustic, visual, thermal, air) together with user experience, spatial ergonomics, and privacy in post-disaster housing areas remains lacking. This study aims to fill this gap in the literature by analyzing these parameters, which previous studies left engineering-oriented or examined singularly, in the field with an empirical and multi-dimensional IEQ framework. Accordingly, within the scope of the study, answers to the following questions were sought:

Question 1: In the temporary housing units in the İslahiye Osmangazi Neighborhood container city; how are the thermal, visual, auditory, and indoor air quality perceptions of the users shaped within the framework of the existing structural shell and air conditioning characteristics?

Question 2: How do the indoor organization, furniture layout, storage capacity, and spatial flexibility limits of container units affect users' acoustic privacy and long-term habitability experiences?

Question 3: Which human-centered interior architecture strategies can the systematic problem areas identified based on user experience in these units provide input for in terms of institutional and design standards for future post-disaster temporary housing designs?

The literary gap emerging in this context necessitates the re-evaluation of post-disaster temporary housing units within the framework of the interior architecture discipline. Addressing the thermal, visual, auditory, and air quality dimensions of indoor comfort together with ergonomics and spatial design parameters is of critical importance in terms of revealing the suitability of these spaces for long-term living and their potential to support user satisfaction and well-being. This study aims to present a holistic framework that evaluates indoor comfort in post-disaster temporary housing units based on user experiences and to contribute to this area, which is limitedly represented in the interior architecture literature.

3. Material and Method

This study aims to evaluate the indoor comfort of temporary housing units based on user experience. The research was designed as a field-based, cross-sectional, and descriptive study. The research design relies on an evaluation approach based on user perceptions supported by quantitative data collection tools. The study is structured in line with a human-centered interior architecture approach and the indoor environmental quality (IEQ) framework (Figure 1).

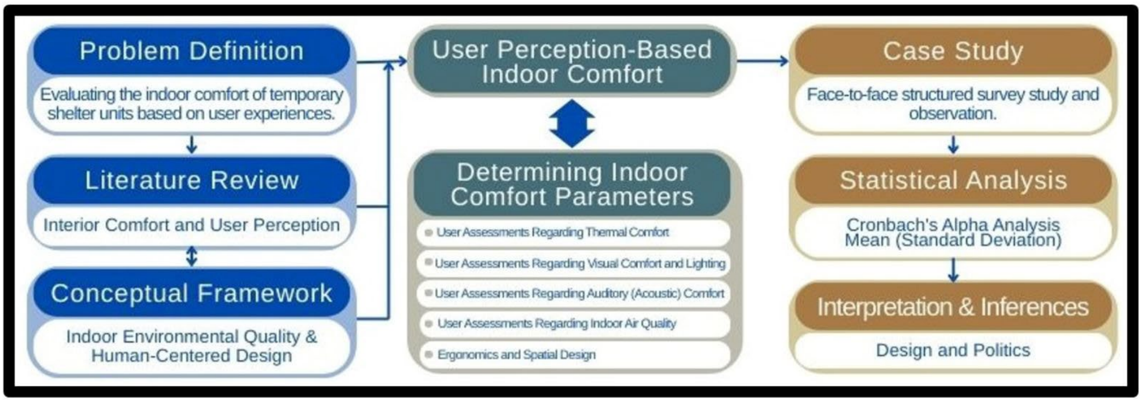

Figure 1 Conceptual and methodological workflow of the study

The research area is the Osmangazi Neighborhood Container City in the İslahiye district of Gaziantep province, established following the February 6, 2023 Kahramanmaraş earthquakes. There are 100 container structures in the settlement. This settlement is a planned temporary settlement area consisting of standard container units to respond to the need for rapid shelter after the disaster (Figure 2). The housing units in the settlement consist of single-story, modular, and prefabricated containers. Each unit contains a basic living area, a wet space, and limited storage space. Although the units were initially designed for short-term use, at the time of the fieldwork, they had effectively been converted into long-term living spaces. This situation makes the settlement a meaningful case for evaluating indoor comfort in the context of long-term use.

Figure 2 Research sample area

The sample of the research consists of 90 household representatives (users) who actively live in the Osmangazi Neighborhood Container City and voluntarily participated in the study. Considering that there are a total of 100 container units in the settlement, a "near-census" field survey approach supported by "convenience sampling", which is one of the non-probability sampling methods, was adopted as the sampling strategy in order to cover almost the entire population. During the field study process, all container doors in the settlement were knocked on one by one to reach the primary adult users of the units. The fact that 90 out of a total of 100 units were actually reached ensured that the sample represented the container city in general at a rate of ~90%. The participants have a diversity that fully reflects the general demographic structure and different usage models (large families, nuclear families, elderly users, etc.) of the existing settlement in terms of household sizes, age groups, and gender distributions.

A structured survey form was used as the data collection tool in the research. The survey form was developed based on the indoor environmental quality (IEQ) framework and ergonomics and spatial design parameters at the interior architecture scale. The content validity of the survey form was evaluated in line with the opinions of three academicians who are experts in the fields of interior architecture and building physics. The experts contributed to its formation by evaluating each item in terms of its level of representing the relevant comfort parameter, its comprehensibility, and its suitability for the disaster context. As a result of this process, the content of the survey form was structured under five main parameters: (i) thermal comfort, (ii) visual comfort and lighting, (iii) auditory (acoustic) comfort, (iv) indoor air quality, and (v) ergonomics and spatial design.

The data collection process was carried out within the scope of the field study in the autumn period of 2023. The surveys were administered by the researcher using the face-to-face interview technique. A 5-point Likert-type scale was used to measure the participants' attitudes, perceptions, and opinions regarding specific statements. The scale was rated between 1 = Strongly Disagree and 5 = Strongly Agree. The internal consistency of the scale was evaluated using Cronbach's alpha coefficient. Reliability analyses were performed separately for both the entire scale and each comfort parameter sub-scale. It was observed that the obtained alpha coefficients were above the accepted threshold value of 0.70, and it was concluded that the internal consistency of the scale was sufficient.

The collected data were transferred to a digital environment and analyzed using appropriate software for statistical analysis. Mean values, standard deviations, and frequency distributions were calculated for each comfort parameter. Through these analyses, users' perceptions and satisfaction levels regarding different IEQ dimensions were revealed. In addition, the findings for each parameter were interpreted comparatively with the comfort ranges and design criteria recommended in the literature. This approach made it possible not only to describe the findings but also to generate design-oriented inferences.

The research aims to evaluate indoor comfort based on users' perceptions, experiences, and satisfaction levels rather than technical performance indicators. Indeed, the IEQ and environmental psychology literature shows that evaluations based on user perceptions are at least as meaningful as objective measurements in terms of revealing the effects of spatial quality in the context of daily use and have the quality of providing direct input for design processes (Al-Akhzami et al., 2024; Ruth et al., 2025; Schweiker et al., 2025).

The methodological framework of this study and the empirical findings obtained contain three main limitations that could serve as a reference for future research.

First, the data collection process (Autumn 2023 period) coincided with the initial phase when the container city was established immediately after the disaster. As seen in Table 1, all of the participants (100%) are early-stage users who have been residing in the respective units for 0-6 months. Although the fact that post-disaster temporary housing transforms into permanent spaces over time is theoretically emphasized in the literature, the findings of this research capture users' "early and medium-term" adaptation and transitional period comfort experiences. Therefore, the obtained data do not reflect the structural shell deteriorations, material wears, or chronic psychological habituation processes resulting from the long-term use of container structures.

The second and most important limitation is that the research methodologically relies entirely on subjective perception and satisfaction evaluations based on user experience (Post-Occupancy Evaluation); it does not include quantitative and objective environmental measurements (temperature data loggers, acoustic decibel levels, lighting lux values, or indoor air quality sensors) for indoor comfort parameters. Although subjective human perception is accepted as a legitimate and primary empirical data source in measuring spatial comfort and user well-being in the interior architecture literature, the fact that these data were not supported by physical measurement tools and not cross-checked (triangulation) limits the scope of the study. With this limitation, it is anticipated that the large user-oriented database presented by the study in its current form will constitute a foundational baseline and point of comparison for future longitudinal research with mixed methodologies that will blend subjective perception tests and objective device measurements together.

Finally, the ANOVA analyses regarding the effects of demographic variables on comfort perception were performed using the existing summary data, and it is recommended to collect larger and more detailed datasets in future studies to enable more comprehensive multivariate analyses (regression, etc.) based on individual participant data.

When the frequency tables presented in the findings section (especially Table 2, Table 4, and Table 5) are examined, a zero (0) frequency concentration can be observed in the "Agree" (4) and "Strongly Agree" (5) scores of some parameters. This situation, defined as the "floor effect" in statistics, is not a data anomaly or sampling error; it is the empirical result of the chronic physical inadequacies (lack of insulation, thermal comfort problems, odor and acoustic problems, etc.) harbored by the container city infrastructure in the early period of the disaster reflecting directly and homogeneously on the user experience.

4. Research Findings

This section presents the findings obtained from the survey study conducted with the users living in container units used for post-disaster temporary housing. The research findings begin with descriptive information regarding the demographic characteristics of the participants. Following this, the fundamental environmental and spatial comfort components that determine the living experiences of the users in the container units are addressed under the headings of thermal comfort, visual comfort and lighting, auditory (acoustic) comfort, indoor air quality, and ergonomics and spatial design. This structure allows user evaluations to be analyzed within a systematic and holistic framework.

4.1. Demographic Characteristics of the Participants

The distributions regarding the demographic characteristics of the users participating in the research are presented in Table 1. When the demographic data are examined, it is seen that the participants exhibit a relatively balanced distribution in terms of gender; the proportions of female and male participants are close to each other.

Table 1 Demographic Characteristics of Users

Variable	Category	n	%
Gender	Female	48	53.3
	Male	42	46.7
Nationality	Turkish citizen	90	100
	Other Nationalities	-	-
Age Group	15–25	13	14.4
	26–35	25	27.8
	36–45	28	31.1
	46–55	17	18.9
	56 and above	7	7.8
Household Size	1 person	-	-
	2–3 people	39	43.3
	4-5 people	37	41.1
	6-7 people	12	13.3
	8 and above	2	2.2
Education Level	Primary	29	32.2
	Secondary Education	47	52.2
	Higher Education	14	15.6
Time Spent in Containers Duration	0–6 months	90	100
	6–12 months	-	-
	12 months and older	-	-
Marital Status	Married	26	28.9
	Single	64	71.1

The fact that all participants are citizens of the Republic of Turkey indicates that the sample is compatible with the spatial and social context of the study. The distribution regarding age groups reveals that the research sample is not concentrated in a single age range, and different age groups are represented in the study. This situation allows users' comfort perceptions to be evaluated without being reduced to a specific demographic profile, making it possible to interpret the comfort evaluations presented in the following subsections within a framework encompassing different user groups.

4.2. User Evaluations Regarding Thermal Comfort

When the user evaluations regarding thermal comfort are examined, it is seen that the temporary housing units fall far short of meeting user expectations in terms of both heating and cooling. The responses given to the thermal comfort scale consisting of five items reveal that the vast majority of the participants concentrated on negative evaluations (Table 2). The internal consistency of the scale regarding thermal comfort was tested with Cronbach's Alpha coefficient and calculated as α = 0.96, and this value indicates that the scale has a high level of internal consistency.

Table 2 User Evaluations Related to Thermal Comfort

	1	2	3	4	5	Mean	SD
The interior of the container is sufficiently heated during the winter months.	20	40	30	-	-	2.11	0.73
The container interior can be kept cool during the summer months.	60	25	5	-	-	1.39	0.59
The temperature inside remains balanced throughout the day.	50	35	5	-	-	1.50	0.60
Heating/cooling systems are adequate for use.	55	25	10	-	-	1.56	0.69
The indoor temperature is generally comfortable.	60	25	5	-	-	1.39	0.59

[1] Strongly disagree [2] Disagree [3] Undecided [4] Agree [5] Strongly agree [M] Mean [SD] Standard deviation

The average of the responses given by the participants to the statement "The interior of the container is adequately heated in winter months" was calculated as Mean = 2.11 (SD = 0.73). This value indicates that the level of heating in winter conditions is generally perceived as inadequate by the users, but it is evaluated as a relatively less problematic area compared to other thermal comfort indicators. Evaluations regarding the summer months, on the other hand, are much more negative. The statement "The container interior can be kept cool in the summer months" stands out as the item with the lowest average with Mean = 1.39 (SD = 0.59). This finding shows that container units experience overheating problems, especially in hot climate conditions, and the current design approach falls short in terms of summer comfort.

Similarly, the statement regarding whether the indoor temperature is balanced throughout the day was evaluated with values of Mean = 1.50 (SD = 0.60), and the statement regarding the adequacy of heating/cooling systems with Mean = 1.56 (SD = 0.69). These results reveal that indoor temperature is perceived as unstable not only in extreme seasonal conditions but also during the daily usage process, and existing mechanical systems fall short in providing user comfort. The calculation of the statement "The indoor temperature is generally comfortable" as Mean = 1.39 (SD = 0.59) confirms that users' general thermal comfort perception is at a quite low level. The low standard deviation values indicate that participant opinions are largely homogeneous and that problems related to thermal comfort point to a widespread and systematic problem area rather than individual ones.

The complete absence of responses (0 frequency) in the 'Agree' and 'Strongly Agree' (4 and 5) options in the basic items regarding thermal comfort indicates that container units fall completely short in providing indoor temperature balance due to thin sandwich panel wall technology and inadequate insulation layers. This cumulative pattern confirms that the thermal comfort grievance experienced by users during seasonal transition periods (autumn/summer) points to a methodological floor effect originating from structural inadequacies and shared across the entire sample, rather than being individual/subjective exceptions.

Evaluated overall, it is understood that container units harbor serious thermal comfort problems, especially in the summer months in the context of long-term use; existing heating and cooling solutions are inadequate in meeting user needs. This situation reveals that in the design of post-disaster temporary housing units, thermal performance must be addressed not only as a technical adequacy but also as a critical design input in terms of user health and well-being.

4.3. User Evaluations Regarding Visual Comfort and Lighting

When user evaluations regarding visual comfort and lighting are examined, it is seen that visual comfort in temporary housing units is perceived relatively more positively compared to other environmental comfort components; however, user satisfaction remains limited in some sub-indicators. The responses given to the visual comfort and lighting scale consisting of five items reveal that participant evaluations concentrated at a moderate level (Table 3). The internal consistency of the scale regarding visual comfort and lighting was tested with Cronbach's Alpha coefficient and calculated as α = 0.91, and this value indicates that the scale has a high level of internal consistency.

Table 3 User Evaluations Related to Visual Comfort and Lighting

	1	**2**	**3**	**4**	**5**	**Mean**	**SD**
Daylight enters the interior space at an adequate level.	20	4	15	45	6	3.14	1.30
Sufficient for use in artificially lit spaces.	30	14	3	33	10	2.77	1.50
The lighting level does not cause eye strain.	40	17	5	19	9	2.33	1.46
Window openings positively affect space utilization.	19	4	7	28	32	3.56	1.52
The interior is generally visually comfortable.	51	13	6	18	2	1.97	1.28

[1] Strongly disagree [2] Disagree [3] Undecided [4] Agree [5] Strongly agree [M] Mean [SD] Standard deviation

The average of the responses given by the participants to the statement "Daylight enters the interior space at an adequate level" was calculated as Mean = 3.14 (SD = 1.30). This value indicates that natural light generally reaches the interior space at an adequate level in container units and is perceived relatively positively by the users. This result regarding natural lighting stands out as one of the significant strong areas under the visual comfort heading.

Evaluations regarding artificial lighting, on the other hand, indicate a more limited level of satisfaction. The statement "Artificial lighting is adequate for using the space" was evaluated with Mean = 2.77 (SD = 1.50), suggesting that users find artificial lighting functionally acceptable, but do not consider it adequate in terms of visual comfort during long-term use. Similarly, the calculation of the statement "The lighting level does not cause eye strain" as Mean = 2.33 (SD = 1.46) reveals that the lighting quality in container interiors falls short in providing visual comfort.

In evaluations regarding the relationship of visual comfort with spatial openings, the statement "Window openings positively affect the use of space" stands out as the item with the highest average with Mean = 3.56 (SD = 1.52). This finding indicates that window openings offer a significant contribution not only in terms of natural lighting but also in terms of spatial perception and usage comfort. In contrast, the calculation of the statement "The interior space is generally visually comfortable" as Mean = 1.97 (SD = 1.28) confirms that users' general perception of visual comfort remains at a low level and that a holistic satisfaction is not achieved despite positive sub-indicators. The relatively high standard deviation values reveal that user perceptions regarding visual comfort and lighting are not homogeneous; natural and artificial lighting conditions can vary depending on the location and orientation of the containers, as well as individual usage habits.

Evaluated overall, it is seen that visual comfort and lighting in container units meet user expectations in some sub-indicators; in particular, natural light and window openings support the spatial use. However, the fact that artificial lighting quality and the general perception of visual comfort remain at a low level indicates that existing lighting solutions are inadequate in meeting user needs in the context of long-term living. This situation reveals that in the design of post-disaster temporary housing units, visual comfort must be addressed holistically, not only through the illumination level but also in terms of eye health, spatial perception, and user satisfaction.

4.4. User Evaluations Regarding Auditory (Acoustic) Comfort

When user evaluations regarding acoustic comfort are examined, it is seen that the container units used for temporary housing fall far short of meeting user expectations in terms of sound insulation and interior silence. The responses given to the acoustic comfort scale consisting of five items reveal that the vast majority of the participants concentrated on negative evaluations (Table 4). The internal consistency of the scale was tested with Cronbach's Alpha coefficient and calculated as α = 0.97, and this value indicates that the scale has a very high level of internal consistency.

Table 4 User Evaluations Related to Auditory (Acoustic) Comfort

	1	2	3	4	5	Mean	SD
Outdoor noise is not disturbing inside the container.	75	6	1	8	-	1.36	0.89
Noises from neighboring containers are not disturbing.	60	18	4	6	2	1.58	1.01
The interior is sufficiently quiet for relaxation and sleep.	65	17	3	3	2	1.44	0.89
The container's sound insulation is sufficient.	60	25	5	-	-	1.39	0.59
The interior is generally comfortable from an acoustic standpoint.	63	18	7	2	-	1.42	0.73

[1] Strongly disagree [2] Disagree [3] Undecided [4] Agree [5] Strongly agree [M] Mean [SD] Standard deviation

The average of the responses given by the participants to the statement "External noise is not disturbing inside the container" was calculated as Mean = 1.36 (SD = 0.89). This finding indicates that container units cannot provide adequate acoustic protection against noise originating from the external environment, and environmental sounds are distinctly felt indoors. Similarly, the evaluation of the statement "The interior space is quiet enough for rest and sleep" with Mean = 1.44 (SD = 0.89) reveals that containers fail to provide the quiet conditions necessary for rest and sleep, which is one of their basic usage scenarios.

Evaluations regarding sounds originating from neighboring units also point to a negative picture. Although the statement "Sounds coming from neighboring containers are not disturbing" seems to have a relatively higher average compared to other items with Mean = 1.58 (SD = 1.01), this value is still at a low level. This situation indicates that sound permeability between units is high in the container layout and that acoustic privacy is not adequately provided. The relatively high standard deviation value, on the other hand, suggests that the perception of noise coming from neighboring units may vary depending on the location of the containers and environmental conditions.

In evaluations directly related to the building shell, it is seen that the statement "The sound insulation of the container is adequate" has a low average with Mean = 1.39 (SD = 0.59). The complete absence of responses (0 frequency) at the 4 and 5 Likert points in the items related to the container's sound insulation and external noise methodologically confirms that all users statistically unite on a common ground of dissatisfaction (floor effect) in the face of the sound permeability of the sandwich panel shell technology. The low standard deviation value reveals that participant opinions are largely homogeneous specific to this item and that the inadequacy of sound insulation is perceived as a widespread and common problem area. Similarly, the calculation of the statement "The interior space is generally acoustically comfortable" as Mean = 1.42 (SD = 0.73) confirms that users' general acoustic comfort perception is at a quite low level.

When the low average and relatively low standard deviation values are evaluated together, it is seen that problems related to acoustic comfort point to a systematic problem area associated with the structural characteristics and layout of container units, rather than individual experiences. Evaluated overall, it is understood that temporary housing units exhibit inadequate acoustic performance against noise originating from both the external environment and neighboring units; and this situation creates negative effects on rest, sleep, and psychological well-being. These findings reveal that in the design of post-disaster temporary housing units, acoustic performance must be addressed not as a secondary comfort criterion, but as a fundamental design input in terms of user health and quality of life.

4.5. User Evaluations Regarding Indoor Air Quality

When user evaluations regarding indoor air quality are examined, it is seen that the container units used for temporary housing fall far short of meeting user expectations, especially in terms of odor formation and general air quality perception. The responses given to the indoor air quality scale consisting of five items reveal that a significant portion of the participants concentrated on negative evaluations (Table 5). The internal consistency of the scale was tested with Cronbach's Alpha coefficient and calculated as α = 0.91. This value indicates that the scale has a high level of internal consistency and reliability.

Table 5 User Evaluations Regarding Indoor Air Quality

	1	**2**	**3**	**4**	**5**	**Mean**	**SD**
There is no unpleasant odor inside the room.	80	8	2	-	-	1.13	0.40
Ventilation is sufficient for the interior.	34	20	10	16	10	2.42	1.43
The indoor air provides a feeling of freshness.	36	18	7	17	12	2.46	1.50
The humidity level is comfortable.	40	15	3	22	10	2.41	1.52
Indoor air quality is generally adequate.	70	15	5	-	-	1.28	0.56

[1] Strongly disagree [2] Disagree [3] Undecided [4] Agree [5] Strongly agree [M] Mean [SD] Standard deviation

The average of the responses given by the participants to the statement "No disturbing odor occurs in the interior space" was calculated as Mean = 1.13 (SD = 0.40). The complete absence of responses (0 frequency) in the 'Agree' and 'Strongly Agree' options for the items regarding odor formation and general air quality adequacy demonstrates the sharp and unexceptional negative effect created in subjective perception by the septic, drainage, and ventilation deficiencies experienced in the first months the settlement was established. This quite low average value indicates that disturbing odors are widely felt in container interiors and that solutions related to odor control are perceived as inadequate by the users. The low standard deviation value reveals that this negative perception is largely shared among the participants.

Evaluations regarding ventilation, on the other hand, present a relatively more scattered picture. The statement "Ventilation is adequate for the interior space" was evaluated with Mean = 2.42 (SD = 1.43), showing that user perceptions differ significantly. Similarly, the calculation of the statement "The indoor air gives a feeling of freshness" as Mean = 2.46 (SD = 1.50) indicates that some users find the indoor air acceptable, but a significant portion experiences negative experiences in this regard. The relatively high standard deviation values suggest that ventilation performance can vary depending on the location of the containers, usage intensity, and environmental conditions. A similar situation applies to evaluations regarding humidity levels. The calculation of the statement "The humidity level is at a comfortable level" as Mean = 2.41 (SD = 1.52) reveals that indoor humidity conditions are perceived inconsistently and unpredictably by the users. This finding suggests that humidity control constitutes a significant problem area, especially in long-term use.

Looking at the general evaluation, it is seen that the statement "Indoor air quality is generally adequate" has a quite low average with Mean = 1.28 (SD = 0.56). This result confirms that problems in individual components (odor, ventilation, humidity) significantly negatively affect users' general perception of air quality. The low standard deviation value indicates that general air quality inadequacy is perceived as a widespread and systematic problem.

Evaluated overall, it is understood that indoor air quality in temporary housing units harbors serious problems in terms of user health and comfort; in particular, odor control and natural or mechanical ventilation performance remain inadequate. These findings reveal that in the design of post-disaster temporary housing units, indoor air quality must be addressed not only as a technical requirement but as a fundamental design input in terms of users' physical and psychological well-being.

4.6. User Evaluations Regarding Ergonomics and Spatial Design

When user evaluations regarding spatial comfort and ergonomics are examined, it is seen that the container units used for temporary housing fall short of meeting user expectations, especially in terms of storage capacity, spatial flexibility, and ergonomic adequacy. The responses given to the spatial comfort and ergonomics scale consisting of five items reveal that participant opinions generally concentrated on negative evaluations (Table 6). The internal consistency of the scale was tested with Cronbach's Alpha coefficient and calculated as α = 0.97. This value indicates that the scale has a very high level of internal consistency and reliability.

Table 6 User Evaluations Regarding Ergonomics and Spatial Design

	1	2	3	4	5	Mean	SD
The spatial size of the container is sufficient for daily life.	30	15	8	29	8	2.67	1.45
Furniture placement facilitates space utilization.	40	22	4	14	10	2.24	1.44
Storage space is sufficient.	57	23	1	6	3	1.61	1.03
The space can be adapted to different needs.	45	28	7	8	2	1.82	1.06
The interior is generally ergonomic.	35	25	5	16	9	2.32	1.40

[1] Strongly disagree [2] Disagree [3] Undecided [4] Agree [5] Strongly agree [M] Mean [SD] Standard deviation

The average of the responses given by the participants to the statement "The spatial size of the container is adequate for daily life" was calculated as Mean = 2.67 (SD = 1.45). This value indicates that spatial size is perceived relatively more positively compared to other spatial comfort components, but it still does not fully meet user expectations. The relatively high standard deviation value suggests that the perception of spatial adequacy varies depending on the users' household size, usage habits, and layout.

In evaluations regarding the furniture layout, the calculation of the statement "Furniture layout facilitates the use of space" as Mean = 2.24 (SD = 1.44) reveals that the existing furniture layout remains limited in supporting the effective use of the space. Similarly, the evaluation of the statement "The interior space is generally ergonomic" with Mean = 2.32 (SD = 1.40) indicates that although ergonomic comfort is partially achieved, it is not perceived at an adequate level by the users. One of the areas where spatial comfort is perceived the weakest is storage facilities. The fact that the statement "Storage areas are adequate" has a quite low average with Mean = 1.61 (SD = 1.03) indicates that the inadequacy of storage areas in container units stands out as a widespread and prominent problem area (Figure 3). The low standard deviation value reveals that this negative perception is largely shared among the participants.

Figure 3 Examples of interior space usage and storage space needs

Similarly, the calculation of the statement "The space can adapt to different needs" as Mean = 1.82 (SD = 1.06) indicates that the capacity of container interiors to adapt to different user profiles and changing daily needs is limited. This finding reveals that the inadequacy of spatial flexibility is one of the fundamental factors negatively affecting spatial comfort in the context of long-term use.

Evaluated overall, the fact that the average values regarding spatial comfort and ergonomics remain below 3 in all items indicates that container units exhibit a limited performance in meeting daily life requirements. The relatively high standard deviation values, on the other hand, suggest that spatial experiences can vary depending on user characteristics and usage patterns. These findings reveal that in the design of post-disaster temporary housing units, the issues of spatial adequacy, ergonomics, and flexibility must be addressed not only within the framework of minimum shelter requirements but within the scope of a holistic comfort approach that will support users' long-term living practices.

4.7. Differences in Comfort Perception According to Demographic Variables

A one-way analysis of variance (ANOVA) was conducted to examine the effect of demographic variables (age, household size, education level) on the perception of indoor comfort.

The Effect of Age Group

A statistically significant difference among age groups was detected only in the perception of acoustic comfort ($F(4,85) = 3.24$, $p = 0.015$). The post-hoc Tukey HSD test showed that the 56 and above age group (Mean = 1.62, SD = 0.58) evaluated acoustic comfort significantly better compared to the 26-35 age group (Mean = 1.35, SD = 0.49) ($p = 0.036$). No significant difference was found among age groups in other comfort parameters (thermal, visual, air quality, spatial) ($p > 0.05$).

The Effect of Household Size

The most prominent effect of household size on comfort perception was observed in the spatial comfort parameter ($F(3,86) = 10.89$, $p < 0.001$). The Tukey HSD test revealed that households of 2-3 people (Mean = 2.45, SD = 0.95) found spatial comfort significantly more adequate compared to households of 6-7 people (Mean = 1.62, SD = 0.65) ($p < 0.001$). Similarly, households of 4-5 people (Mean = 2.15, SD = 0.88) evaluated spatial comfort more positively than households of 6-7 people ($p = 0.002$). No significant effect of household size was found on other comfort parameters ($p > 0.05$).

The Effect of Education Level

The level of education created significant differences in the perception of visual comfort ($F(2,87) = 4.92$, $p = 0.009$) and indoor air quality ($F(2,87) = 3.45$, $p = 0.036$). In terms of visual comfort, higher education graduates (Mean = 3.02, SD = 1.12) reported higher satisfaction than primary education graduates (Mean = 2.55, SD = 0.92) ($p = 0.008$). In indoor air quality, higher education graduates (Mean = 2.18, SD = 0.75) have a more positive perception compared to secondary education graduates (Mean = 1.94, SD = 0.68) ($p = 0.034$). No significant effect of education level was detected on thermal and acoustic comfort, and spatial comfort.

5. Discussion

This study evaluated the environmental and spatial comfort perceptions of users in container units used for post-disaster temporary housing within a multi-dimensional framework. The findings show that user satisfaction remained at a limited level in all of the headings: thermal comfort, acoustic comfort, visual comfort and lighting, indoor air quality, and spatial comfort and ergonomics. When the average satisfaction scores presented in Table 7 are examined, it reveals that comfort problems emerged at different intensities among the headings, but generally, container units fall short in meeting long-term living requirements (Table 7).

Table 7 Users' Overall Satisfaction Level with the Interior

Basic Parameters	Average Satisfaction (Mean)	Average SD
Thermal Comfort	1.59	0.64
Acoustic Comfort	1.44	0.82
Visual Comfort and Lighting	2.75	1.41
Indoor Air Quality	1.94	1.08
Spatial Comfort and Ergonomics	2.13	1.28

The comparative evaluation shows that the lowest average satisfaction values are concentrated under the acoustic comfort (Mean = 1.44) and thermal comfort (Mean = 1.59) headings. This situation indicates that basic environmental comfort components, such as noise control and indoor temperature balance, negatively affect the user experience to a determining extent in container units. Especially, the overheating problems that become prominent in the summer period and the transmission of noise originating from the external environment and neighboring units to the interior space play a critical role in the decline of comfort perception. The literature also emphasizes that lightweight building shells and inadequate insulation solutions limit both thermal and acoustic performance in temporary and modular housing units; the user-based findings of this study support these assessments.

Although the indoor air quality heading (Mean = 1.94) presents a relatively higher average value compared to thermal and acoustic comfort, it is seen that the satisfaction level is still low. This result shows that components such as ventilation, odor formation, and humidity control are not perceived adequately by users. Furthermore, the relatively high standard deviation values under this heading indicate that the perception of indoor air quality can vary depending on the location of the containers, usage intensity, and environmental conditions. This situation suggests that indoor air quality is a comfort component sensitive not only to design but also to usage and operational practices.

The average satisfaction score (Mean = 2.13) obtained under the spatial comfort and ergonomics heading reveals that users found spatial size and general ergonomics partially acceptable; however, problems such as the inadequacy of storage areas and the inability of the space to adapt to different needs limited the comfort perception. This finding aligns with post-occupancy evaluation studies showing that the spatial organizations of container units, constructed at the "minimum shelter" scale, fall short in terms of long-term living practices.

In the summary table, the highest average satisfaction value was obtained under the visual comfort and lighting heading (Mean = 2.75). However, the fact that this value also remains below 3 indicates that natural and artificial lighting conditions are found adequate by users only to a limited extent. This situation suggests that daylight access, opening ratios, and indoor lighting arrangements in container units are decisive on spatial perception and the feeling of "freshness", but existing solutions do not fully meet this potential.

The ANOVA results show that comfort perception is not homogeneous and is significantly affected, especially by household size and education level. The most striking finding is that dissatisfaction with spatial comfort increases systematically as household size increases. The fact that the spatial comfort average is at an extremely low level, such as 1.62, in households of 6-7 people shows that standard container dimensions (approximately 20-25 m^2) are completely inadequate for large families. This finding directly overlaps with the concepts of 'crowding' and 'spatial inadequacy' defined as environmental stressors by Evans (2003).

It is noteworthy that the level of education affects the perception of visual comfort and indoor air quality. The more positive evaluation of these parameters by higher education graduates may be related to their environmental awareness and capacity to develop strategies for improving existing conditions (for example, using natural ventilation more effectively). This situation is consistent with the empirical findings of Frontczak and Wargocki (2011), indicating that individual background, expectations, and socio-demographic factors directly shape the perception of indoor environmental quality and comfort evaluations.

The difference observed only in acoustic comfort among age groups suggests that younger users are more sensitive to environmental noise. In the literature, it is stated that young individuals' need for private space and demand for a quiet environment is more prominent compared to older individuals (Ulrich, 1984; Vischer, 2007). This situation reveals that user profiles should be taken into account when designing solutions for noise control in container cities.

Evaluated overall, these findings, supported by the summary table, reveal that comfort problems in container units are multidimensional and interrelated to an extent that cannot be reduced to a single design parameter. Interactions between thermal, acoustic, visual, and spatial comfort components and indoor air quality show that inadequacy in one area can also negatively affect other comfort areas. In this context, it is understood that in the design of temporary housing units, comfort must be addressed not as a secondary criterion, but as a holistic design input that considers user health, quality of life, and long-term use requirements.

6. Conclusion

This study examined the indoor comfort performance of temporary housing units established in the Osmangazi Neighborhood Container City in the İslahiye district of Gaziantep province following the February 6, 2023 Kahramanmaraş earthquakes, with a holistic approach based on user experiences and empirical data. The findings obtained from the field research reveal that container units produced to rapidly meet the urgent shelter need after the disaster have effectively transformed into long-term living spaces, contrary to the assumption of "temporary" use. The survey study conducted with 90 users and on-site field observations prove that user satisfaction is at a critically low level in most of the thermal, auditory, indoor air quality, and ergonomics and spatial design parameters, and that it harbors a systematic inadequacy. This situation necessitates going beyond quantitative targets in the management and design of post-disaster housing areas and standardizing a multi-dimensional comfort optimization centered on user experience at the institutional level.

In this housing experience that lasts for months or years, structuring the units only within the limits of "minimum shelter areas" risks long-term user health and psychosocial well-being. Accordingly, national and international technical regulations and design guidelines need to be updated with a holistic approach. Modular ergonomics criteria, along with verifiable technical performance indicators such as the sound transmission loss (Rw) of the units, daylight factor, and indoor air quality (CO_2 and volatile organic compound levels), should be included in the relevant standards. Integrating interior architecture, environmental control, and building physics experts into planning and emergency logistics processes will be an institutional step that will directly increase the habitability of temporary settlements produced after a disaster.

Data and Climate-Oriented Design Strategies: The quantitative data obtained in the research present an evidence-based and prioritized hierarchy of design interventions, shaped depending on the intensity of user dissatisfaction (Mean) and its homogeneity arose the sample (SD):

First Priority Intervention Area (Acoustic and Thermal Comfort): According to the results of the comparative analysis, the parameters with the lowest and most homogeneous satisfaction levels across the sample are the acoustic comfort (Mean = 1.44, SD = 0.82) and thermal comfort (Mean = 1.59, SD = 0.64) areas. Considering the Mediterranean-Continental transitional climate of the İslahiye region, which is exposed to extreme heat exceeding 40°C and intense solar radiation in summer and is harsh in winter, the existing thin sandwich panel technology is completely inadequate in maintaining the indoor temperature balance. In the face of this specific climatic necessity, solar shading (reflective secondary roof) systems integrated onto the roofs of the units should be designed. This passive design strategy will reduce the radiation load on the unit while also physically damping the impact noise created by raindrops falling on the panel surface. At the settlement scale, acoustic absorbent landscape elements (dense leafy green bands) to be positioned between units will minimize neighborhood noise and privacy violations through spatial morphology.

Second Priority Intervention Area (Indoor Air Quality): Indoor air quality problems (Mean = 1.94), which rank second, are fueled especially by the chronic odor problem (Mean = 1.13) in the units. This problem deepens during periods in İslahiye's harsh winter months when windows cannot be opened due to climatic necessities. Inadequate air exchange leads to the accumulation of moisture, mold, and carbon dioxide indoors. In order to resolve this situation, mechanical sealing apparatus with check valves should be used in the infrastructure and drainage lines of wet volumes; and decentralized heat recovery ventilation grilles with humidity sensors and carbon filters, operating independently of user control, should be integrated into the building shell.

Third Priority Intervention Area (Spatial Design and Ergonomics): The storage crisis (Mean = 1.61), which increases as household size increases, necessitates volumetric solutions instead of the limited 21 m² floor area. Although it is seen that users find spatial size and general ergonomics partially acceptable (Mean = 2.13), the lack of storage limits this perception. The standard 2.40 m ceiling height of container units should be carried to the vertical axis in modular interior design with drop-ceiling type lift storage units or hidden storage areas within a raised podium. Instead of being fixed elements, the furnishings used should be designed as folding work/dining tables integrated into container wall panels and railed/movable dividing wall panels that can flexibly divide the space according to day-night scenarios. Since daylight access to the interior space (Mean = 2.75) is relatively the most positively evaluated area by users in the summary data, flexible furniture layouts that will support this strength should be preferred.

The empirical and methodological limits of this study present a multidimensional scientific roadmap for future academic research:

Longitudinal Tracking: Monitoring user experiences longitudinally over broad timeframes such as the 1st, 3rd, and 5th years of the disaster will reveal how comfort conditions change over time depending on material wear and user adaptation.

Methodological Triangulation: Supporting the data obtained from the subjective survey study with objective indoor environmental quality data loggers such as thermal cameras, decibel meters, lux meters, and CO_2 sensors will clarify the correlations between the perceptual dimension and physical reality.

Multi-Site Comparative Studies: Comparing the original findings obtained from the İslahiye settlement with other container cities having different microclimatic characteristics (like the Hatay coastal region or Kahramanmaraş) and different settlement morphologies will contribute to the development of post-disaster housing standards in a flexible and context-sensitive manner.

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CRediT Authorship Contribution Statement

Esra Avlanmaz Bilecen: Writing – review & editing, Writing – original draft, Methodology, Investigation, Analysis, Data curation, Conceptualization, Buse Büyükkömürcü: Investigation, Analysis, Data curation, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

Data will be made available on request.

Ethics Committee Approval

This study was approved by the Ethics Committee of Hasan Kalyoncu University (Protocol No: E-97105791-050.04-53568).

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Resume

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