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Co-Design of a Public Space and the Implementation: Atakent (Car) Park

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Abstract

Citizen Design Science is a new co-design strategy for urban and architectural systems that improves the planning, design, management, and renewal of cities, urban habitats, and architectural structures, using active design tools through citizens' observation, experience, and local knowledge. The aim of this study is to describe how Atakent Car Park Area is transformed into a public space design and implementation through both digital and analog active design tools in the co-design process that includes citizens' spatial experiences, needs, and desires through the method of citizen design science. The objective indicators and subjective perception applied in the study were combined in the co-design process to implement an urban design project. The experimental collaborative urban design process is realized on a democratic platform based on the tendencies and expectations of the participants. Two conceptual urban design projects were prepared with design science data including 178 local citizens' wishes, needs, and suggestions about the area, and participating citizens were asked to vote for the project democratically in the urban space. The selected conceptual design project was transformed into an implementation project in the urban area.

Keywords: *Citizen science, citizen design science, co-design, participatory urban design, hierarchical clustering analysis.*

Kamusal Alanın Birlikte Tasarımı ve Uygulaması: Atakent (Oto) Park

Öz

Vatandaş Tasarım Bilimi, kentlerin, kentsel yaşam alanlarının ve mimari yapıların planlanmasını, tasarımını, yönetimini ve yenilenmesini geliştiren, vatandaşların gözlem, deneyim ve yerel bilgisi aracılığıyla aktif tasarım araçlarını kullanarak kentsel ve mimari sistemler için yeni birlikte tasarım stratejisidir. Bu çalışmanın amacı, vatandaş tasarım bilimi yöntemiyle, vatandaşların mekansal deneyimlerini, ihtiyaçlarını ve isteklerini içeren birlikte tasarım sürecinde hem dijital hem de analog aktif tasarım araçları aracılığıyla Atakent Otoparkı'nın kamusal alan tasarım ve uygulamasına nasıl dönüştüğünü anlatmaktır. Çalışmada uygulanan nesnel göstergeler ve öznel algı, birlikte kentsel tasarımda birleştirilerek bir kentsel tasarım projesi uygulanmıştır. Deneysel birlikte kentsel tasarım süreci, katılımcıların eğilimleri ve beklentileri üzerinden demokratik bir platformda gerçekleşmiştir. 178 yerel vatandaşın katılımıyla alana dair istek, ihtiyaç ve önerilerini içeren tasarım bilimi verileri ile iki konsept kentsel tasarım projesi hazırlanmış olup, katılımcı vatandaşların projeyi kentsel alanda demokratik biçimde oylamaları istenmiştir. Seçilen konsept tasarım projesi uygulama projesine dönüştürülerek kentsel alanda uygulanmıştır.

Anahtar kelimeler: *Vatandaş bilimi, vatandaş tasarım bilimi, birlikte tasarım, katılımcı kentsel tasarım, hiyerarşik kümeleme analizi.*

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1. Introduction

Standardized production, repetition, uniformity, monotony and similarity negatively affect our cities, neighborhoods, buildings and urban environments. There is a gap between industrially produced components of small-scale prototypes and buildings, urban environments and cities (Verebes, 2015). Alongside other societal challenges such as migration, poverty and wider cultural or political crises, ubiquitous standards, uniform production in the construction industry and permanent solutions that no longer apply, lead to anonymous and distant lives in cities.

The participation of residents and other stakeholders in urban planning and design processes is crucial to create inclusive, safe, flexible, and sustainable cities and human settlements (United Nations, 2015). In the pursuit of resilient cities, establishing relevant communities for the operation of the system from the grassroots level is necessary to ensure social sustainability. In contemporary urban planning and design, community participation is fundamentally viewed to achieve sustainable development and inclusive decision-making within the context of resilience (Erdem, 2022). When citizens actively engage in the processes of planning, design, and implementation, plans and designs will align more closely with the needs, interests, and expectations of stakeholders and citizens. Citizen participation in urban planning and design has the potential to enhance outcomes and support implementation by bringing together knowledge, expertise, and skills from diverse backgrounds, facilitating mutual learning and personal development among participants, fostering a sense of ownership over the outcomes, reaching consensus on solutions, and achieving better results through collaborative efforts.

Trends focusing on societal and individual needs are ideal for the principles of co-design, which encourage user participation in the design and production of solutions tailored for specific audience or the entire community (Ardito et al., 2012; Trischler et al., 2019). Although these practices may seem novel, they have been in use for over fifty years (Önder, 2003; Sanders & Stappers, 2008; Gül et al., 2016; Topay, 2020; Dilaver et al., 2022). Collaborative design research initiatives have been established in Europe since the 1970s. Users, despite not necessarily representing a specific discipline, have become a vital component of the co-design process. Sanders, an American academic and designer specializing in co-design and production, explores the evolution of designers' understanding of humanity. Unlike the customers and consumers of the 1980s, users began to be referred to as participants and co-creators in the 1990s (Sanders, 2005). Furthermore, starting from the 1990s, the concept of governance, as opposed to management, became widespread globally, partly influenced by the political crisis faced by representative democracy. Thanks to participatory techniques of the 2000s, people are invited to actively engage in real design as co-designers. This profound transformation led to the development of a new understanding of participation, ushering in a participation approach that replaces the divine role and power traditionally associated with the designer's role (Sanches & Frankel, 2010) (Figure 1). Consequently, concepts such as grassroots planning, tactical urbanism, and pop-up urbanism have emerged.

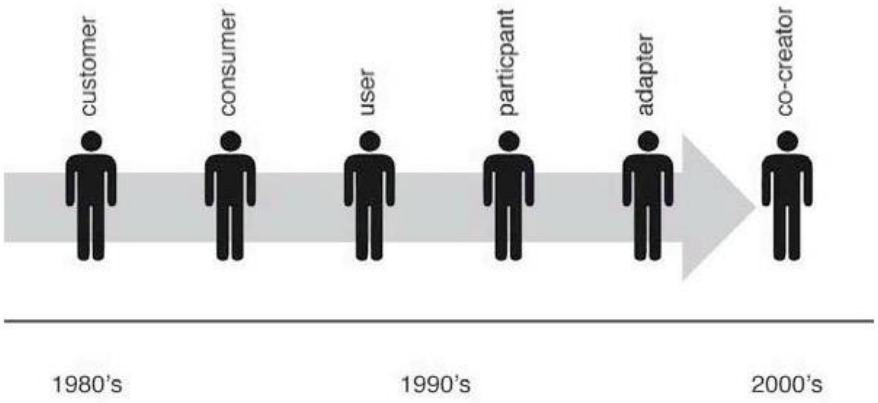


Figure 1. Changes in the way designers think about people (Sanches & Frankel, 2010)

It is a common scenario to break down the subject into different components when working on urban design projects. Decisions are often made without extensive public communication, either following widely used participatory formats or reverting to limited methods such as voting in traditional non-participatory approaches. However, especially the participation of vulnerable groups is frequently suppressed as mere symbolic gestures. It is essential to promote a new understanding of participation that not only provides information and ideas but also aims to involve participants in every stage of the process and assumes the role of a stakeholder as a planner/designer. The challenge here is to establish a common language based on continuous communication among the actors. It is therefore crucial for citizens to accurately reflect their needs or thoughts through co-design and enable its collaborative production.

Local governments are authorized institutions in the design and transformation of public space. Karşıyaka Municipality aimed to carry out a participatory study in the transformation of Atakent Car Park, which was selected from the inventory of left-over areas in Karşıyaka district prepared by Karşıyaka Municipality Urban Design Directorate. This study aims to co-design the public space through a common design language to be established with citizens and professional designers in the transformation of the irregular Atakent Car Park, which is one of the left-over urban areas on the border of Atakent and Yalı neighborhoods in Karşıyaka district of İzmir, into a qualified and multifunctional public space. The method used in the study is 'citizen design science' in which citizens actively participate in the design process and produce design science data.

2. Participatory Urban Planning and Design Method: Citizen Design Science

'Citizen Science' provides scientific data through public participation in scientific research (Irwin 1995). The method used in the study, 'citizen design science', was developed by Johannes Müller; Hangxin Lu, Chirkin Artem, Bernhard Kleina, and Gerhard Schmitt at ETH Zurich - Future Cities Laboratory in 2018 by combining active design and crowdsourcing methods. Instead of traditional participation practices such as public hearings, writing comments, citizen-based committees, participation of representations, etc., it is a method that includes innovative and active tools using today's information and communication technology in participatory design approaches in urban planning and development (Mueller et al., 2018). Citizen design science using urban design tools is a new approach to engage citizens in the urban design and planning process. The 'design science' data obtained through various analysis methods from citizens' local experiences and design proposals produced through active design tools are used in the design process of professional designers 'in the context of data-driven governance' (Mueller & Lu, 2017). Citizen design science is a synthesis of citizen science and design science that uses bottom-up data and information flows to improve the design and functioning of urban space (Lu & Schmitt, 2017).

Three key concepts make up this methodology: a) citizen science, which refers to the elements of participation and the type of data collection; b) citizen design, which refers to active design by citizens; and c) design science, which refers to translating citizens' design proposals into designs by expert designers (Figure 2).

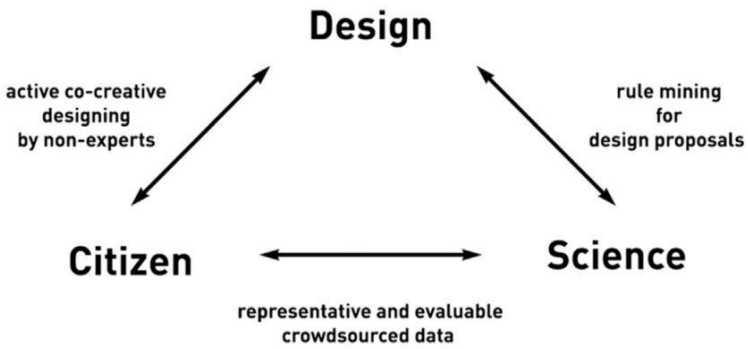


Figure 2. Concept of citizen design science (Mueller, Lu, Chirkin, Klein & Schmitt, 2018)

Citizens (users) are considered as non-expert designers and designers through primitive models of their environment. Cognitive toolkits show how citizens perceive and understand the design space through simple 3D models of the design space. Such tools encourage citizens to think about the design problem and express themselves (Mueller & Lu, 2017). Experts design urban planning and urban design projects based on data from citizens. In this method, citizens are actively involved in urban planning and urban design projects through design scenarios, not just being simple sensors. By strengthening the role of citizens, this initiative connects bottom-up and top-down decision-making processes in urban design. Citizens' competences and experiences have the potential to generate better strategies and plans for their neighborhoods (Mueller et al., 2018).

3. Description of the Study Site and Methodology of the Study

Based on the 'leftover space inventory' study of the Urban Vision Development Unit of Karşıyaka Municipality-Urban Design Directorate, Atakent Car Park, which is 4,400 m^2 in size, was selected as the study area, which is located in the borders of Atakent and Yalı Neighborhoods in Karşıyaka district. It is located in the north of Izmir city center and Izmir Bay, owned by Karşıyaka Municipality and is a Regional Storey Car Park Area in the zoning plan. In the nearest neighbor of Atakent Car Park Area; there are sports complex, hospital, high school, primary school, library for the visually impaired and the old stream bed water mark. In the north-east of the area, which currently has an irregular Car Park lot function, where passive green meets old trees, the amount of green is more than other streets (Figure 3).

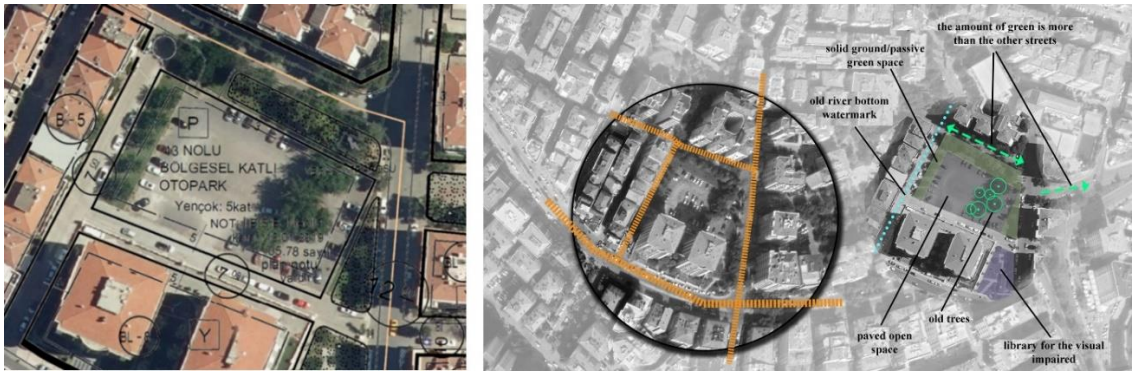


Figure 3. Atakent Car Park area and its near surroundings

In Atakent Car Park Area, the aim is to establish an inclusive, democratic, and transparent citizen participation through the methodology of design science. This approach integrates citizens into all stages of the design process, fostering a 'citizen consciousness' and strengthening the sense of belonging. The goal is to create a high-quality public space organization and implementation derived from spatial data related to citizens' needs, desires, and experiences. Consequently, this approach introduces a new organizational model in the production of public space through the methodology of citizen design science.

The co-design process relies on the communication between scientists, local residents, visitors, and the authority represented by Karşıyaka Municipality. This communication process involves local residents providing data about the area and its issues through a collaborative design tool with expert designers. During the implementation, individual active design suggestions are presented in the role of expert designers. Following the workshop, the structure of the communication consists of the expert designers and the authority evaluating the design science data.

The participatory process aims to document spatial organizational suggestions made by citizens who experience or visit the area through discussions about authority, needs programs, and rules in co-design, active design application, and a survey that includes demographic and experiential questions. The conducted 'pre-interview studies' focus on identifying issues related to the area and understanding how local residents envision the area in the future. These studies contribute to the authority's decisions regarding the vision and needs program of the area. The issues, suggestions, and evaluations documented in the study report are shared with the authority. Subsequently, during meetings with

the 'authority,' the vision of the area is evaluated based on this report, and the needs program, production process, and implementation guidelines for the active design phase within the workshop are planned. During the workshop, individual design drafts of participating citizens are recorded on an analog model. After the completion of the implementation, participants are directed to an experience survey containing demographic data, implementation experiences, and questions about issues related to the area. The design science data obtained from the analysis after the implementation and the experience survey are negotiated in 'roundtable meetings' with the 'authority' and 'professional designers,' leading to design decisions regarding spatial organization. With reference to the design decisions made, conceptual design alternatives are generated, and these design alternatives, along with all the design science data, are presented to participating citizens for voting. In the implementation of public space, the method of co-production is proposed, suggesting the application of selected urban objects, landscape, and graphic design practices in the area involving participating citizens and expert designers (Figure 4).

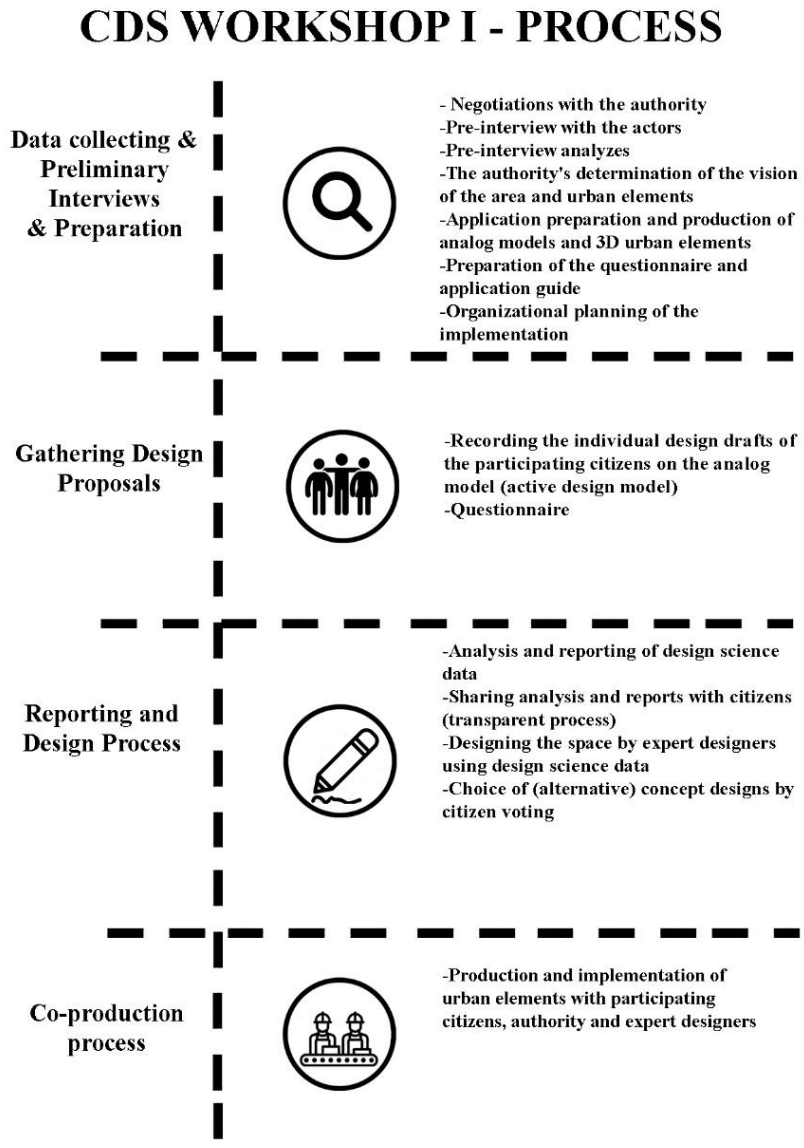


Figure 4. The process structure of citizen design science workshops (by Author)

As part of the study, landmarks in the vicinity of the Atakent Car Park Area were identified using Kevin Lynch's (1960) mind-map technique to facilitate the participation of visually impaired citizens in the design process. These landmarks were shared with the participants. The design elements involved in the workshop were produced in three-dimensional and relief formats, and participants' design drafts were recorded through the workshop coordinator (Figure 5).

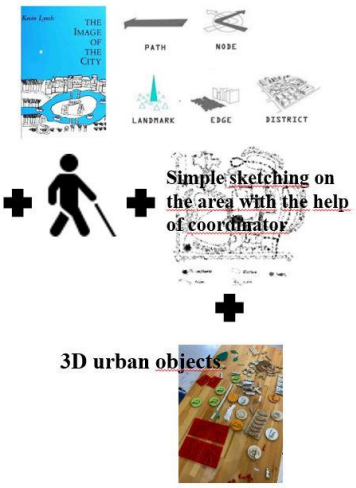


Figure 5. Co-design process for visually impaired citizens (by Author)

In contrast to traditional participatory practices, this dialogue, formed through the design science data actively produced by local citizens about their living or visited environments using active design tools, is essential and citizen-centered. The objective is to reach more local participants, establish close dialogues with citizens, and enable the participation of citizens with specific needs, such as users of the nearby Library, in the design process. After co-design, the second step of the study, the 'experience survey,' was conducted. This survey, consisting of 25 questions sensitive to the protection of personal data, aimed to understand demographic information, desires, and needs related to the study area, measure the experience of the implementation, and comprehend the participants' intentions regarding the co-production process. Within the scope of the study, an urban design application was conducted with 96 participants aged 15 and above.

4. Results and Discussion

After the conducted preliminary interview study, an evaluation was made in collaboration with the authority to assess the opinions gathered. The purpose was to establish the vision, design constraints, and the needs program for the area, and to make decisions regarding urban elements. Based on the perspectives of the local residents and shopkeepers, it was decided that up to 50% of the area would be allocated for car park use, while the rest would be dedicated to multifunctional, high-quality public space arrangements. Within the proposed urban elements for the area, an open object was suggested to accommodate functions proposed by the participants. Additionally, in the context of urban governance, the establishment of the 'Citizen Participation Unit,' a novel public initiative in municipal administration to facilitate citizen coordination, was decided upon. Guidelines for implementation were prepared for the participatory work in alignment with these decisions (Figure 6).

Figure 6. Brochures prepared for Atakent Car Park area, implementation guidelines, and preliminary interview study

Due to the participation of 178 local citizens through an open call, purposive sampling was employed in the study. In the initial phase of the collaborative design process for the Atakent Car Park Area, individual and spatial design suggestions were meticulously documented using photographs. The second phase involved the completion of the process of collecting design proposals for the area through an experience survey comprising 25 questions (Figure 7). The design principles to be embraced in the conceptual design project(s) were discerned through meticulous analyses considering the interrelations among spatial proposals.

Figure 7. Above: An example of a participant's design draft, the co-design process. Below: The implementation guidelines and the experience survey process (Photos: Pelin Özden)

Spatial cluster analysis and graphics of the documented individual design drafts of the participants and the analyses of the experience surveys have been prepared. The data were organized, classified according to urban object types, and dendrogram graphics related to user groups and urban objects were generated (Figure 8).

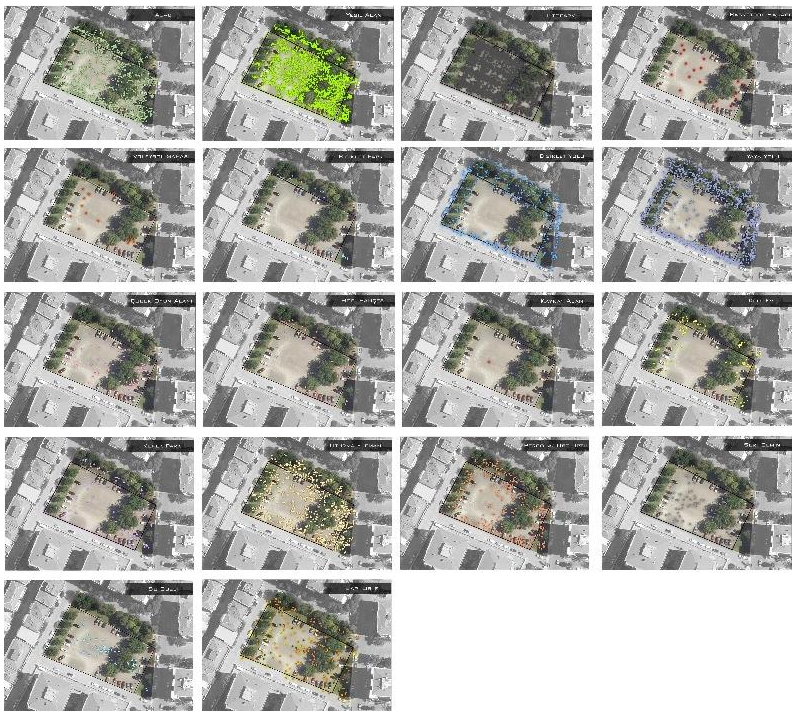
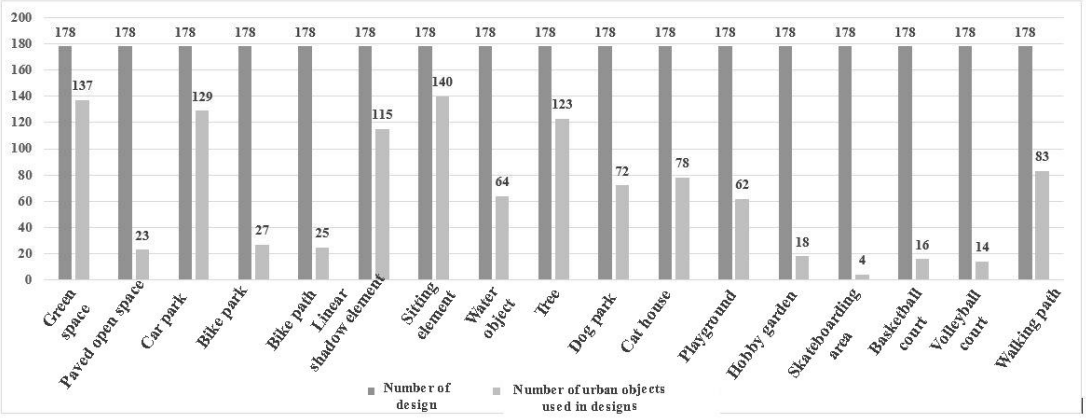


Figure 8. Hierarchical clustering diagram for each urban elements

In the co-design process involving 178 participants, a total of 9.497 urban objects were utilized. Table 1 illustrates the distribution of urban elements preferred by the participants.

Table 1. Graph showing the preference of urban elements used by participants in their design drafts based on user design counts



With reference to Table 1; the car park area ratio in the area is represented as 30% with a capacity of 0-20 vehicles, and 30% with a capacity of 60-80 vehicles. Additionally, within the scope of the study, which does not allow car park usage exceeding 50% density, the 'yellow cube' object, classified as an 'open' object, has been used by participants, constituting 11% of them, as a 'car park' object, envisioning 100% car park functionality for the area. This situation has been regarded as a *manipulative design tactic*.

In the study, participants utilized the 'yellow object', open object, 217 times. During the analysis, 97 objects related to technical needs and requests (such as lighting elements, garbage bins, rubber flooring, etc.) were excluded from clustering. The remaining 120 uses of the 'yellow object' were categorized into three distinct groups: (a) public function, (b) commercial function, and (c) artistic function. The analyses revealed a predominant presence of items with a public function, whereas proposals with a commercial function received the lowest preference. Hierarchically, suggestions were primarily focused on picnic tables, table tennis, and sports equipment.

In the context of the study, drafts of 'spatial proposals' and the 'questionnaire,' participant profiles, site data, and design information were systematically examined in relation to each other. The evaluation encompassed (a) infrastructure and technical requirements, and (b) spatial organization of urban elements and design principles. This comprehensive analysis was conducted in a 'round table meeting' format involving 'authorities,' 'scientists,' and 'professional designers.' The integrated analysis of the questionnaire and the examination of the open objects led to proposed solutions, including inadequate lighting elements, insufficient maintenance of the existing green infrastructure, and the recommendation of a permeable concrete surface for the hard ground due to significant water accumulation caused by heavy rainfall in the area.

Through the combined analysis of user profiles and urban element object data using base layers generated with Geographic Information Systems tools, the primary urban element, the car park facility, indicates 'regulation' based on its current function, along with additional public functions. The car park arrangement has been conceptualized in the northwest area of the site, with a maximum usage capacity not exceeding 50%. The urban element 'pedestrian pathway,' which is currently perceived by pedestrian users as a 'transit passage zone,' defines a walking route along the periphery of the area. The design concept of the 'pedestrian pathway,' incorporating suggestions from visually impaired citizens, has been approached as a textured surface system that appeals to the sense of touch and provides directional guidance. Thus, an inclusive design concept has been developed within the framework of the 'universal design' perspective.

After the evaluation, hierarchical clustering analysis graphs of urban elements and their spatial organization diagrams for two distinct alternative concept designs were shared with professional

designers. In the first alternative concept design project prepared by the Karşıyaka Municipality-Urban Design Directorate, the 'picnic table' element, suggested by the majority of participants, is represented, whereas in the second project, the 'table tennis' element represents the 'open object' (Figure 9).

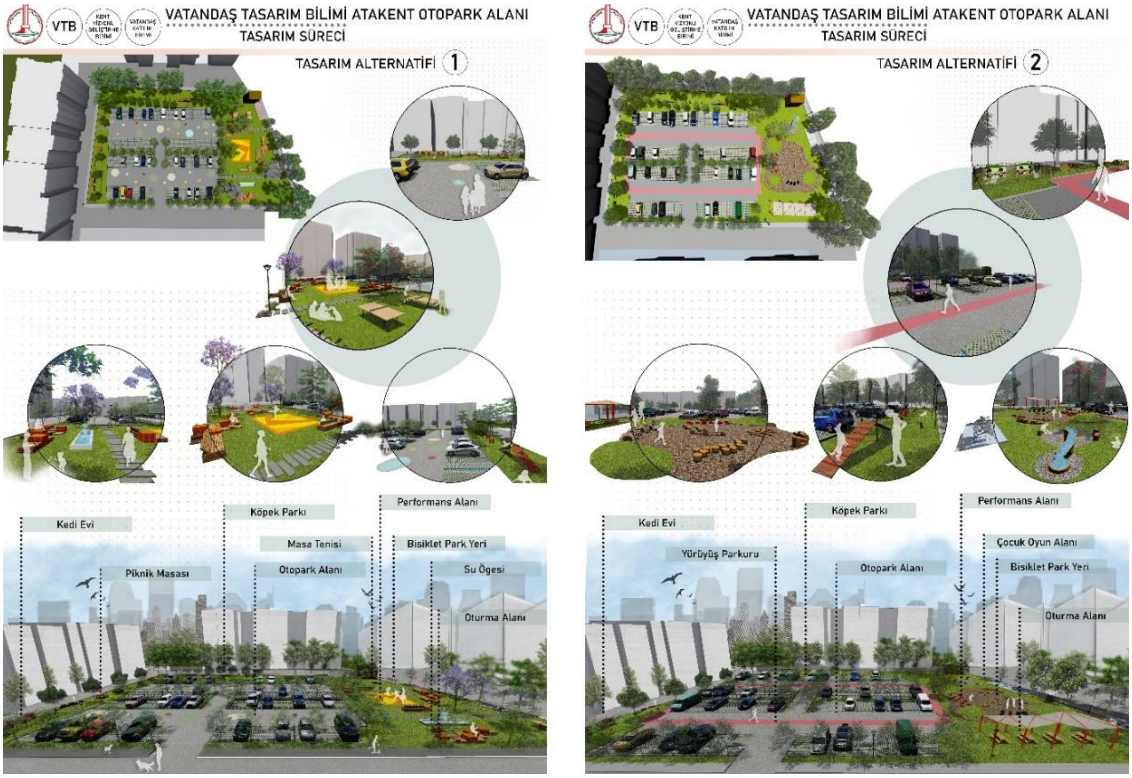


Figure 9. Left: Alternative concept design project 1, Right: Alternative concept design project 2, Karşıyaka Municipality-Urban Design Directorate

A voting process was conducted to select between the two alternative concept design projects prepared for the implementation of a high-quality public space in the Atakent Car Park Area. The voting structure included the transparent sharing of design science data from the co-design process, participants' voting on the alternative concept design projects, and a voting survey consisting of 5 open-ended questions regarding the reasons for their preferences and concerns about the voted project, which are fundamental in citizen science projects. Within the framework of citizen science methodology, projects were presented to the participants in the area during the voting process, where all processes and evaluated data were transparently shared with the participants. Participants voted for their chosen concept design project in the 'transparent ballot box', facilitated by the coordination between the City Vision Development Unit and the Citizen Participation Unit (Figure 10).

Figure 10. Voting process of alternative concept design projects in the transparent ballot box (Photos: Karşıyaka Municipality Press and Publication Directorate)

In the analog and digital voting process, where 73 citizens participated, 43 participants chose Alternative Design Project 1, while 30 participants chose Alternative Design Project 2. Based on the data from the process, the voting results of the citizens who participated in the co-design process indicate that Alternative Design 1 was chosen by democratic majority. Upon completion of the revisions in the project, urban furniture for the high-quality public space implementation of Atakent Car Park Area was produced in the municipal workshops, considering the municipality's production capacity, and then implemented (Figure 11-12-13).

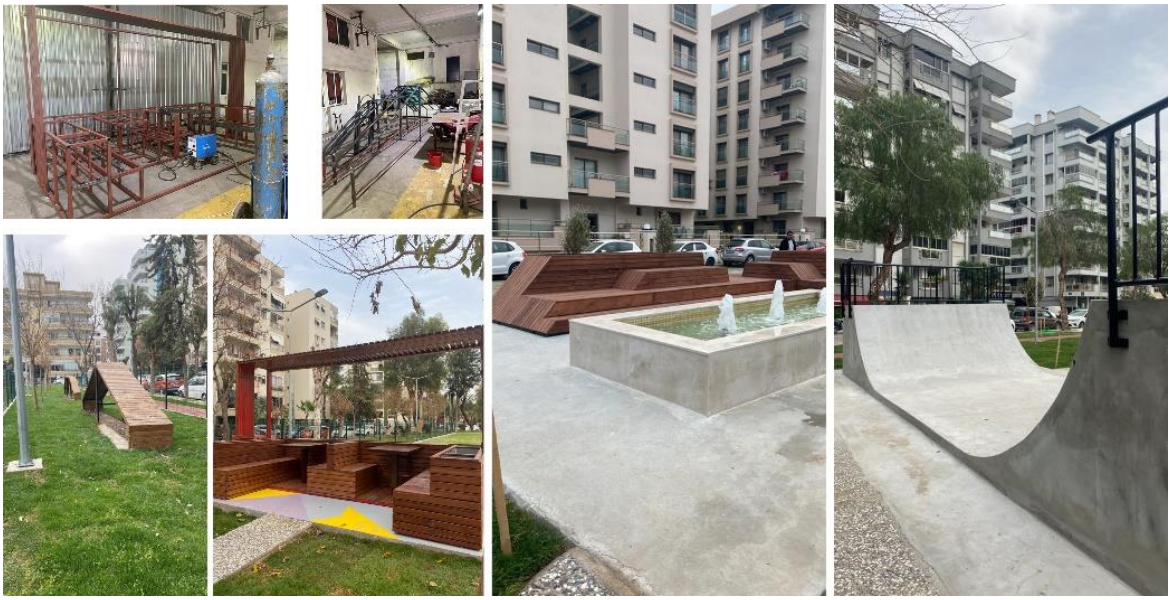


Figure 11. Visuals from the production and on-site implementation of urban elements (Photos: Pelin Özden)

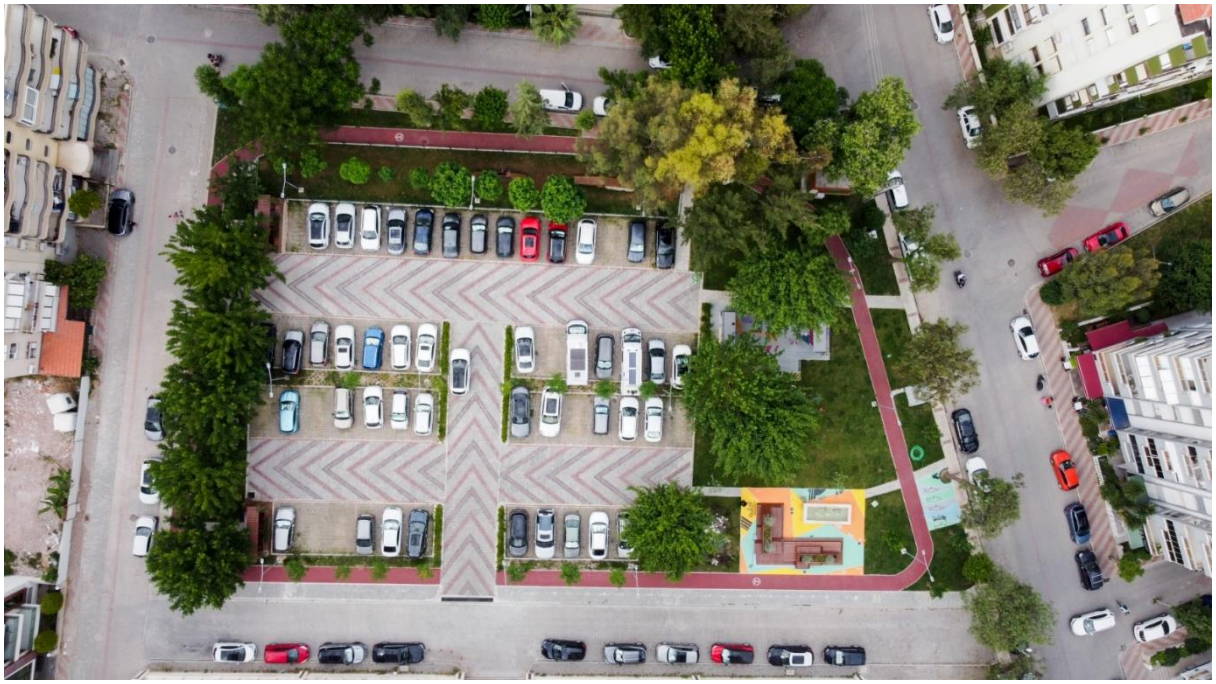


Figure 12. Top view of Atakent Car Park area after implementation (Photos: Karşıyaka Municipality Press and Publication Directorate)

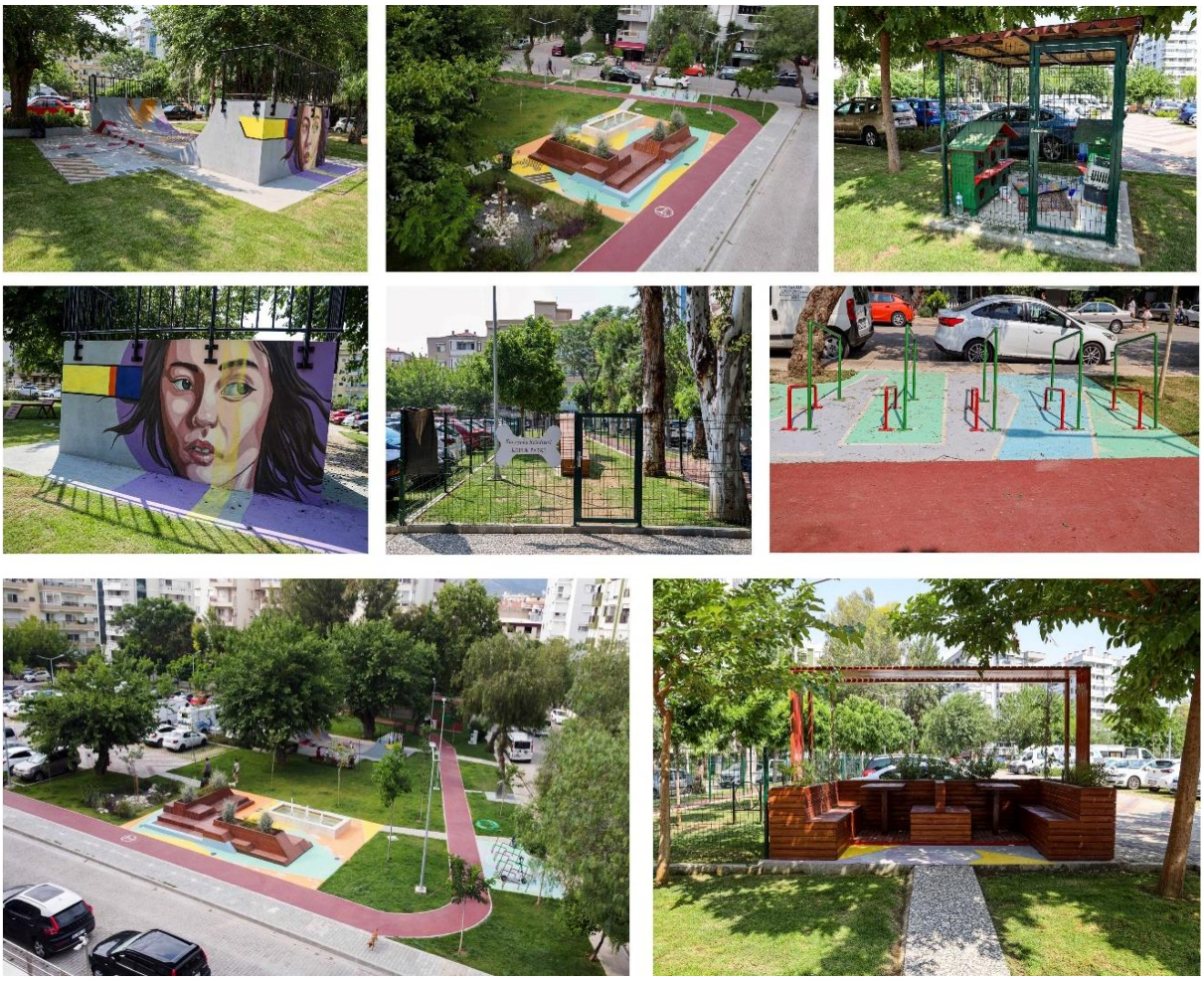


Figure 13. Atakent Car Park area after implementation (Photos: Karşıyaka Municipality Press and Publication Directorate)

5. Conclusion and Suggestions

A collaborative design process was conducted with 178 citizens in collaboration with the municipality to generate design data based on their experiences, needs, and desires for urban design. The most inspiring aspect of the study is the use of active design tools by a non-designer citizen to establish a common language and dialogue with a professional designer. The method also encompasses smart learning in the context of urban experience. The collaborative urban design process took place on a democratic platform based on participants' preferences and expectations.

In the study, unlike previous citizen design science studies (Sanches & Frankel, 2010; Klinsch, 2014; Mueller & Lu, 2017; Tomarchio et al., 2019; Mueller et al., 2020; Müller, 2021) diversity was enhanced by adding the yellow object tool set in addition to simplified design tools. This expansion allowed the identification of urban elements and functions that were not previously conceived by the authority or design experts. However, the yellow object, which turned into a design trick as in the case of the car park element, is an example of how conflicting ideas in participant-driven urban design approach can be distinguished from each other. To achieve consensus, the voting step was added to the process. The method also brings consensus through collective intelligence.

The remarkable aspect of this study lies in the engagement of a layperson without prior design knowledge in utilizing active design tools to establish a common language or discourse with a professional designer. Despite the efficacy of this common language facilitated by the tool, it has inherent limitations. Consequently, an augmentation in diversity was pursued by integrating a 'yellow object-open object' tool into the common language. The 'open object' represents a mechanism employed by participants to identify urban elements that align with their unmet needs and aspirations,

thereby enabling the definition of urban components and functionalities that were previously overlooked by authorities or design experts.

This inclusive approach also provided participants with a more nuanced means of expression within the urban design study. Furthermore, an examination of the open object analysis from the study predominantly focused on the proposed diverse urban functions.

The study elucidated that individuals with distinct or special needs have a pivotal role in the co-design process. This revelation underscores the imperative of revisiting the existing methodologies in citizen design science to foster inclusivity (Mueller & Lu, 2017; Mueller et al., 2020; ; Tomarchio, Hasler, Herthogs, Müller, & Tunçer, 2019). For instance, it facilitated the development of a three-dimensional and embossed model, a conventional design language tool, while contemplating the 'mind map' process in a manner accessible to visually impaired citizens. Thus, the diversified participant profile served as an experimental approach that advanced the methodology. Consequently, it became evident that participants with special needs, as encountered in the co-design process, may encounter challenges with digital design tools.

Within the scope of the study, participants with special or diverse needs had the opportunity to participate through the reevaluation of the toolset of the existing citizen design science method to make it more inclusive. A three-dimensional and embossed toolset, which serves as a common design language tool, was created to enable visually impaired citizens to perceive the 'mind map' process in a way they can comprehend. Therefore, the diversified participant profile has transformed the method into an experimental and tactical approach that enhances inclusivity. For participants with special or different needs, more process constructs can be created within the method. For instance, the involvement of visually impaired users through the digital participation tool is still a problem.

The citizen design science method, where design science data is generated as a participatory urban design approach, requires effective organizational collaboration in the context of its organization. In this regard, the municipal organizational structure has been expanded with the establishment of the 'Citizen Engagement Office'. Further organizational developments will be necessary for the implementation phase in collaboration with citizens as part of the ongoing co-design process.

Acknowledgements and Information Note

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Author Contribution and Conflict of Interest Declaration Information

All authors contributed equally to the article. There is no conflict of interest.

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