



An Analysis of User Experiences in Urban Green Public Spaces to Formulate More Inclusive Design Principles

Mohammad Imran^{1*}, Martinus Bambang Susetyarto²

¹Universitas Negeri Gorontalo, Indonesia

²Universitas Trisakti, Jakarta, Indonesia

Corresponding Author: Mohammad Imran, imransains02ars@gmail.com

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ABSTRACT

Urban green public spaces play a vital role in environmental quality and social life, yet their design often prioritizes physical and aesthetic aspects while overlooking diverse user experiences, limiting inclusivity across age, gender, and social groups. This study analyzes user experiences of urban green public spaces to inform more inclusive design principles in architecture and urban design. Using a mixed-methods approach, qualitative data were collected through semi-structured interviews with 10 purposively selected users, while quantitative data were obtained from a survey of 100 respondents across two sites in the Minahasa Peninsula (North Minahasa and Tondano). Data were analyzed using thematic analysis and descriptive statistics. The findings indicate that user comfort, accessibility, and sense of safety are shaped not only by physical elements but also by circulation quality, spatial legibility, and design flexibility for formal and informal activities. The study demonstrates that a user experience-based approach reveals overlooked dimensions of inclusivity and proposes contextual, applicable design principles for developing more equitable, responsive, and sustainable urban green public spaces.

INTRODUCTION

Urban green public spaces are increasingly recognized as a key element in supporting environmental sustainability and the quality of life of urban communities in various parts of the world. Various international studies show that green spaces not only function as an ecological element, but also play an important role in improving the mental health, social cohesion, and psychological well-being of urban communities (Kabisch et al., 2021). Along with increasing urban density and development pressures, green public spaces are becoming an increasingly complex and diverse arena for social interaction. However, green public space design practices still place a lot of emphasis on visual and physical aspects, while the user experience dimension is often overlooked.

In the study of architecture and urban design, the quality of green public spaces is generally evaluated through objective indicators such as space area, availability of facilities, and spatial affordability. This approach is considered not to be able to fully capture the subjective dimension of user experience which includes a sense of security, comfort, and social connectedness (Peters et al., 2021). A number of studies show that public spaces that physically meet standards are not necessarily felt inclusive by all community groups. This indicates the limitations of the evaluation approach that is still oriented to physical objects, rather than to user experience.

The user experience-based approach is starting to gain traction in contemporary green public space design discourse. This approach places the user as an active subject who shapes the meaning of space through everyday social practices (Shaftoe, 2020). Nonetheless, most research still focuses on measuring user perception or satisfaction levels. The relationship between the empirical findings of user experience and the formulation of systematic and applicable design principles is still relatively limited, thus creating a conceptual gap in design practice.

The research gap is even more pronounced when viewed from the geographical context. The literature on the user experience of green public spaces is dominated by studies in developed countries with relatively stable urban planning systems. Meanwhile, studies in the Global South region are still limited, both in terms of the number and depth of user experience analysis (Rigolon et al., 2021). In fact, differences in social, cultural, and economic contexts have the potential to produce significantly different dynamics of space use. The emptiness of this study shows the need for contextual research that is able to expand the global perspective on the design of inclusive green public spaces.

In the Indonesian context, green public spaces face challenges in the form of limited land, rapid urban growth, and high diversity of users. Recent studies show that many green public spaces in Indonesian cities are not yet fully friendly to vulnerable groups, especially in terms of accessibility and a sense of security (Permatasari et al., 2022). In the Minahasa Peninsula region, green public spaces have an important social function as a space for cross-community interaction. However, user experience-based evaluations in this region are still very limited, so the potential for space inclusivity has not been explored optimally.

Based on these conditions, this study explicitly aims to analyze the experience of urban green public space users as the basis for the formulation of more inclusive design principles in the context of architecture and urban design. This research focuses on the dimensions of comfort, accessibility, and a sense of security experienced by diverse groups of users. Using a mixed methods approach, this study seeks to integrate qualitative data on user experience with quantitative findings of space usage patterns. This goal is expected to produce a comprehensive and contextual understanding of the inclusivity of green public spaces.

The theoretical contribution of this research lies in strengthening the user experience approach as an analytical framework in the study of green public spaces, which has been dominated by physical and normative approaches. This research expands the concept of inclusive design by placing the subjective experience of the user as the foundation for the formulation of design principles. Practically, the findings of this study are expected to be a reference for architects, urban planners, and policymakers in developing more equitable and responsive green public spaces. Thus, this research contributes to the development of sustainable and inclusive urban green public space design practices.

THEORETICAL REVIEW

Urban Green Public Spaces and User Well-Being

Urban green public spaces have long been understood as important infrastructure in supporting the welfare of urban communities. Contemporary research shows that the existence of green spaces contributes significantly to physical and mental health, especially through stress reduction, increased physical activity, and psychological recovery of users (Markevych et al., 2020). In addition to individual benefits, green public spaces also serve as a medium for shaping social interactions that strengthen the cohesion of urban communities. However, these benefits are not automatically felt equally by all groups of users, depending on how the space is designed and managed.

Follow-up studies confirm that the quality of user experience in green public spaces is influenced by more than just the presence of vegetation or basic facilities. Factors such as the readability of the space, visual comfort, and sustainability of social activities play a role in determining the extent to which green spaces actually support collective well-being (Liu et al., 2021). Thus, the understanding of green public spaces needs to shift from a quantitative approach based on area to a qualitative approach that emphasizes the user experience holistically.

Hypothesis 1 (H1): The quality of user experience of green public spaces has a positive effect on the level of user's physical, mental, and social well-being.

User Experience as an Analytical Framework in Urban Design

The user experience approach is increasingly being adopted in urban design studies in response to the limitations of evaluation based solely on physical indicators. Within this framework, space is understood as the result of a dynamic interaction between spatial elements and the social practices of

everyday users (Gehl & Svarre, 2021). User experience encompasses the emotional, cognitive, and social dimensions that shape perceptions of the quality and inclusivity of public spaces. Therefore, user experience becomes an important lens to uncover how space is perceived and interpreted by different groups.

Empirical research shows that the mismatch between physical design and the actual user experience often leads to public spaces being underutilized or even avoided by certain groups (Sauter & Huettenmoser, 2022). This condition shows that the success of green public spaces is not only determined by technical standards, but by their ability to respond to the real needs of users. Thus, the user experience-based approach offers an analytical framework that is more sensitive to social and cultural diversity in urban contexts.

Hypothesis 2 (H2): The user experience-based design approach has a significant effect on the perception of quality and inclusivity of green public spaces.

Inclusive Design Principles in Public Green Spaces

Inclusive design in green public spaces aims to ensure that spaces can be accessed, used, and felt safe by all groups of people without discrimination. This concept evolved from criticism of design practices that tend to accommodate dominant users and ignore vulnerable groups such as the elderly, children, women, and people with disabilities (Imrie & Luck, 2021). Inclusive design focuses not only on physical access, but also on belonging, psychological comfort, and social legitimacy in the use of space.

Recent studies emphasize that inclusive design principles should be contextual and responsive to local usage patterns (Foth et al., 2023). A universal approach that does not consider social and cultural contexts often fails to create a truly inclusive space. Therefore, the principles of inclusive design need to be formulated based on real user experience, so as to be able to bridge the normative value of design with social practices in the field.

Hypothesis 3 (H3): The application of inclusive design principles has a positive effect on the level of acceptance and use of green public spaces by diverse user groups.

Accessibility, Safety, and Spatial Flexibility as Key Experience Dimensions

Accessibility, sense of security, and flexibility of space are key dimensions that consistently emerge in studies of green public space user experience. Accessibility is not only related to the ease of access to the space, but also the ease of movement and activity in it for various groups of users (Vale et al., 2022). A sense of security, both physically and psychologically, affects the duration of the visit and the intensity of the use of green public spaces. Perceptions of insecurity are often the main limiting factor for vulnerable groups.

In addition, the flexibility of the space allows users to carry out a wide range of formal and informal activities simultaneously. Flexible green public spaces tend to be more adaptive to changing social and cultural needs of the community (Francis et al., 2024). The literature shows that the integration of these three dimensions simultaneously contributes significantly to the perception of inclusivity and the quality of user experience. However, the empirical

relationship between these dimensions still requires further testing, especially in the context of developing cities.

Hypothesis 4 (H4): The accessibility, sense of security, and flexibility of spaces have a significant effect on the inclusive experience of green public space users.

METHODOLOGY

Types and Approaches to Research

This study uses a mixed methods approach with a convergent parallel design, namely qualitative and quantitative data collection is carried out simultaneously, analyzed separately, and integrated at the stage of interpretation of results. In this design, qualitative and quantitative data have equal weight and complement each other in explaining the phenomenon being studied. According to Fetters et al. (2020), the convergent parallel approach allows researchers to integrate the depth of qualitative understanding with broader quantitative patterns. This approach was chosen to obtain a comprehensive understanding of the user experience of green public spaces, both in terms of the depth of the meaning of the experience and the general pattern that can be generalized in a limited way. Convergent parallel design is considered effective in architectural and urban design research that demands integration between empirical findings and contextual interpretations of spatial experiences (Plano Clark & Ivankova, 2022).

Research Location and Spatial Context

The research was carried out on two urban green public spaces in the Minahasa Peninsula area, North Sulawesi, namely one location in North Minahasa Regency and one location in the urban area of Tondano. The selection of the location is based on consideration of the representativeness of the function of green public spaces as recreational spaces, social interactions, and informal activities of the community with diverse user characteristics. In the context of contemporary urban planning, the importance of considering local social and geographical contexts in the study of public space is also emphasized by Cilliers and Timmermans (2021). In addition, this area has relatively not been studied much in the study of the experience of green public space users, so it has the potential to contribute contextually novelty in urban design studies in the Global South region.

Population, Sampling Techniques, and Research Participants

The study population included all active users of green public space at both study sites. For qualitative data, the study involved 10 informants who were selected using purposive sampling techniques, with the criteria of representation of the main user group of public spaces. The composition of the informants consisted of: (1) three general adult users, (2) two elderly, (3) two female regular users, (4) two teenagers, and (5) one informal trader around the location. The determination of the number of informants is based on considerations of data depth and the principle of thematic saturation in qualitative research, as

described by Guest et al. (2020) and reaffirmed in a recent methodological study by Hennink and Kaiser (2022).

For quantitative data, the study involved 100 respondents who used green public space who were selected using non-probability sampling with an accidental sampling approach. This technique was chosen due to the unavailability of a formal sample framework and the high mobility of public space users. In exploratory urban public space research, this sampling approach is considered relevant to capture the variation in actual user experience in the field (Taherdoost, 2020). The number of respondents was considered sufficient for descriptive statistical analysis and exploration of differences in experiences between user groups.

Data Collection Techniques and Instruments

Qualitative data were collected through semi-structured interviews and walking interviews. Semi-structured interviews are used to explore user perceptions regarding the comfort, accessibility, sense of security, and flexibility of the space. To strengthen the connection between the narrative of the experience and the actual spatial conditions, some interviews were conducted in the form of walking interviews. This method allows researchers to directly observe the user's interaction with the physical and social elements of the space, as recommended in mobility-based spatial experience research (Evans & Jones, 2021).

Quantitative data was collected using a five-point Likert-scale-based structured questionnaire that measured users' perceptions of space quality, accessibility, sense of security, and inclusivity. The questionnaire instrument was developed by adapting the evaluation indicators of green public spaces from previous research, then adjusted to the local context of the research. The content validity test was carried out through expert judgment, while the internal reliability of the instrument was tested using Cronbach's Alpha coefficient, following the measurement standards in social and built environment research recommended by Hair et al. (2022).

Research Implementation Procedure

The research procedure is carried out gradually and systematically. The initial stage includes literature study, preliminary observation of the location, and preparation and initial test of research instruments. The next stage is the collection of qualitative and quantitative data carried out in parallel at both research sites, in accordance with the principle of convergent parallel design (Plano Clark & Ivankova, 2022). After all the data is collected, interview transcription, qualitative data encoding, and questionnaire data processing are carried out. The final stage of the research is focused on the integration of the results of the analysis to formulate inclusive design principles based on the user experience of green public spaces.

Data Analysis Techniques

Qualitative data is analyzed using thematic analysis, which includes open coding processes, theme grouping, and interpretation of user experience

patterns. This analysis is assisted by NVivo software to improve the consistency, transparency, and traceability of the qualitative data analysis process. Quantitative data were analyzed using descriptive statistics and simple comparisons between user groups with the help of IBM SPSS software. The integration of qualitative and quantitative data is carried out at the interpretation stage through the process of triangulation and reinforcement of findings, as recommended in cutting-edge mixed methods research practices (Fetters et al., 2020).

RESERACH RESULTS

Space Comfort as a User's Spatial Experience

Based on the results of the interviews, the comfort of green public spaces is understood by users as a comprehensive and sustainable spatial experience, not limited to the existence of physical facilities alone. Adult users emphasize that the clarity of the circulation path makes them feel calmer and at home because they don't need to avoid each other or feel distracted by the movements of other users *"If the path is clear, I feel more at home. There is no need to avoid each other or be confused about which way to go."* (D-01, October 2025 interview). This perception is in line with the experience of the elderly who view the readability of spatial planning as an important factor for maintaining physical comfort, especially in reducing fatigue while walking *"If the layout is neat and easy to read, I don't get tired quickly. The bench is also clearly visible from afar."* (L-02, October 2025 interview). Regular female users add that comfort is also related to the visual aspect and the less crowded seating arrangement, allowing them to go on activities for longer without feeling pressured *"The seats are nice if they are not too crowded. I can sit for a long time without feeling disturbed."* (P-01, October 2025 interview). Meanwhile, adolescents interpret comfort as freedom of movement and activity without rigid space limitations *"It's comfortable if you can walk, sit, or gather without feeling like the space is narrow"* (R-02, October 2025 interview). Overall, the user narrative suggests that comfort is formed from the interaction between clear circulation, space readability, and the flexibility of element arrangements, creating a space experience that feels organized but not restrictive.

These qualitative findings show that the comfort of green public spaces is a relational construction of experience between users and spatial configurations. Users do not judge comfort separately based on one specific element, but rather through the alignment between movement, orientation, and facility placement. Spaces that do not have conflicts between circulation zones and activity zones tend to be perceived as more comfortable, as they allow users to carry out activities naturally without visual or physical distractions.

The results of the quantitative analysis show a relatively high tendency for the perception of comfort, especially in indicators related to spatial quality.

Table 1. Descriptive Statistics of Spatial Comfort Perception (n = 100)

Indicator	Red Hours of deviation	
Circulation clarity	4.18	0.61
Spatial readability	4.05	0.66
Seating layout comfort	3.97	0.72
Availability of physical facilities	3.54	0.81

The highest average values were found in the indicators of circulatory clarity and spatial readability, which showed that users generally felt easy to move and understood the structure of the space. In contrast, the physical facility availability indicator had the lowest average value with the highest standard deviation, indicating a variation in the user experience of the available facilities. This pattern reinforces the qualitative finding that comfort is more influenced by the quality of spatial planning than the number of facilities. The integration of qualitative and quantitative findings confirms that the comfort of green public spaces is the result of the quality of spatial design that supports the flow of movement, readability, and flexibility of space use, not just the completeness of physical elements.

Accessibility as an Inclusive Space Experience

The accessibility of green public spaces is perceived by users as the ability of the space to be used independently, safely, and without confusion. The elderly highlighted that long, uneven, or different elevation paths are the main obstacles in accessing space "For me who is old, the path is a bit difficult if it is too long or uneven" (L-01, October 2025 interview). Adult users view accessibility from an efficiency perspective, which is the ease of entering and exiting the area without having to turn far "Entering this area is easy, you don't need to go far. That's what makes me come often." (D-02, October 2025 interview). Different experiences were conveyed by female regular users who emphasized aspects of psychological comfort, especially visual openness and lighting "If the access is open and not dark, I am more comfortable coming by myself" (P-02, October 2025 interview). Meanwhile, informal traders view accessibility as a factor that directly affects the intensity of visits and the sustainability of economic activities "If people enter easily, automatically there will be more buyers" (P-03, October 2025 interview). This narrative shows that accessibility is not interpreted uniformly, but rather very contextual according to the physical conditions, roles, and needs of the user.

Qualitatively, accessibility emerges as a dimension of space inclusivity that greatly determines who can use the space optimally. Small barriers in lane design can have a significant impact on certain groups, especially the elderly and women, so accessibility is not only technical but also related to the user's sense of security and independence.

The difference in accessibility perception between user groups is evident in the results of the descriptive analysis.

Table 2. Mean Accessibility Scores by User Group (n = 100)

<u>User Group Mean Hours of deviation</u>		
Adults	4.05	0.63
Elderly	3.41	0.78
Women	3.89	0.69
Youth	3.97	0.65

The older group showed the lowest average scores with the highest standard deviations, which indicated the most diverse and less positive accessibility experiences. These findings are consistent with a qualitative narrative that highlights physical barriers as a key issue in space use.

The integrated results confirm that accessibility is a fundamental aspect in creating inclusive green public spaces. The disparity in perception between user groups shows the need for a more responsive design to the diversity of user abilities and needs.

Sense of Security and Flexibility of Space in Supporting Activities

A sense of security is perceived by users as a condition that arises from social interaction and flexibility in the use of space. Adult users associate a sense of security with the existence of diverse activities and a quiet atmosphere *"If it's crowded and there are a lot of activities, it feels safer"* (D-03, October 2025 interview). This perception is reinforced by women regular users who emphasize the importance of space openness and the presence of others as a form of natural social surveillance *"I feel safer when there are a lot of people and the space is open"* (P-04, October 2025 interview). Teens view the flexibility of space as a factor that creates a lively and relaxed atmosphere *"If the space can be used in a variety of ways, the atmosphere is more lively"* (R-01, October 2025 interview). A similar view was also conveyed by informal traders who saw that the diversity of activities helped maintain environmental security *"If there are many activities, the environment will be more maintained"* (P-05, October 2025 interview). Overall, a sense of security is understood as a result of social dynamics facilitated by flexible and adaptive spatial design.

These findings suggest that a sense of security does not depend solely on physical elements or formal safeguards, but rather on the ability of space to encourage social presence and interaction. Rigid and mono-functional spaces tend to be perceived as less safe due to the lack of natural activity and supervision.

The relationship between space flexibility and a sense of security is also reflected in the quantitative results.

Table 3. Perceived Safety Scores Based on Spatial Use Pattern (n = 100)

<u>Spatial Use Pattern Mean Hours of deviation</u>		
Mixed-use areas	4.16	0.58
Single-use areas	3.44	0.74

Areas with mixed functions had higher average values of sense of security perception than areas with single functions. This shows that the flexibility of space use contributes positively to the user's sense of security through increased social activities. The integration of the findings confirms that space flexibility is an important strategy in building a sense of security in green public spaces. Designs that allow for diverse activities simultaneously have proven to be more effective in creating a lively, supervised, and inclusive environment.

DISCUSSION

The results show that the quality of the experience of green public space users contributes significantly to the physical, mental, and social well-being of users. These findings consistently corroborate Hypothesis 1 (H1), which states that a positive space experience not only improves comfort, but also promotes social engagement as well as the psychological balance of users. Spatial comfort shaped by the clarity of circulation, readability of space, and flexibility of use, as also noted in a study of contemporary urban green spaces (Houlden et al., 2021), has been shown to support light physical activity, mental relaxation, and sustained social interaction. Thus, the quality of the space experience has a substantive role in shaping the multidimensional well-being of green public space users.

Theoretically, these findings are in line with contemporary salutogenic approaches in the study of the built environment that emphasize the role of space in strengthening health resources through a sense of order, control, and meaning. Cutting-edge international research shows that urban green spaces designed based on user experience are able to lower stress levels and improve mood, while strengthening social cohesion in congested urban contexts (Markevych et al., 2020). Within this framework, the user experience cannot be reduced to mere aesthetic satisfaction, but rather is understood as a mediating mechanism between the character of space design and psychosocial health. Therefore, Hypothesis 1 (H1) gains strong empirical support both theoretically and contextually.

This research also broadens the understanding by showing that user welfare is greatly influenced by the quality of the relationship between users and the spatial structure of the space. When space is intuitively readable and used without barriers, users tend to feel more comfortable staying longer and building social attachment, as shown in a study of the relationship between the form of space and user behavior (Zuniga-Teran et al., 2021). This condition encourages green public spaces to function as part of daily routines, not just transit spaces. These findings confirm that user experience serves as a connecting mechanism between the quality of green public space design and overall user well-being.

In addition, the results of the study clearly support Hypothesis 2 (H2) which states that a user experience-based design approach has a significant effect on the perception of quality and inclusivity of green public spaces. Users judge the quality of the space not only from the presence of physical elements, but from how those elements work functionally and relationally in supporting activities

and movement. These findings suggest that space quality is experience-centric and contextual, not purely technical, as emphasized in the human-centered design approach to public space planning (Stevens & Ambrey, 2020). Thus, the perception of space quality emerges as a result of dynamic interaction between users and the built environment.

Furthermore, this study shows that user experience is a more sensitive indicator of space quality than evaluation based on physical elements alone. The perception of the readability of the space, smooth circulation, and flexibility of use is proven to be more decisive in quality assessment than the number of facilities available. These findings confirm international research that shows that public spaces are often underutilized when their design is not aligned with the real user experience (Mehta, 2020). Thus, Hypothesis 2 (H2) emphasizes the importance of a paradigm shift from object-based design to experience-based design.

The findings of the study also support Hypothesis 3 (H3) which states that the application of inclusive design principles has a positive effect on the level of acceptance and use of green public spaces by diverse user groups. Differences in the perception of spatial experiences, particularly between the elderly and other age groups, indicate that space design is not yet fully inclusive. This suggests that inclusivity is the result of conscious and user experience-based design decisions, rather than an automatic consequence of the openness of space, as also affirmed in contemporary inclusive public space studies (López-Bonilla et al., 2023). Thus, these findings reinforce the urgency of explicitly applying inclusive design principles.

Furthermore, the results of the study consistently support Hypothesis 4 (H4), which states that accessibility, sense of security, and flexibility of space have a significant effect on the inclusive user experience. Accessibility is not only related to physical convenience, but also to the user's confidence in navigating the space, while the sense of security is more influenced by the presence of social activities and the flexibility of space use than by formal security alone (Francis et al., 2021). Nonetheless, the limitations of this study lie in the scope of location and the single-time portrait approach, so further research is recommended using longitudinal design and spatial context expansion to enrich the understanding of the relationship between spatial design and user inclusive experience.

CONCLUSION AND RECOMMENDATION

This study concludes that the quality of inclusive space is not solely determined by the completeness of physical and aesthetic elements, but also by how the space is experienced, read, and used by diverse users. The comfort, accessibility, sense of security, and flexibility of space have been proven to be key factors in shaping a sustainable user experience and contributing directly to physical, mental, and social well-being. The user experience-based design approach is able to uncover the dimension of inclusivity that is often overlooked in conventional design practices, especially related to the differences in needs between age groups, gender, and social backgrounds. Thus, this study emphasizes the importance of formulating green public space design principles

that are oriented to the real experience of users as the foundation for the development of more equitable, responsive, and sustainable urban public spaces in the context of architecture and urban design.

FURTHER STUDY

Future research is encouraged to deepen the exploration of inclusive public space quality by incorporating longitudinal and comparative studies across different urban contexts, scales, and cultural settings. Subsequent studies may also integrate mixed-method approaches that combine user experience data with quantitative environmental performance indicators, such as microclimate comfort, mobility patterns, and health outcomes, to strengthen the empirical basis of inclusive design evaluation. In addition, further research could focus on underrepresented user groups, including persons with disabilities, elderly populations, and marginalized communities, to better capture diverse experiential needs. Expanding the analytical framework to include digital tools, participatory design methods, and smart urban technologies would also provide valuable insights into how user-experience-oriented principles can be systematically embedded in the planning and design of sustainable and equitable green public spaces.

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