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Determining Female Housing Users' Housing Needs and Satisfaction Levels During the Pandemic

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Abstract

This study hypothesizes that the COVID-19 pandemic has changed housing users' physical and psychosocial needs, and thus, their expectations of their residences. The study aims to determine what new needs housing users have and how satisfied they are with their residences. First, a literature search was conducted on residences and user needs and satisfaction. Second, surveys were conducted to identify the residential problems and needs of female users from Rize during the pandemic when people have been spending more time indoors since the preventive measures. The data were analyzed using the Statistical Package for Social Sciences and the results were expressed in figures and tables. The questionnaires were administered to female users, who are believed to be more responsible for household tasks than male users. Findings on users' residential use and satisfaction levels before and during the pandemic are presented in detail. In the last stage, the study made recommendations regarding the design of current residences and future ones based on the results. The survey results showed that participants had spent more time in their residences, used the rooms more often, performed different activities in the rooms, attached different meanings to their residences, and changed the norms regarding the use of the rooms since the pandemic. Depending on these changes, participants had new needs, made or considered making modifications, and encountered some problems during the process. The study aimed to develop design proposals for future residences by determining how the pandemic had affected current users and what new residential needs they had had since the pandemic began. In this study, the effects of this newly encountered process on residential spaces are revealed. In addition the results will contribute to the plans of new projects or existing residences.

Keywords:
COVID-19, housing design, female housing user, user satisfaction, user needs

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INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) that broke out in Wuhan, China, at the end of 2019 has been declared a pandemic by the World Health Organization. The pandemic has taken hold of the whole world and led to significant changes in behaviors, lifestyles, and habits. Almost all countries have taken several measures to prevent the spread of the virus, such as social distancing, quarantine, curfews, travel restrictions, flexibility in working hours, distance learning, working from home, etc. In other words, the pandemic has affected every sphere of life (healthcare, education, culture, economy, social life, etc.). It has also changed how we use our apartments/houses (residences) and even what meaning we attach to them. In other words, there has been a dramatic change in the physical reality and psychosocial meaning of our residences. We did not think much about what our residences meant to us in the hustle and bustle of everyday life before the pandemic. However, they have been places where we spend our whole lives since the onset of the pandemic. Before the pandemic, our residences were our private spaces. However, they have turned into workspaces and studies where we have ended up spending a large portion of the day since the pandemic began. In line with this, there have been significant changes in housing planning and indoor and outdoor relations. Users whose new residential needs are not met are more likely to be dissatisfied with their residences. This paradigm change has drawn researchers' attention to residential factors affecting users' everyday lives. There has been a growing body of research on residence use during the pandemic (Origoni & Origoni, 2020; Ak, 2020; Taşçı,2020; Yalçın, 2021; Soykan Berber, 2021; Ekenyazıcı Güney &Tulum, H. 2021; Turna&Usta, 2021; Tayanç; 2022; Adıgüzel Özbek& Melikoğlu Eke, 2022). Research on housing is critical because it gives us clues as to whether users are physically, socially, and psychologically satisfied with the way they live in their residences. The short-term benefit of research on housing is that it allows us to solve the problems of current projects as soon as possible. Its medium-term benefit is providing information for the building cycle in future projects. Its long-term benefit is that it provides feedback to develop new design criteria for future projects (Liu, 1999).

This study hypothesized that the COVID 19 pandemic had transformed housing users' physical and psychosocial needs, and thus, their expectations of their residences. The study aimed to develop design proposals for future residences by determining how the pandemic had affected current users and what new residential needs they had had since the pandemic began. First, a literature review was conducted on users' residential needs and satisfaction levels. Second, surveys were conducted to identify the residential problems and needs of female users from Rize during the pandemic. The data were analyzed using the Statistical Package for Social Sciences (SPSS).

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HOUSING AND PANDEMIC

Having a shelter is one of the basic needs, like food and clothes. Residences are safe environments expected to meet accommodation needs (Özkan, 1981). According to Gür (2000), housing is a phenomenon interlocked with human life and is an organized pattern of communication, interaction, space, time, and meaning. According to Dostoğlu (2000), housing is a shelter that meets one of the basic needs of humans and families, while it is also a social phenomenon with economic and spatial meanings. Home is our corner on earth; it is our first universe, a true cosmos in the truest sense of the word (Bachelard, 1996). Francescato (1998) defines one's home as an everyday-life sanctuary that symbolizes one's socioeconomic status and describes the relationship one has with one's environment. Sommerville (1997) argues that home has a physical reality and an intellectual dimension.

As a type of building that meets accommodation needs, the housing includes many different actions. These actions depend on many factors, such as users' characteristics, needs, lifestyles, socioeconomic characteristics, etc. (Zorlu, 2004). Some actions performed in houses are sitting, resting, working, engaging in hobbies, eating, cleaning, and sleeping.

Housing has a social connotation as well because it is where the family takes shape. According to Rapoport (1969), although the passive purpose of housing is to provide shelter, its primary purpose is to create the most suitable environment for human life. In other words, housing is a sociospatial unit. Housing is where one functions physically and visibly, but it is also a structure that fulfills one's values and meets one's needs that develop through cultural and social conditioning (Ersoy, 2002).

The concept of housing has transitioned from a simple shelter mechanism to a complex system as a result of the changes in physical and social structure. Therefore, housing has become the subject of many disciplines (physics, sociology, psychology, etc.) (Eyüce, 1991).

The pandemic has introduced many concepts into our lives, such as social distancing, isolation, flexible working, distance learning, quarantine, etc. These preventive measures have changed our daily lives and routines. Since the pandemic, people have ended up spending much more time at home, trying to live their lives within four walls. However, this has urged them to question whether they can really fit their lives into the confines of their residences. The new normal has given birth to new spatial and functional needs. However, people have started questioning whether their residences can meet their new needs. The pandemic has turned residences into schools and offices. Due to the pandemic, people try to adapt to living within the limits of their residences. However, there has been a considerable change in people's residential needs and expectations. The primary objective of a design is to meet user needs. Therefore, it is critical to identify all needs that change with time. Individual and social welfare is possible as long as new needs are met within the framework of those norms (Eyüce, 1991). This shows that

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residential needs should be reconsidered in the face of changing conditions.

HOUSING USERS' NEEDS

According to Ünügür (1973), the environment should meet some conditions for users to perform certain actions. People whose needs are met can effectively perform their actions in society. This points to a necessity and an obligation (Atasoy, 1973). Meeting user needs is necessary for the most effective performance of individual and social actions.

The spatial setup of a residence depends on its users' needs, lifestyles, and expectations (Zorlu&Sağsöz, 2010). Therefore, housing users' needs should be identified to contribute to personal and social welfare.

A need indicates a necessity. Favorable residential conditions are a prerequisite for user satisfaction. A design should focus on needs depending on users' wants, expectations, futures, possibilities, and cultural codes (Bektaş, 1995).

User needs are classified differently, but what they have in common is that needs have physiological, social, and psychological aspects. Maslow (1954) was the first to address user needs. He developed a Hierarchy of Needs to explain the five levels every human being must progress through to self-actualization. Those levels were physiological needs, safety needs, love and belonging, esteem, and self-actualization. Ünügür classifies user needs as physical and psychosocial (Zorlu, 1996). Physical user needs refer to situations that provide shelter and comfort conditions at a minimum level. Psychosocial user needs refer to the environmental conditions required to act without discomfort. Depending on the subject of the present study, the most important physical user needs are spatial and auditory user needs, while the most important psychosocial user needs are visual privacy needs.

HOUSING USER SATISFACTION

User satisfaction is about evaluating users' perceived feelings for a resident and its environment (Ogu, 2002). Residential satisfaction is affected by numerous parameters, such as privacy, personalization, identity, social status, personal/social space, sense of place, freedom of choice, etc. (Özsoy, 1995). Ergenoğlu and Çağdaş (2003) classify the parameters affecting residential satisfaction as user-related parameters, environmental parameters, building-related parameters, residential parameters, and parameters related to housing and interior spaces and user needs.

Housing user satisfaction changes with time because it is affected by different factors. The demographic characteristics of users and the features of the residence and its immediate surroundings affect housing user satisfaction. In line with this, it is an important problem for users' inability to meet their residential needs. Therefore, we should consider residential environments and remove the reasons that make users

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dissatisfied in those environments (Eyüce, 1991). Users have high residential satisfaction if they live in suitable places for their lifestyles and meet their needs and expectations. Housing user satisfaction is also associated with physical and mental health. This is particularly important today because people have been spending much more time indoors and attributing different roles to their residences since the pandemic began. What meaning people attach to where they live depends on how much time they spend there (Özsoy, 1994).

A residence is successful if it is located at the right spot at the right time for the right people with the right organization (Gür, 2000). Residential satisfaction is related to the extent to which a residence meets its users' needs. In this context, users' evaluation of a residence is critical to realizing the right design.

METHOD

We need to identify users' wants and needs and design residences that can fulfill them to increase user satisfaction. Post-use evaluation and user involvement in the housing production process are two methods used to determine users' wants and needs (Der, 2005). According to Özsoy et al. (1995), post-use evaluation is an assessment method used to ascertain how satisfied housing users are with the physical environment. The purpose of the post-use evaluation is to identify the reasons for dissatisfaction during use and to recreate building programs for new designs in accordance with users' needs (Altaş, 2003). Post-use evaluation allows us to determine residential shortcomings and create better places that satisfy users' needs and wants. Post-use evaluation is user-focused.

Residential needs depend on the changes during use. This study aimed to determine users' residential needs and satisfaction levels during the pandemic to make revisions or suggestions for current or new residences. The sample consisted of 188 female housing users aged 22-61 living in Rize, Turkey. Data were collected using an online survey, which is a quantitative research technique.

The sample consisted of women for two reasons. First, women are considered more responsible for domestic activities than men in Turkey. Second, the pandemic is believed to have taken a greater toll on women because they have had to take on different roles at the same time. In other words, they have had to function as wives, mothers, and workers at the same time.

The research setting was the city of Rize for various reasons. First, there is research on the residential satisfaction levels and needs of users during the COVID-19 pandemic. However, there is no research on this topic in Rize despite its vegetation, built environment features, and socioeconomic and sociocultural characteristics. Second, the city has been undergoing rapid construction and spatial transformation in recent years. Third, there has been an average of 44 percent increase in house

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sales in the Eastern Black Sea Region, according to the Turkish Statistical Institute (TUIK) (URL 1).

This study addressed satisfaction at the residence scale. The questionnaire form had two stages to reach appropriate and sufficient data on demographics, residential information, and pre- and post-pandemic residential satisfaction.

The first stage consisted of items on user characteristics (age, occupation, education, living arrangement, ownership status, etc.) and residential information (resident type, the number of rooms, total meter square, etc.).

The second stage consisted of items on residential use and satisfaction levels before the pandemic. It also asked participants what room they used most, except the bedroom, how many hours they spent in which room, how satisfied they were with their residences, and the reasons for their dissatisfaction with their residences, if any.

Afterward, participants were asked how satisfied they had been with their residences since the pandemic began. The other questions elicited information on (1) what their working arrangements were, (2) how their residences affected their productivity, (3) what problems they faced during distance learning, (4) which room they used most for work, (5) how many hours they spent indoors, (6) how satisfied they were with their residences, (7) the reasons for their dissatisfaction if their satisfaction level was moderate, low or very low, (8) what they did in their free time, (9) what modifications they made to their residences and why, and (10) what kind of spaces they needed most.

The data were analyzed using the Statistical Package for Social Sciences (SPSS). Frequency distributions were calculated using frequency analysis. The relationship between the variables was determined using the correlation test. The "Crosstabs" tab was used for the tables to show the relationship between the variables (significant results according to the p-value).

All parts of the questionnaire were analyzed and evaluated within themselves and in relation to each other.

RESULTS AND DISCUSSION

User Characteristics and Residential Results

Table 1 shows the participants' characteristics and ownership status. Most participants were married (82.4%). More than half the participants had bachelor's degrees (58.5%). Half the participants lived with three more people (50.5%), while more than a quarter lived with two other people (21.8%). More than half the participants owned the residences they lived in (61.7%). More than a quarter of the participants were tenants (28.1%). Ten participants lived in the family property (5.3%), while nine lived in public housing (4.7%).

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Table 1. Participants' Characteristics and Ownership Status

Marital Status			Education (Degree)			Number of Residents			Ownership Status		
	N	%		N	%		N	%		N	%
Married	155	82.4	Primary School	3	1.5	1	12	6.3	Owner	116	61.7
Single	33	17.5	Middle School	3	1.5	2	11	5.8	Tenant	53	28.1
			High School	21	11.1	3	41	21.8	Family Property	10	5.3
			Vocational School	14	7.4	4	95	50.5	Public housing	9	4.7
			Bachelor's	110	58.5	5	26	13.8			
			Master's	25	13.2	6	2	1.06			
			PhD	12	6.3	7	1	0.5			

Tables 2 and 3 show the properties of the residences. One hundred and one participants lived in apartments (53.4%). Seventy-one participants lived in apartment complexes (38.1%). Eight participants lived in public housing (4.2%). Six participants lived in houses (3.2%). More than half the participants lived in 101-150 m^2 residences (54.7%). Fifty participants lived in 151-200 m2 residences (26.5%). Seventeen participants lived in 51-100 m2 residences (9.04%). Nine participants lived in 201-250 m2 residences (4.7%). Nine participants lived in >250m2 residences (4.7%). Most residences had three rooms (71.2%). Less than a quarter of the residences had more than three rooms (18.6%). Eighteen residences had two rooms (9.5%). Most residences had one living room (93.6) and one kitchen (96.2%). Half the residences had one bathroom (51.2%), while more than a quarter had two bathrooms (36.1%). Half the residences had two balconies (49.4%), a quarter of the residences had one balcony (26.5%), and less than a quarter of the residences had three balconies (21.2%).

Table 2. Residential Properties

	N	%		N	%		N	%
Residence type			m2			Number of rooms		
House	6	3.2	51-100	17	9.04	1	-	
Apartment	101	53.4	101-150	103	54.7	2	18	9.5
Apartment complex	71	38.1	151-200	50	26.5	3	134	71.2
Housing complex	2	1.1	201-250	9	4.7	>3	35	18.6
Public housing	8	4.2	>250	9	4.7			

Table 3. Residential Properties

	N	%		N	%		N	%		N	%
Number of living rooms			Number of kitchens			Number of bathrooms			Number of balconies		
1	176	93.6	1	181	96.2	1	96	51.2	1	50	26.5
2	8	4.2	2	4	2.1	2	68	36.1	2	93	49.4
3	2	1.06	3	1	0.5	3	21	11.1	3	40	21.2
>3	2	1.06	4	2	1.06	>3	3	1.5	>3	5	2.6

Residential Use and Satisfaction Levels before and during the Pandemic

Participants were asked, “What is your working arrangement during the pandemic?” Fifty-five participants stated that they worked in their offices during the pandemic (29%). Forty-eight participants noted that they worked from home during the pandemic (26%). Fifty-two participants remarked that they did not work during the pandemic (28%). Thirty-three participants expressed that they worked in their offices for a short while during the pandemic (17%) (Figure 1). The figures show an almost homogenous distribution regarding working systems during the pandemic. However, they also show that people have been spending much more time indoors since the onset of the pandemic.

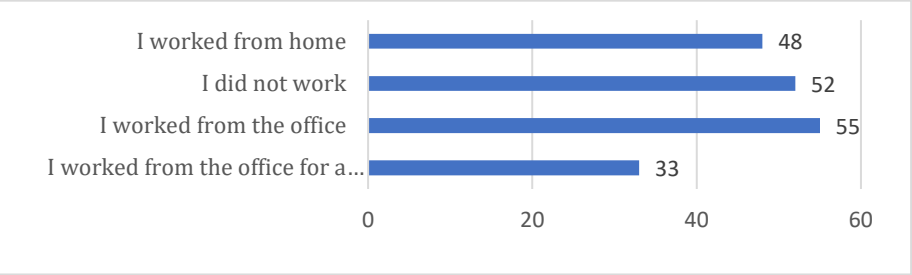

Figure 1. Work during the Pandemic

Participants were asked, "If you are working from home during the pandemic, how is that affecting your productivity?" The results showed that marital status affected how participants believed working from home impacted their productivity. Half the married participants (51%) and the majority of the single participants (85.3%) stated that they had been working from home since the pandemic. More than a quarter of the married participants noted that working from home positively affected their productivity, whereas less than a quarter of the married participants remarked that working from home negatively affected their productivity. More than a quarter of the single participants noted that working from home positively affected their productivity, whereas less than a quarter of the single participants remarked that working from home negatively affected their productivity.

Participants were asked the open-ended question, “If you have a child receiving distance education during the pandemic, can you tell us about the residential problems you are facing during the process?” The greatest difficulty participants experienced during distance education was too much noise/lack of sound insulation. Participants stated that they were disturbed by too much noise indoors and outdoors because their buildings lacked proper sound insulation. Constructions and neighbors caused the outdoor noise. The indoor noise was caused by the doorbell ringing or siblings being too loud during distance education. Participants with more than one child also noted that their children sometimes had to be online for distance education at the same time, which caused a cacophony of noise. They added that they sometimes had to change the

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hours of classes because they had to clean their residences, which caused their children to lose concentration.

Another residential challenge was related to the number and size of rooms. Mothers who worked from home and/or had more than one child stated that they had to set up more than one work/study space at home. They noted that their children sometimes logged into online classes from their bedrooms, which was problematic in terms of privacy because their classmates could see their bedrooms in the background. They added that they had difficulty adjusting their residences for their children's distance education because they needed to organize their books, but they did not have enough space. They remarked that they did not have enough space at home for their children's gym classes, and therefore, they were worried that their children were becoming more and more sedentary. Participants stated that they had difficulty providing their children with a classroom-like environment because they either had too small rooms or had no extra rooms at all. They also noted that their children had difficulty attending online classes because they either had bad Internet connections or inadequate materials, such as computers and smartphones.

Participants were asked, "How much do you use the rooms as your workspace? Can you rank them from most to least often, please?" Participants stated that they mostly worked in the living room, followed by the kitchen, bedroom, anteroom, and balcony (based on those who marked "1") (Table 4).

Table 4. Rooms as Workspaces during the Pandemic

Rooms as Workspaces during the Pandemic						Total
	1	2	3	4	5	
Living room (f) (%)	85 45.9%	47 25.4%	16 8.6%	19 10.3%	18 9.7%	185 100%
Kitchen (f) (%)	69 37.5%	54 29.3%	29 15.8%	17 9.2%	15 8.2%	184 100%
Bedroom (f) (%)	35 19.0%	27 14.7%	73 39.7%	29 15.8%	20 10.9%	184 100%
Anteroom (f) (%)	30 16.4%	14 7.7%	22 12.0%	51 27.9%	66 36.1%	183 100%
Balcony (f) (%)	28 15.2%	18 9.8%	26 14.1%	70 38.0%	42 22.8%	184 100%

Participants were asked, "How often did/do you use the rooms before/during the pandemic, except for the bedroom to sleep in? Can you rank them from most to least often, please? The living room was the room they spent most of their time in before the pandemic. They spent more than 3-6 hours on average in the living room before the pandemic. However, the kitchen was the room they spent most of their time in during the pandemic. They spent more time in the living room during the pandemic than before the pandemic. They spent 3-6 hours in the living room before the pandemic, but they spent more than six hours in the living room during the pandemic. They also spent more time in the

kitchen during the pandemic than before. However, they spent less time in the bedroom during the pandemic than before the pandemic. Participants used the balcony and anteroom during the pandemic as much as they did before the pandemic. They spent more time in the bathroom during the pandemic than before the pandemic (Table 5). Participants spent most of their time in the living room, followed by the kitchen, bedroom/balcony/anteroom, and bathroom (Table 6). Ninety participants spent most of their time in the living room before the pandemic (47.9%), whereas 84 participants spent most of their time in the living room during the pandemic (44.7%). Thirty-one participants spent most of their time in the bedroom before the pandemic (16.5%), whereas 29 participants spent most of their time in the bedroom during the pandemic (15.4%). Thirty-one participants spent most of their time in the anteroom before the pandemic (16.5%), whereas 29 participants spent most of their time in the anteroom during the pandemic (15.4%). Twenty-three participants spent most of their time in the bathroom before the pandemic (12.2%), whereas 20 participants spent most of their time in the bathroom during the pandemic (10.6%). Seventy-two participants spent most of their time in the kitchen before the pandemic (38.3%), whereas 80 participants spent most of their time in the kitchen during the pandemic (42.6%). Twenty-seven participants spent most of their time in the balcony before the pandemic (14.4%), whereas 29 participants spent most of their time in the balcony during the pandemic (15.4%).

Participants mostly used the living room before the pandemic, but they mostly used the kitchen during the pandemic. They spent more time in the living room during the pandemic than before the pandemic. They spent less time in the bedroom during the pandemic than before the pandemic. They used the balcony and anteroom during the pandemic as much as they did before the pandemic. They spent more time in the bathroom during the pandemic than before the pandemic. They spent more time in the kitchen during the pandemic, suggesting that they cooked more and had more meals at home during the pandemic. Participants who spent more time at home devoted more time to kitchen chores. In addition, participants and their children turned the kitchen into a study and office during the pandemic. Participants and their children used the bathroom more often for hygiene reasons. The results also showed that the higher the number of residents at home, the more time they spent in the kitchen. This is probably because participants and their children use the kitchen not only to cook and eat but also to study and work.

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Table 5. Average Hours of Space Use per Day before and during the Pandemic

Average Hours of Space Use per Day before the Pandemic (except for the bedroom)						Total
	Never	0-1 hours	1-3 hours	3-6 hours	+6 hours	
Living room(f) %)	11 5.9%	12 6.4%	43 22.9%	68 36.2%	54 28.7%	188 100%
Kitchen (f) (%)	7 3.7%	25 13.3%	95 50.5%	52 27.7%	9 4.8%	188 100%
Bedroom (f) (%)	12 6.4%	56 29.9%	15 8.0%	27 14.4%	77 41.2%	187 100%
Balcony (f) (%)	57 30.5%	76 40.6%	36 19.3%	15 8.0%	3 1.6%	187 100%
Anteroom (f) (%)	84 44.9%	76 40.6%	14 7.5%	11 5.9%	2 1.1%	187 100%
Bathroom (f) (%)	14 7.5%	125 66.8%	41 21.9%	5 2.7%	2 1.1%	187 100%
Average Hours of Space Use per Day during the Pandemic (except for the bedroom)						Total
	Never	0-1 hours	1-3 hours	3-6 hours	+6 hours	
Living room (f) (%)	7 3.7%	14 7.4%	46 24.5%	57 %30.3	64 %34.0	188 100%
Kitchen (f) (%)	7 3.7%	25 13.3%	79 42.0%	67 %35.6	10 %5.3	188 100%
Bedroom (f) (%)	15 8.0%	46 24.6%	31 16.6%	29 %15.5	66 %35.3	187 100%
Balcony (f) (%)	54 38.7%	81 43.1%	36 19.1%	13 %6.9	4 %2.1	187 100%
Anteroom (f) (%)	82 43.9%	79 42.2%	13 7.0%	9 %4.8	4 %2.1	187 100%
Bathroom (f) (%)	19 10.2%	111 59.4%	48 25.7%	6 %3.2	3 %1.6	187 100%

Table 6. Most Used Room before and during the Pandemic

Most Used Room before the Pandemic							Total
	1	2	3	4	5	6	
Living room (f) (%)	90 47.9%	50 26.6%	8 4.3%	15 8.0%	10 5.3%	15 8.0%	188 100%
Kitchen (f) (%)	72 38.3%	69 36.7%	19 10.1%	8 4.3%	9 4.8%	11 5.9%	188 100%
Bedroom (f)(%)	31 16.5%	18 9.6%	89 47.3%	32 17.0%	13 6.9%	5 2.7%	187 100%
Anteroom (f) (%)	31 16.5%	9 4.8%	8 4.3%	47 25.0%	47 25.0%	46 24.5%	187 100%
Balcony (f) (%)	27 14.4%	14 7.4%	32 17.0%	54 28.7%	31 16.5%	30 16.0%	187 100%
Bathroom (f) (%)	23 12.2%	21 11.2%	35 18.6%	58 30.9%	35 18.6%	16 8.5%	187 100%
Most Used Room during the Pandemic							Total
	1	2	3	4	5	6	
Living room (f)(%)	84 44.7%	56 29.8%	13 6.9%	11 5.9%	9 4.8%	15 8.0%	188 100%
Kitchen (f) (%)	80 42.6%	60 31.9%	17 9.0%	9 4.8%	13 6.9%	9 4.8%	188 100%
Bedroom (f) (%)	29 15.4%	20 10.6%	89 47.3%	27 14.4%	13 6.9%	10 5.3%	187 100%
Balcony (f) (%)	29 15.4%	16 8.5%	24 12.8%	46 24.5%	42 22.3%	31 16.5%	187 100%
Anteroom (f)(%)	29 15.4%	10 5.3%	14 7.4%	42 22.3%	52 27.7%	41 21.8%	187 100%
Bathroom (f)(%)	20 10.6%	20 10.6%	33 17.6%	63 33.5%	32 17.0%	20 10.6%	187 100%

Participants were asked to evaluate how satisfied they were with their residences before and during the pandemic. Eighty participants were satisfied with their residences before the pandemic (43%). Fifty-two participants were very satisfied with their residences before the pandemic (28%). Forty-eight participants were moderately satisfied with their residences before the pandemic (25%). Four participants were dissatisfied with their residences before the pandemic (2%). Four participants were very dissatisfied with their residences before the pandemic (2%). The results show that participants were, in general, satisfied with their residences before the pandemic. Eighty-seven participants were satisfied with their residences during the pandemic (46%). Fifty-four participants were moderately satisfied with their residences during the pandemic (29%). Thirty-seven participants were very satisfied with their residences during the pandemic (20%). Three participants were dissatisfied with their residences during the pandemic (1%). Seven participants were very dissatisfied with their residences during the pandemic (4%) (Figure 2). The results show that participants are as satisfied with their residences during the pandemic as they were before the pandemic. However, fifty-two participants were very satisfied with their residences before the pandemic (28%), whereas thirty-seven participants were very satisfied with their residences during the pandemic (20%). The majority of the participants who were satisfied with their residences before the pandemic are also satisfied with their residences during the pandemic (91%). Only eight percent of the participants who were satisfied with their residences before the pandemic are moderately satisfied with their residences during the pandemic. Only one percent of the participants who were satisfied with their residences before the pandemic are dissatisfied with their residences during the pandemic.

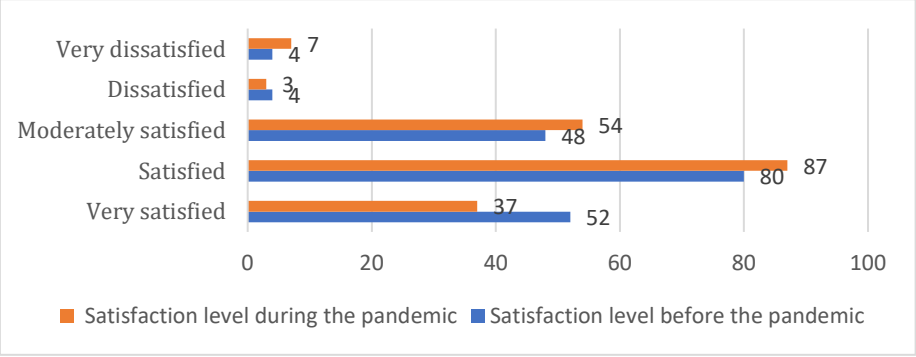

Figure 2. Residential satisfaction before and during the Pandemic

The "ownership status" affected participants' residential satisfaction levels before and during the pandemic. Thirty-one tenants were satisfied with their residences before the pandemic (59.6%; n=52), whereas 18 tenants were satisfied with their residences during the pandemic (54.6%; n=33). Eighty-eight homeowners were satisfied with their residences before the pandemic (75.9%; n=116), whereas 58 homeowners were satisfied with their residences during the pandemic (81.6%; n=71). Six

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participants living in family property were satisfied with their residences before the pandemic (60%; n=10), whereas five participants living in family property were satisfied with their residences during the pandemic (71.4%; n=7). Seven participants living in public housing were satisfied with their residences before the pandemic (70%; n=10), whereas six participants living in public housing were satisfied with their residences during the pandemic (85.7%; n=7) (percentages are based on "very satisfied" and "satisfied" responses) (Table 7). The "total square meter" affected participants' residential satisfaction levels before and during the pandemic. The bigger the residences, the more satisfied the participants were with them. The bigger the kitchen, the more satisfied the participants were with it (Table 8).

Table 7. The Effect of Ownership Status on Residential Satisfaction before and during the Pandemic

Residential Satisfaction before the Pandemic						
Ownership Status	Very Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied	Total
Homeowner	40 34.5%	48 41.4%	25 21.6%	2 1.7%	1 %0.9	116 100%
Tenant	9 17.3%	22 42.3%	16 30.8%	2 3.8%	3 %5.8	52 100%
Family Property	1 10.0%	5 50.0%	4 40.0%	0 0.0%	0 %0.0	10 100%
Public Housing	2 20.0%	5 50.0%	3 30.0%	0 0.0%	0 %0.0	10 100%
Residential Satisfaction during the Pandemic						
Ownership Status	Very Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied	Total
Homeowner	17 23.9%	41 57.7%	12 16.9%	0 0.0%	1 1.4%	71 100%
Tenant	6 18.2%	12 36.4%	12 36.4%	1 3.0%	2 6.1%	33 100%
Family Property	1 14.3%	4 57.1%	2 28.6%	0 0.0%	0 0.0%	7 100%
Public Housing	0 0.0%	6 85.7%	1 14.3%	0 0.0%	0 0.0%	7 100%

Table 8. The Effect of Total Meter Square on Residential Satisfaction before and during the Pandemic

Residential Satisfaction before the Pandemic						
Total Meter Square	Very Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied	Total
51-100 m2	0 0.0%	6 35.3%	6 35.3%	2 11.8%	3 17.6%	17 100%
101-150 m2	23 22.3%	47 45.6%	30 29.1%	2 1.9%	1 1.0%	103 100%
151-200 m2	19 38.0%	21 42.0%	10 20.0%	0 0.0%	0 0.0%	50 100%
201-250 m2	3 33.3%	4 44.4%	2 22.2%	0 0.0%	0 0.0%	9 100%
+250 m2	7 77.8%	2 22.2%	0 0.0%	0 0.0%	0 0.0%	9 100%

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Residential Satisfaction during the Pandemic						
Total Meter Square	Very Satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied	Total
51-100 m2	0 0.0%	2 28.6%	2 28.6%	0 0.0%	3 42.9%	17 100%
101-150 m2	11 15.3%	40 55.6%	20 27.8%	2 1.4%	0 0.0%	72 100%
151-200 m2	8 27.6%	17 58.6%	4 13.8%	0 0.0%	0 0.0%	29 100%
201-250 m2	3 50.0%	2 33.3%	1 16.7%	0 0.0%	0 0.0%	6 100%
+250 m2	2 50%	2 50%	0 0.0%	0 0.0%	0 0.0%	4 100%

Participants were asked why they were moderately satisfied, dissatisfied, or very dissatisfied with their residences before and during the pandemic. Figure 3 shows the results. Participants' residential satisfaction levels were adversely affected by various factors: the relationship level of the rooms, the need for a garden, the lack of a view, the number and size of the balcony/patio, the number of living rooms and bathrooms, and the size of the rooms. Participants were dissatisfied with their residences also because their residences needed repair and were unhappy with their neighborhoods. The lack of adequate storage area and connection with the outdoors did not affect participants' residential satisfaction levels. Participants were highly dissatisfied with poor housing planning and the lack of noise isolation, ventilation, daylight, and flexible space and equipment. However, they were less dissatisfied with these problems during the pandemic than before the pandemic.

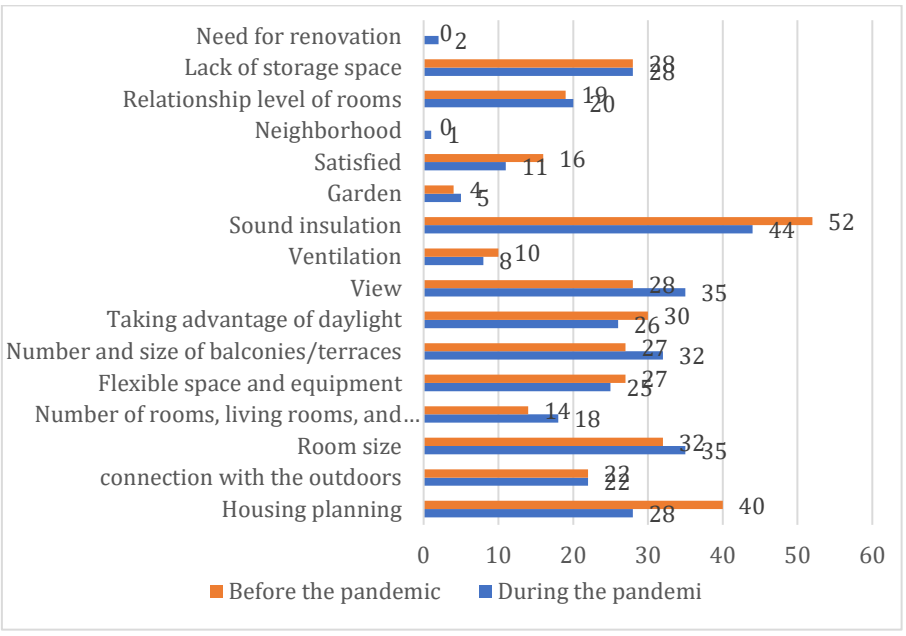

Figure 3. The reasons why participants are dissatisfied with their residences during the pandemic

The results showed that participants were less satisfied with their residences during the pandemic than they were before the pandemic. Of the participants who were very satisfied with their residences before the pandemic, 35.9% were satisfied, and 5.1% were moderately satisfied with their residences during the pandemic. Of the participants who were

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satisfied with their residences before the pandemic, 12.1% were moderately satisfied, and 1.7% were dissatisfied with their residences during the pandemic (Table 9).

Table 9. Residential Satisfaction Levels before and during the Pandemic

Residential Satisfaction Levels before the Pandemic	Residential Satisfaction Levels during the Pandemic						
		Very satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very Dissatisfied	Total
	Very satisfied	23 59.0%	14 35.9%	2 5.1%	0 0%	0 0%	39 100%
	Satisfied	1 1.7%	49 84.5%	7 12.1%	1 1.7%	0 0%	58 100%
	Moderately Satisfied	0 0%	0 0%	17 100%	0 0.0%	0 0.0%	17 100%
	Very Dissatisfied	0 0%	0 0%	1 25.0%	0 0.0%	3 75.0%	4 100%
	Total	24 20.3%	63 53.4%	27 22.9%	1 0.8%	3 2.5%	118 100%

Participants were asked how they spent their time indoors, except working, during the pandemic. Most participants stated that they cooked during the pandemic (83%), indicating that they use the kitchen very often during the pandemic. The second most common action performed by participants was cleaning (70.9%), suggesting that they pay more attention to their hygiene and therefore devote more time to cleaning. These findings support the results regarding the most commonly used rooms. The marital status affected participants' leisure time activities. Most single participants spent their time on self-care (71%), whereas only 30% of the married participants spent their time on self-care. More than half the married participants spent their time cooking (53.8%). However, only six percent of the single participants spent their time cooking.

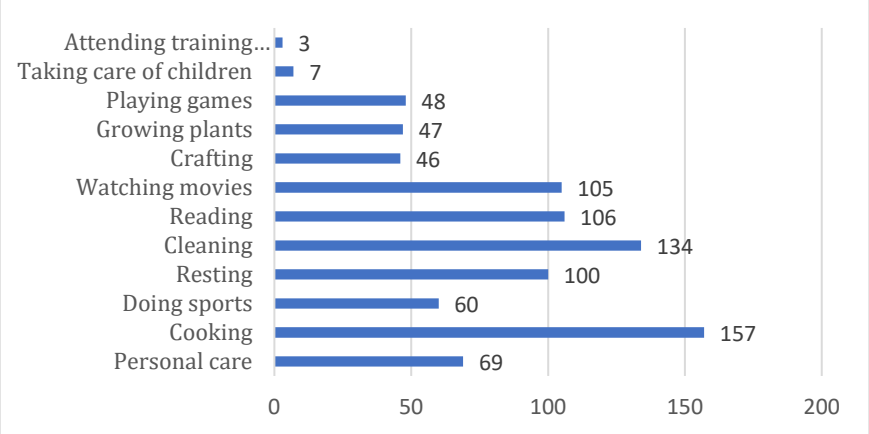

Figure 4. Most Common Activities during the Pandemic

Participants were asked what modifications they needed to make to their residences during the pandemic. Less than half the participants stated that they did not need to modify their residences (45%). However, participants noted that they needed to move the furniture around

(35.4%), use the rooms for other purposes (31.2%), buy new furniture (16.4%), use furniture for other purposes (15.3%), or merge/separate spaces (9%). Very few participants remarked that they were considering buying another modem, growing plants, painting the walls, replacing the wallpaper, and decorating.

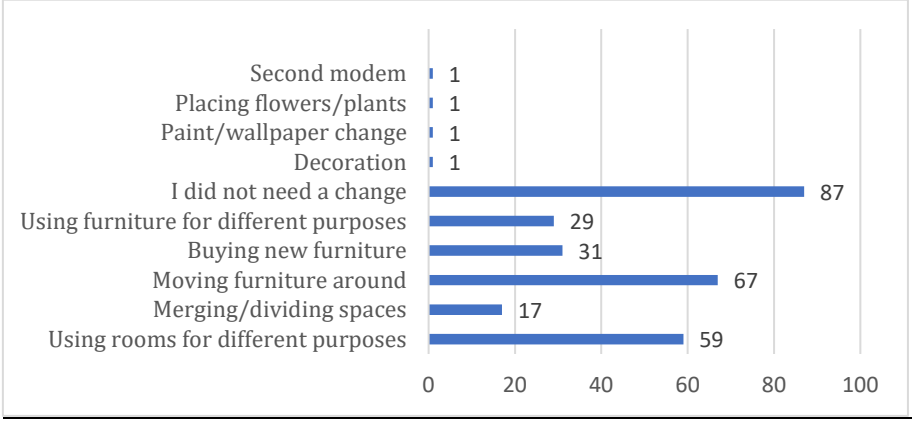

Figure 5. Indoor Modifications

Participants were asked, "Can you state the reasons for the modifications you have made to your residence, please?" The most common reason for the modifications was creating a study or a workspace. Especially those who had more than one child and/or worked from home needed multiple studies/workspaces in their residences. Some participants stated that they needed to repurpose some rooms and move the furniture around to create a classroom-like environment for their children receiving distance education. Those who had more than one child repurposed their kitchens, living rooms, and bedrooms to provide each family member an independent study or workspace.

Some participants made modifications to their residences to have better Internet access. For example, they either moved the furniture around or bought new ones.

Participants noted that they made modifications to their residences for other reasons. For example, the pandemic identified new needs and priorities. They were bothered by the furniture they did not use. Their residences were too small, or their furniture was too old. They stated that they moved their furniture around or bought new ones to maximize the space in their residences.

Some participants remarked that they made modifications to their residences for a change because they were bored. Some others made modifications because they wanted to feel good or turn their studies into fun settings for their children receiving distance education. Some participants noted that they modified their residences even before the pandemic because it made them happy.

Participants were asked, "What are the space and building elements that you have needed most in your residence since the pandemic began?" They were allowed to choose more than one option. Participants needed gardens (43.9%), spaces for sports (40.2%), studies/workspaces (38.6%), hobby rooms (27.5%), balconies (25.4%), cellars (17.5%),

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patios (16.4%), flexible space and equipment (14.8%), or windows (9%). Participants mostly needed gardens, balconies, patios, and windows to contact the outside world during the pandemic. Secondly, they needed spaces for sports because they wanted to lead more active lives during the pandemic. Thirdly, they needed studies/workspaces and hobby rooms because they ended up spending much time indoors during the pandemic. The homeowners needed gardens the most (65%), while the tenants needed studies (37.5%) and hobby rooms (25%) the most.

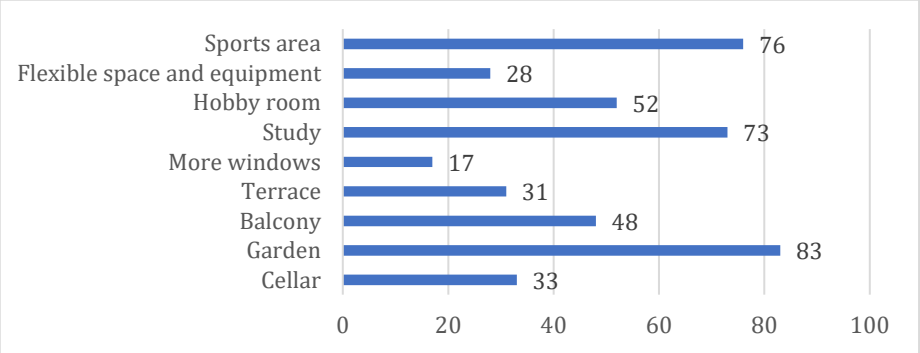

Figure 6. Space and Building Elements

Participants were asked why they needed those spaces and building elements. Participants stated that they needed gardens because they spent much time indoors during the pandemic, and therefore, wanted to have some sort of contact with the outside world. They also noted that their children wanted to go out and take walks. They also needed to get enough sunlight, work the land, socialize, and have fresh air. Secondly, participants needed spaces for sports because they wanted to have fun at home and stop gaining weight. Thirdly, they needed studies/workspaces because parents ended up working from home while children ended up receiving distance education. Participants remarked that they needed quiet spaces to study or work because their dinner tables were full of stuff (laptops, pencil boxes, books, notebooks, etc.), which demotivated them. They noted that they needed extra studies/workspaces in their residences because both they and their children had to use the Internet at the same time, and therefore, the current studies/workspaces were not enough. In addition, they felt uncomfortable because they sometimes had to turn on their cameras, resulting in others seeing their rooms, which was a privacy concern. These results show that residences need studies. Participants also stated that they needed hobby rooms. Therefore, residences should have hobby rooms to enjoy their time and feel mentally relaxed during the pandemic. Participants noted that they needed more balconies, patios, and windows because they wanted to enjoy their time watching outside and relaxing. They needed balconies also because they wanted to disinfect their clothes and groceries there. They also needed cellars because they went shopping less often and bought in bulks when they did during the pandemic. Moreover, they also wanted to keep hygiene products in the cellar.

Participants needed flexible spaces and accessories to create more space for themselves because they had small residences with too many people living in at the same time.

EVALUATION AND CONCLUSION

The results show that lockdowns, distance education, and flexible working conditions have changed the way housing users have lived in their residences. Since the pandemic began, they have spent more time indoors, used the rooms longer, and performed different activities in different rooms. All these changes have brought about new needs. Housing users have made or considered making some modifications to their residences and encountered some problems during the process. The following are results and recommendations regarding residential designs:

Since the pandemic, housing users have been using and repurposing their residential spaces more often. They spent most of their time in their living rooms before the pandemic. However, they have been spending most of their time in their kitchens since the pandemic. They have repurposed their kitchens and used them for purposes other than eating and cooking. Therefore, kitchens should be designed so that they should be big enough to allow residents to perform different tasks in them.

Since the pandemic, housing users have been using and repurposing their living rooms more often. Therefore, living rooms should be designed so that they should allow both parents and children to perform different tasks in them at the same time.

Since the onset of the pandemic, housing users have been using their bathrooms and toilets more often for hygiene reasons. Therefore, residences should have more than one bathroom and toilet, which should be large enough to allow users to store hygiene products in.

The more time housing users spend in their residences, the more they need to contact the outside world. Therefore, they need gardens, patios, and balconies. Therefore, residences should have spatial constructs, such as gardens, patios, and balconies, which provide indoor-outdoor interactions.

Housing users need studies/workspaces the most because both parents and children spend much time indoors working and studying at the same time, causing a cacophony of noise. Outside noises are also a problem for people because they distract them. Therefore, noise control is a parameter that should be addressed in housing designs.

Housing users have repurposed their living rooms, kitchens, and bedrooms and turned them into quiet and comfortable studies/workspaces for each family member since the onset of the pandemic. Therefore, architects and interior architects should design more workspaces for residences or design living rooms, kitchens, and bedrooms so that residents can use them for other purposes.

Housing users need new accessories in their residences because they have been spending more time indoors since the pandemic, and

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therefore, they want to be happy and comfortable and want to change their rooms into fun and attractive spaces for family members. Furniture should be designed so that it can be used for different purposes.

Housing users need to exercise and pursue their hobbies because they spend much time indoors during the pandemic. Therefore, architects and interior architects should design sports areas and hobby rooms for residences.

The results show that housing users have needed more rooms or larger rooms in their residences because they have encountered problems in terms of auditory and visual privacy since the onset of the pandemic. These results indicate that architects and interior architects should adopt flexible design approaches to respond to housing users' needs and problems. Providing the relationship between the user, the action, and the space without major changes is only possible with design flexibility. Users should be provided with simple and efficient spatial setups and solutions that meet their needs with little intervention.

Residences should consist of removable or movable partition elements that allow users to divide, enclose, and modify spaces that serve different functions that users intend to perform indoors during the pandemic. In addition, multi-purpose modular system equipment allows different spatial setups and facilitates flexible planning.

New residences should be based on flexible and adaptable housing plans. Architects and interior architects should prefer structural elements to create flexible spaces that serve different purposes. Architects and interior architects should correctly determine spatial organization characters, spatial dimensions, and carrier system characteristics at the design stage. They should design modifiable and immutable spaces. Flexible planning can be possible with an approach that separates those spaces from each other. In addition, creating neutral spaces that residents can use according to their needs is extremely important for flexibility.

Therefore, architects and interior architects should consider these conditions in new housing designs and adopt flexible approaches to design larger residences. Using flexible building elements and reinforcements helps existing residences to adapt to changes. In this way, users can create studies/workspaces, personal spaces, and hobby rooms in their residences.

The pandemic is reshaping the needs of housing users. The results of the present study will contribute to the plans of new projects or existing residences.

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Resume

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