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Research Article

Behavioral Impressions and Mapping in University Public Open Spaces

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Abstract This study investigates user behaviors in public open spaces within university campuses. The 15 July Democracy Square, located at Kanuni Campus of Karadeniz Technical University, serves as an important public open space meeting users' needs for social interaction, relaxation, and recreation. The research was conducted over a two-week observation period, with data collected through behavioral observation and photography techniques. The collected data were digitally mapped and analyzed. Findings revealed that male users were more active along pedestrian pathways in green spaces, while female users preferred areas near the pool. In the amphitheater, higher user density was observed on the eastern side, whereas the western side was used more sparingly by female users. Speaking, playing games, eating, and studying emerged as the most frequently observed activities. Differences in user behavior between exam weeks and regular class weeks were also identified. The results emphasize the importance of designing public open spaces that align with user profiles to enhance social interaction and satisfaction. Future designs should prioritize flexibility, accessibility, and diverse activity programs to support user engagement effectively.

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1. Introduction

As inherently social beings, all living organisms engage in interaction and communication with others. Such interactions become evident in instances where living beings gather, meet, or encounter one another.

The spaces that facilitate interaction and communication by partially isolating individuals from their surroundings, while simultaneously accommodating their activities, may be defined as “spaces”. In another definition, space is described as a bounded portion of the environment that can be perceived and comprehended by humans (Hasol, 2010). Gür (1996) defines space as an area shaped by the characteristics of human relations and by the organization required to sustain these relations within defined boundaries.

Etymologically, the term “public” traces its origins to Ancient Rome. Derived from the Latin word populus, meaning “community” or “people”, it conveys notions of openness, collectivity, and common ownership. Over time, the concept has evolved under the influence of various societies and cultures (Uzgören & Erdönmez, 2017). According to the Turkish Language Association (TDK), public space is defined as an area owned collectively by the public, where matters of public interest are handled (Turkish Language Society, 2020). Another definition characterizes public space as a shared area where individuals carry out daily routines or participate in periodic communal events such as festivals and celebrations; spaces that foster social connection (Erdönmez & Akı, 2005). Public spaces thus refer to defined areas where people encounter, gather, socialize, and interact.

The relationships among individuals in public open spaces contribute to the dynamic structure of cities. According to Madanipour (1999), such spaces serve as platforms for individuals to situate themselves within society and to engage in activities aligned with their needs. The formation of these spaces fosters social cohesion and strengthens communal ties. Accordingly, public open spaces should be inclusive, offering equal opportunities to users with diverse backgrounds and characteristics.

Although limited, existing studies emphasize the importance of spatial quality in fostering social interaction. The ability of public open spaces to meet varying user needs is considered a crucial design criterion (Alpak, Düzenli, & Yılmaz, 2018). Among the pioneers in the field, William H. Whyte conducted seminal observational research by recording people's behaviors in public settings, identifying tendencies for individuals to remain close to others, either in groups or alone. Jan Gehl further developed observational techniques to analyze public life, including systematic counts of pedestrian movements and stationary behaviors (Whyte, 1980; Gehl, 2010; Gehl & Svarre, 2013; Zapata & Honey-Roses, 2022). Coley, Kuo, and Sullivan (1997) found that green, wooded areas attracted more young and adult populations than those lacking vegetation. Kweon, Sullivan, and Wiley (1998) revealed that green spaces enhance social bonds and a sense of community. These studies affirm the critical social role of public open spaces, which support both social gathering and social activities (Zapata & Honey-Roses, 2022). Furthermore, Colley, Brown, and Montarzino (2017) examined the relationship between individual characteristics and employees’ use of green spaces and recovery experiences during outdoor work breaks, surveying 366 individuals in five urban science park settings. Their

findings indicate that higher levels of job stress correlate positively with increased green space usage and perceived restorative benefits. Appel-Meulenbroek, de Vries, and Weggeman (2017) investigated how spatial variables influence behavior. They collected behavioral data from 138 employees within a large research institution and analyzed spatial relations through network analysis of architectural layouts. Using χ^2 tests, they demonstrated that proximity among individuals in shared indoor or outdoor spaces significantly affected behavioral patterns and information exchange.

Public open spaces are thus essential for users' socialization and personal growth. Among university populations, physical activity is strongly linked to general well-being, and campus open spaces serve as primary venues for such activities. These environments support both social and developmental needs (Düzenli, Mumcu, Yılmaz, & Özbilen, 2012). For many users, campus open spaces are the main settings for engaging in physical activity. According to social cognitive theory, there is a reciprocal relationship between individual factors, environment, and behavior (Shaikh, Patterson, Lanning, Meyer, & Patterson, 2018). Studies suggest that individuals often develop unhealthy activity patterns before university and tend to maintain them during their university years. The undergraduate period thus presents an important opportunity to promote positive behavioral change. Campus public spaces are ideally situated to support this shift, providing accessible recreational options for students, faculty, and staff alike. Research also shows that different spatial elements cater to different types of activities, indicating that design diversity supports a variety of uses (Cooper & Theriault, 2008; Düzenli, Tarakçı Eren, & Alpak, 2019). Nevertheless, a lack of detailed data persists regarding specific user behaviors and preferred activities in campus open spaces. In this regard, the aim of this study is to identify user behaviors by focusing on the 15 July Democracy Square (formerly known as the Festival Area), a public open space located within the campus of Karadeniz Technical University. Within the framework of this objective, the study involves the photographic and written documentation of user behaviors -such as standing, sitting, playing, talking, eating, and drinking- while observing whether these activities are performed individually or in groups. These observations aim to assess the spatial and social needs of users. Based on the findings, the study seeks to determine which behaviors and activities users prioritize in order to socialize and foster personal development within the campus environment.

2. Study Area

Campuses, as integral components of urban design, significantly influence both the urban silhouette and the rhythm of urban life. They are daily living environments in which students typically spend four or more years of their lives. A campus should not merely fulfill the basic needs of its users, but also create a sense of belonging and lasting memories by adding meaning to their experiences (Broussard, 2009; Akgül Yalçın, 2012).

This study aims to identify which behaviors or activities users prefer to engage in for socialization and personal development by examining user behaviors at the 15 July Democracy Square, located at Kanuni Campus of Karadeniz Technical University in Trabzon, Türkiye. Founded in 1955, approximately 3 km east of the city center, Karadeniz Technical

University is the largest university in Trabzon, hosting 12 faculties, 1 college, 8 vocational schools, 6 graduate institutes, 18 research and application centers, 1 technopark, and 2 culture and congress centers (Karadeniz Technical University, 2023).

The 15 July Democracy Square is situated in the northeastern part of the campus, surrounded by the School of Foreign Languages, the Office of Student Affairs, Koru Hotel, and the Prof. Dr. Osman Turan Congress and Culture Center. The square includes a green area, an amorphously shaped pool, and an open-air amphitheater (Figure 1).

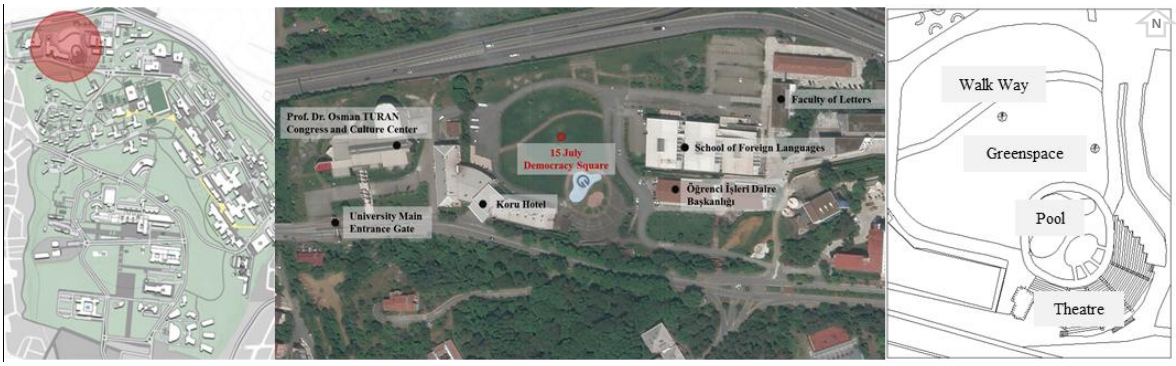

Figure 1. Location maps of the 15 July Democracy Square (created by the author, 2024).

The 15 July Democracy Square is a significant meeting point for the users' rest, meeting, and recreation by virtue of its theatre, pool, and greenspace. In the area, which is intensely used during the education period, various events such as parachute training, concerts, anchovy festivals, etc. are able to be organized. In addition, it is observed that the users engage in behaviors such as playing with balls, flying kites, having picnic, speaking, performing case studies for educational purposes, etc., either individually or as groups. The study focuses on user behavior in this area, considering its role in promoting physical and social activities. Thus, the referred area at the campus was selected within the scope of this study. Observations were made over two weeks, capturing how users interacted with the environment both individually and as groups.

3. Method

The methodology of this study consists of two phases: data collection and data analysis. In the data collection phase, behavioral observation and photography techniques were employed. The photography technique is particularly important for capturing users in their actual locations and at the time the behavior occurs. Through the use of photography, the number of users can be determined, and their activities can be distinguished. Therefore, this technique was preferred to identify user behaviors in campus open spaces (Düzenli, Tarakçı Eren, & Alpak, 2019). In the data analysis phase, behavioral data were digitally recorded and mapped (Table 1).

Table 1. Research methodology (created by the author).

STAGE 1		STAGE 2
Data Collection		**Data Analysis**
• Behavioral Observation User activities such as standing, sitting, speaking, and playing were systematically noted.	• Photography Photography: Images were captured to document spatial usage, providing visual data for mapping.	•Behavioral data were recorded and mapped digitally. •Superimposed maps categorized activities by gender, posture (standing or sitting), and specific actions. •Statistical analysis quantified activity patterns across the two weeks.

In the data collection phase, information regarding behaviors, impressions, and spatial accumulations was obtained through behavioral observation. Before behavioral observations, the 15 July Democracy Square was explored and experienced at specific hours of the day. Considering user density, the period for fieldwork was scheduled during both exam weeks and regular class weeks, specifically between November 18 and November 29, 2019, on weekdays during peak hours (12:00–13:00). Accordingly, to monitor user activity and observe user behavior effectively, the selected time interval was divided into five time slots, creating a total of 50 observation periods over two weeks (Figure 2). During these periods, user behaviors were identified through behavioral observation and documented using the photography technique. Thus, the data collection phase was completed.

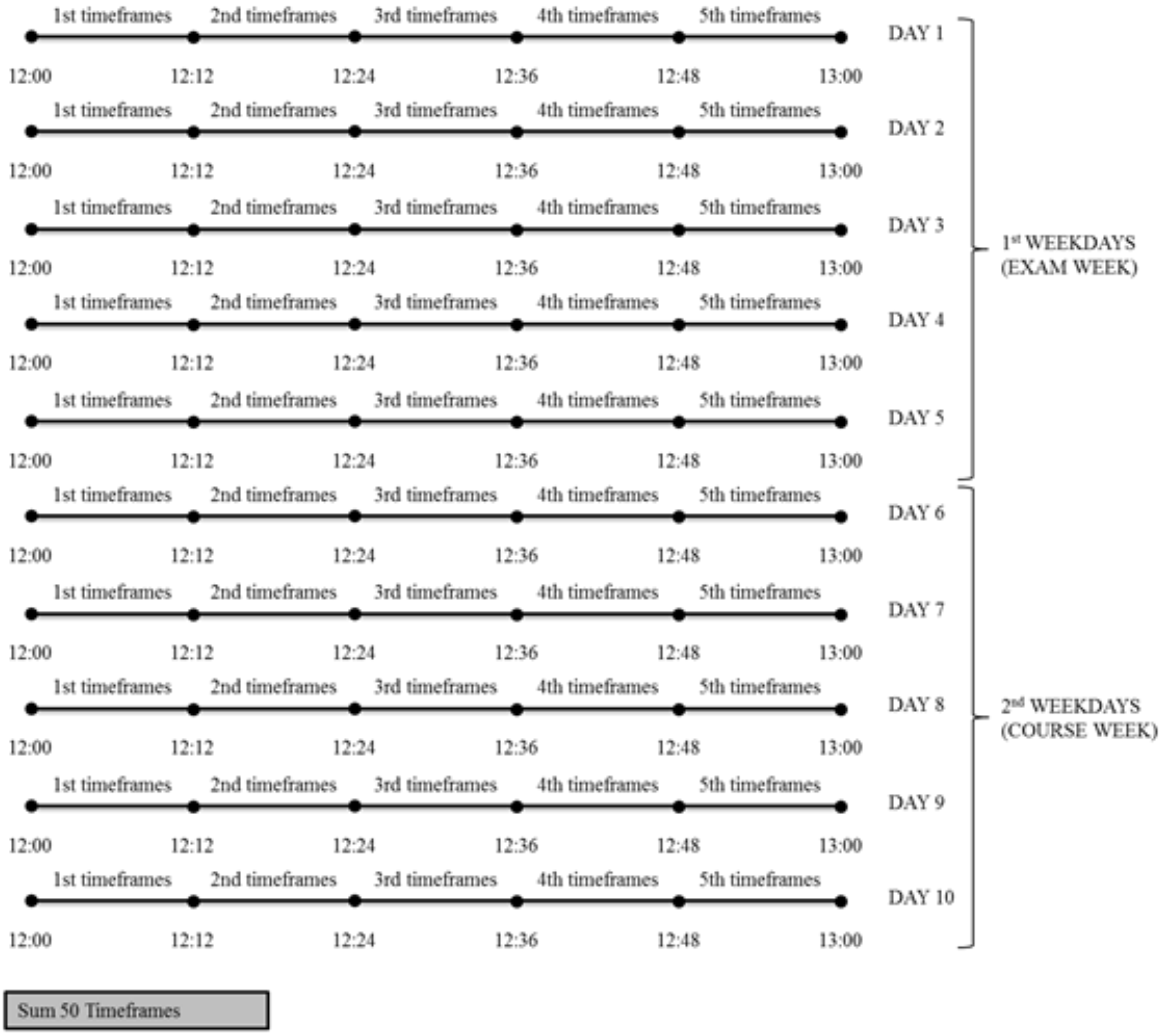

Figure 2. Timeframes (created by the author, 2024).

The phase of analyzing observation data and converting them into statistical information involves transforming the images recorded through photography into behavioral maps and analyzing the data presented in these maps. In this context, the steps are as follows (Figure 3):

- As the first step, the spatial layout of the 15 July Democracy Square was prepared in digital format using AutoCAD 2013 software.
- As the second step, images recorded during five selected time intervals were transferred onto the spatial plan weekly, and the following information regarding users was digitally recorded:
  - ✓ Their location,
  - ✓ The activity they were engaged in (speaking, playing with balls, eating, studying, using mobile phones, etc.),
  - ✓ Whether they were sitting or standing (in the theater or greenspace),
  - ✓ With whom they came (alone, in pairs, or in groups),
  - ✓ Their gender (female or male).
- As the final step, the coded data were entered into a table. In this way, the data were prepared for statistical analysis (Figures 4–8 and Table 2).

To obtain statistical data and determine the spatial distribution of users based on various characteristics, the maps were divided into three sections:

- In the first analysis, users were categorized by gender and the type of activities they engaged in — female (pink) and male (blue),
- In the second analysis, users were categorized based on posture — standing (orange) and sitting (yellow),
- In the third analysis, user behaviors exhibited within the area were identified and represented.

Legends were provided for the data displayed on all three maps. Once the maps were generated, the data were examined to understand users' spatial distribution, preferred behaviors, and chosen activities within the area.

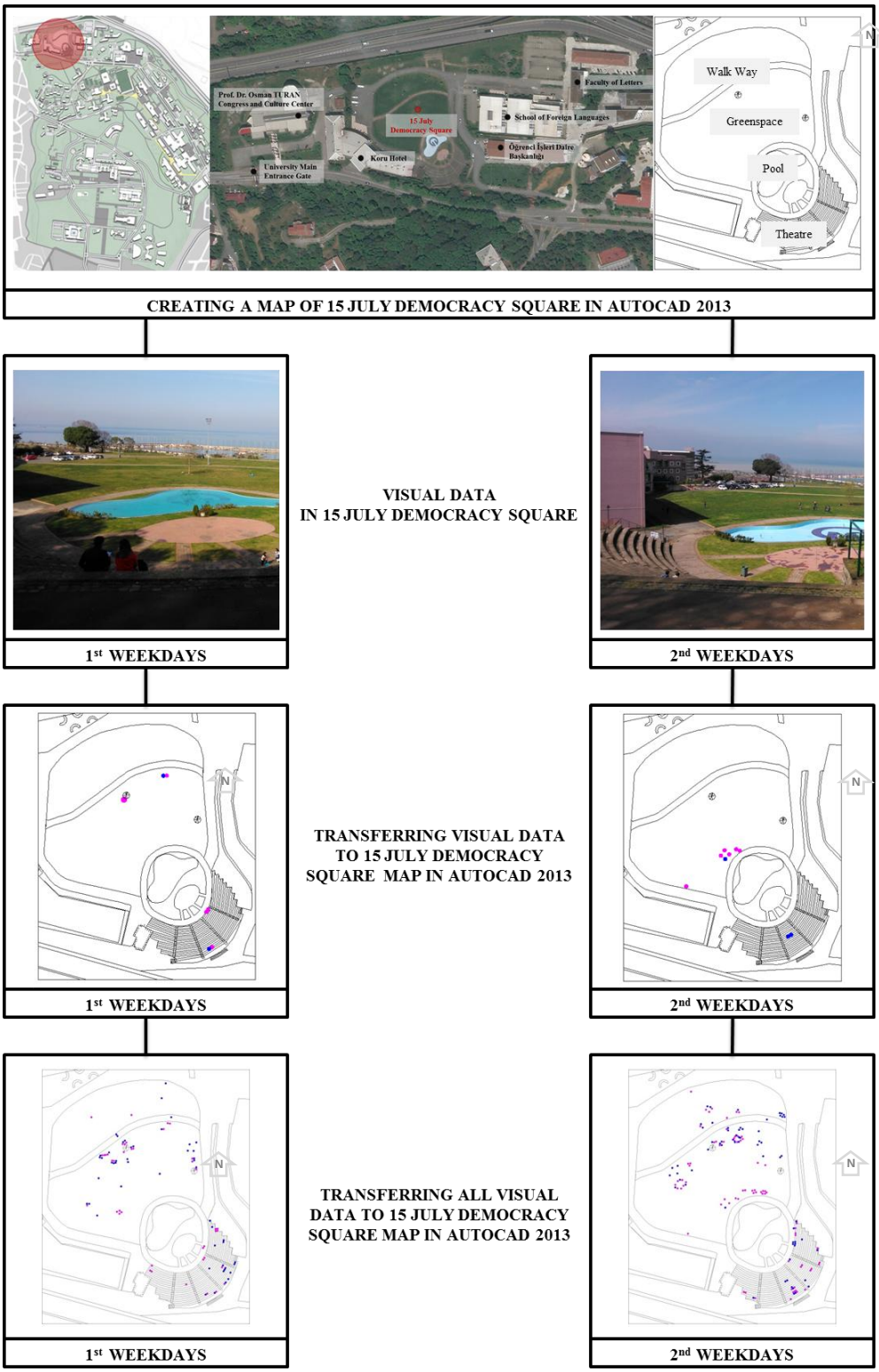

Figure 3. Stages of transferring the recorded images into digital format (created by the author, 2024).

4. Results and Discussion

This section presents the findings derived from behavioral observation and photographic documentation regarding user behaviors at the 15 July Democracy Square, along with the analysis of the collected data.

In the first phase of the study, during the data collection process, the locations of users within the 15 July Democracy Square were documented. Their gender, postural behaviors (standing or sitting), and observed activities were recorded using behavioral observation and photographic techniques during predetermined time intervals. The observations made revealed that users engaged with the public open space in a variety of ways.

The second phase involved the analysis of the collected data, aiming to uncover patterns of activity over the two-week observation period. The analysis produced quantitative data based on the initial observations. Time intervals were examined separately for Week 1 (exam week) and Week 2 (class week), followed by a combined evaluation. This process generated behavioral maps and statistical data (Figures 4–8; Table 2).

These maps were developed from observational and photographic data, emphasizing user behaviors, gender distribution, and activity types. Figure 4 illustrates the spatial distribution of male and female users across the square.

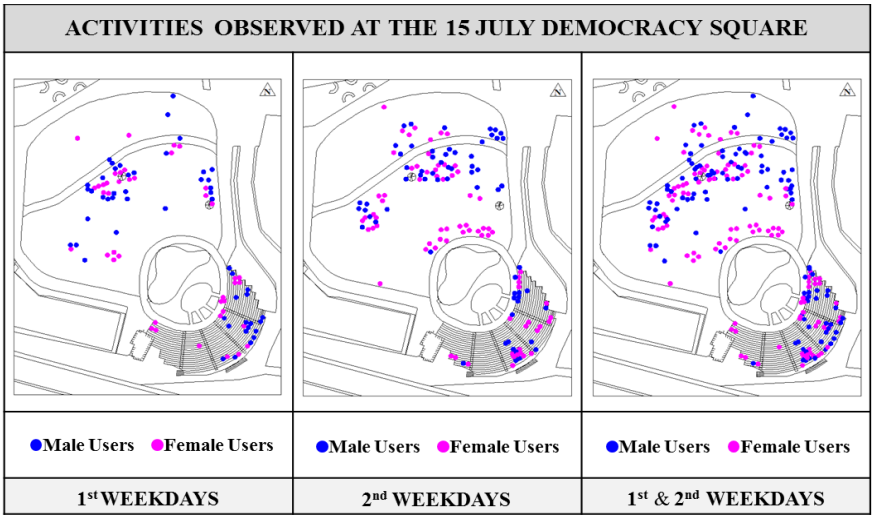

Figure 4. Female and male users at the 15 July Democracy Square (created by the author, 2024).

An analysis of Figure 4 indicates that both male and female users utilized the walkway that cuts through the green space, the area adjacent to the pool, and the vicinity of the amphitheater throughout the weekdays of both observation weeks. Notable differences were observed in spatial preferences: male users predominantly occupied the walkway area within the green zone, while female users more frequently favored the vicinity of the pool. Although user concentration in the theater was highest on the eastern side, a minor presence of female users was also recorded on the western side. Female users were typically observed in groups, whereas male users appeared both individually and in groups. Additionally, couples and larger groups composed of both genders were commonly seen utilizing the space. The weekly distribution of male and female users is presented in Figure 5.

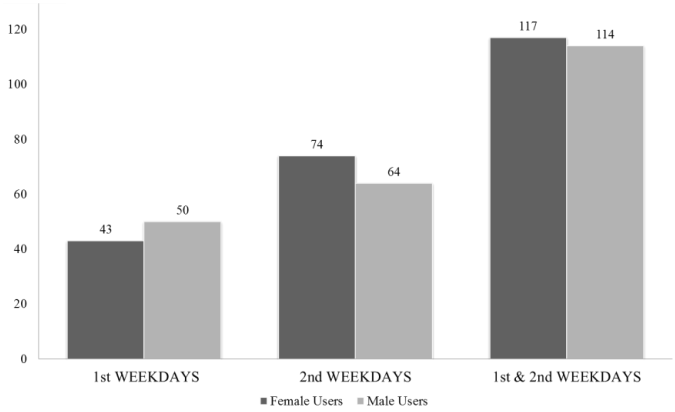

Figure 5. Female and male users at the 15 July Democracy Square (created by the author, 2024).

According to Figure 5, the number of male and female users was relatively balanced. During Week 1, 43 female users (46.24%) and 50 male users (53.76%) were observed. In Week 2, the number of female users increased to 74 (53.62%), while male users totaled 64 (46.38%). Given that Week 2 corresponded with instructional days, user frequency in the area was noticeably higher. Over the entire observation period (November 18–29, 2019), a total of 117 female users (50.65%) and 114 male users (49.35%) were recorded. Figure 6 shows the distribution of users who were standing or sitting across the square.

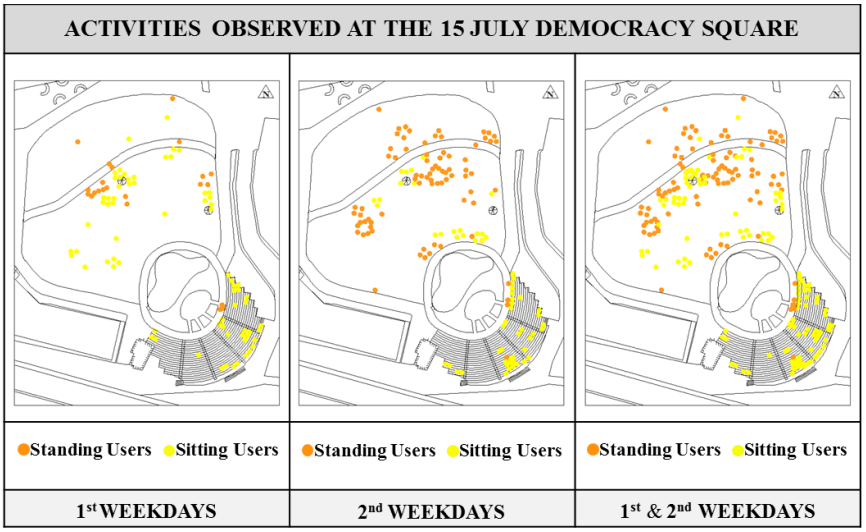

Figure 6. Standing users and sitting users at the 15 July Democracy Square (created by the author, 2024).

Figure 6 reveals a shift in user posture preferences between the two weeks. In Week 1, users were more inclined to sit, particularly in the amphitheater and the green space. In Week 2, however, standing became more prevalent, especially around the green space. While standing users were primarily concentrated around the walkway, both standing and sitting behaviors were observed around the pool area. The data suggest an even distribution of individual and group users engaging in both behaviors. Furthermore, couples were often noted to be sitting together. Figure 7 provides a numerical comparison of standing versus sitting users in terms of week and location.

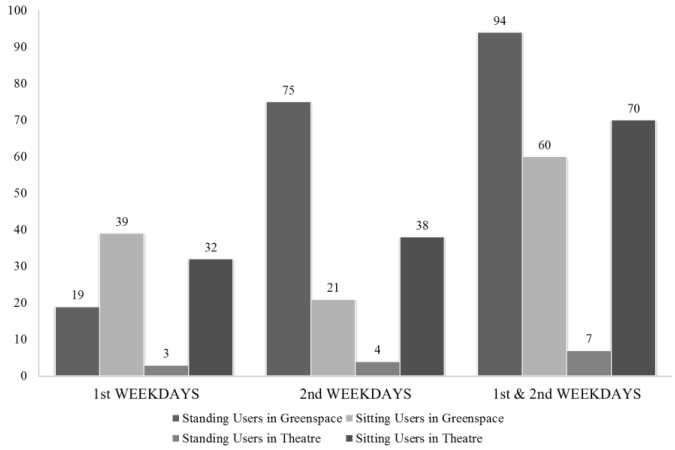

Figure 7. Female and numerical distribution of female and male users at the 15 July Democracy Square (created by the author, 2024).

As illustrated in Figure 7, a significant variation in standing and sitting behaviors was observed between the two weeks. In Week 1, 22 users (23.65%) were standing, whereas 71 users (76.25%) were sitting. In contrast, Week 2 recorded 79 standing users (57.25%) and 59 sitting users (42.65%). Over the full period, 101 users were observed standing, while 130 were sitting. At the amphitheater, 7 users were standing and 70 were sitting. In the green space, 94 users were standing, compared to 60 who were seated. Figure 8 details the variety of activities users engaged in during the observation period.

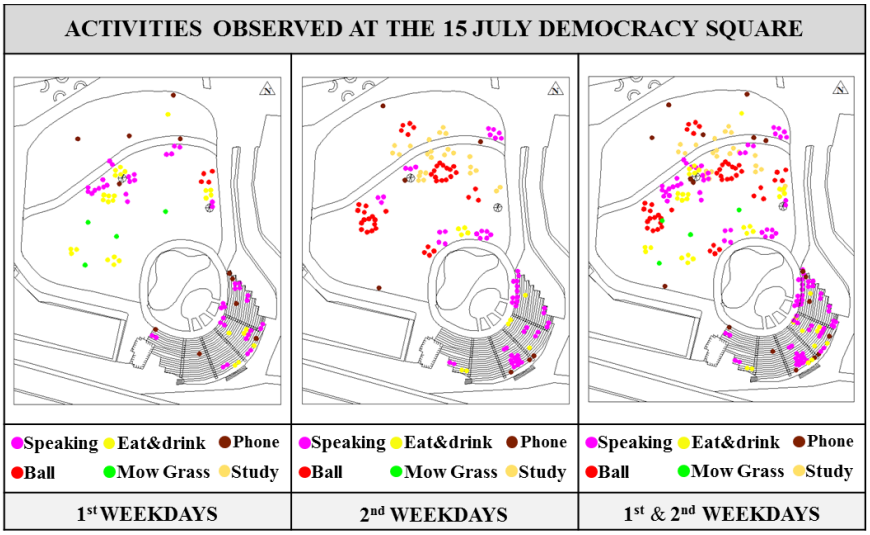

Figure 8. Activities observed at the 15 July Democracy Square (created by the author, 2024).

Analysis of Figure 8 shows a range of activities taking place in the square. The most frequently observed behaviors were speaking and playing with balls. Other noted activities included eating, using mobile phones, mowing grass, and conducting study-related tasks. A comprehensive breakdown of user activity by weekday and week is presented in Table 2.

Table 2. Percentages of the activities performed as per weekdays at the 15 July Democracy Square (created by the author, 2024).

ACTIVITIES	TIME & LOCATION					
	1st WEEKDAYS (EXAM WEEK)		2nd WEEKDAYS (COURSE WEEK)		1st & 2nd WEEKDAYS	
	Theatre	Green Space	Theatre	Green Space	Theatre	Green Space
Speaking	24.73%	23.65%	23.90%	15.94%	24.24%	19.04%
Eating &	6.45%	24.73%	4.34%	2.90%	5.19%	11.69%
Phone	6.45%	5.39%	2.16%	2.90%	3.90%	3.90%
Playing Ball	-	4.30%	-	29.71%	-	19.49%
Mowing Grass	-	4.30%	-	-	-	1.73%
Study	-	-	-	18.15%	10.82%	-
TOTAL	37.63%	62.37%	30.40%	69.60%	44.15%	55.85%

Table 2 clearly demonstrates variations in activity preferences across the two weeks. The green space remained the primary location for most activities during both weeks. In Week 1, speaking and eating emerged as the dominant activities, whereas in Week 2, speaking and playing with balls were most prevalent. When both weeks are considered collectively, user activities are ranked as follows: speaking (43.28%), playing with balls (19.49%), eating (16.88%), studying (10.82%), using mobile phones (7.80%), and mowing grass (1.73%).

An analysis of weekly activity patterns revealed the following:

- Speaking: In Week 1, both the greenspace and the amphitheater were extensively used for speaking activities. In Week 2, although the amphitheater maintained similar usage levels, a decrease of 8% was noted in the greenspace. Nevertheless, speaking remained the most frequently observed activity across both weeks.
- Eating: Eating was the second most preferred activity in Week 1 (31.18%), predominantly occurring in the greenspace. However, in Week 2, its frequency dropped significantly to 7.24%, mainly due to reduced usage of the greenspace. This represented the most substantial decline between the two weeks. As a result, eating ranked third overall when both weeks were considered together.
- Using Mobile Phones: In Week 1, mobile phone use ranked third (11.84%), with a relatively balanced distribution between the greenspace and the amphitheater. In Week 2, this activity decreased sharply to 5.06%, making it one of the least preferred behaviors. Consequently, mobile phone use ranked fifth overall across the two-weeks
- Playing with Balls: Although playing with balls was among the least observed activities in Week 1 (4.30%), it became the second most frequent activity in Week 2, rising dramatically to 29.71%. This represented the most significant increase in activity between the two weeks. Despite its lower frequency in Week 1, the substantial rise in Week 2 elevated it to the second most preferred activity overall.
- Mowing Grass: Along with playing with balls, mowing grass was among the least preferred activities in Week 1. However, it was not observed at all during Week 2. As a result, mowing grass was the least preferred activity when both weeks were evaluated collectively.
- Studying: This activity was not recorded in Week 1 but emerged as the third most common activity in Week 2 (18.15%). Due to its considerable presence in Week 2, studying ranked

fourth overall across the entire observation period.

These findings suggest that users engaged with the space differently depending on the academic calendar. During Week 1 (exam week), users were frequently observed alone or in small groups of two or three, whereas in Week 2 (class week), they were more commonly seen in groups of five or six. This shift in group dynamics likely contributed to the decreased use of mobile phones in Week 2. It is also plausible that users, seeking relaxation after exams, turned to recreational activities such as playing with balls. Moreover, the commencement of coursework in Week 2 contributed to the increased observation of students conducting academic activities at the 15 July Democracy Square.

To observe behavioral patterns effectively, data were collected on weekdays between November 18 and November 29, 2019, during the peak usage hours of 12:00 to 13:00. Notably, the 8th Anchovy Festival, which began at 12:00 on November 27, 2019, boosted attendance. While the event demonstrated the area's potential for hosting large-scale gatherings, its data were excluded from the statistical analysis and behavioral mapping in order to maintain consistency in daily usage patterns. Visual data and photographs from the festival are presented in Figure 9.

Figure 9. The 8th Anchovy Festival at the 15 July Democracy Square (created by the author, 2019).

The findings derived from the observations and analyses conducted within the scope of this study are summarized as follows:

- Variations in user density were observed to correlate with changing weather conditions.
- It was determined that users actively utilized the 15 July Democracy Square, with a tendency to spend time resting predominantly as groups.
- While activities were largely concentrated in the greenspace and the amphitheater, it was noted that users spent comparatively less time in the vicinity of the pool.
- The greenspace, particularly the area between the walkway and the pool surroundings, emerged as the most intensively used section of the square. Within the amphitheater, user activity was more concentrated on the eastern side, while individual users were observed on the western side.
- The most commonly observed activities in the square were sitting and speaking, followed by ball games. In addition to these, users were also observed engaging in eating, mobile phone use, and studying within the public open space.

- User presence was significantly higher during the second week of observation. While user engagement accounted for 40.26% in the first week, this figure rose to 59.74% in the second week.
- Individuals spending time alone in the area were most frequently engaged in eating or using mobile phones.
- When the weekdays during both weeks were considered collectively, ball games were most frequently observed on Fridays.

Understanding individuals' spatial preferences offers valuable insights into their social environments and personal needs (Fitzgerald, Joseph, & O'Regan, 1995). In this context, existing literature emphasizes the importance of designing campus public open spaces by user needs. Assessing user interest and participation in various leisure activities is essential for this purpose. Numerous studies have explored behavioral patterns within such spaces and examined the presence of gender-based differences, particularly in relation to social interaction and personal development. Research has shown that public open spaces play a crucial role in fostering socialization and supporting individual growth (Owen, 1994; Fitzgerald, Joseph, & O'Regan, 1995; Düzenli, Mumcu, Yılmaz, & Özbilen, 2012).

In line with the findings of the present study, it was observed that users tend to engage in similar behaviors and activities during different periods (i.e., exam week and regular course week) as a means of socializing and achieving personal development. These results underscore the importance of designing future public open spaces that not only accommodate group activities but also support solitary use, offering a range of opportunities for engagement and interaction aligned with user preferences.

5. Conclusion

It has been observed that public open spaces significantly influence human behavior and fulfill important social functions. University campuses, in particular, serve as critical environments for facilitating activities that meet the psychosocial needs of young individuals. Campus outdoor recreation programs offer numerous potential benefits, including student recruitment, retention, and satisfaction. Additionally, such programs contribute to students' mental and physical well-being, promote a healthy lifestyle, foster positive social connections, enhance interpersonal skills, nurture environmentally responsible attitudes, support academic success, and even create pathways to employment opportunities (Andre, Williams, Schwartz, & Bullard, 2017). Attending and adjusting to university life can be a stressful process for students, as they are often required to balance coursework, employment, and social or familial obligations. Recreation—particularly when it takes place in outdoor settings—has been shown to alleviate such stress (Clark & Anderson, 2011; Kanters, Bristol, & Attarian, 2002; Mann & Leahy, 2010).

The 15 July Democracy Square, located within the Kanuni Campus of Karadeniz Technical University, is one such public open space that is actively utilized by its users. The space is frequently used for resting, recreation, and social activities. Users particularly occupy the greenspace for group relaxation or recreational activities such as playing ball games, while those in the amphitheater tend to relax either individually or in small groups.

Research findings from this study affirm that public open spaces on university campuses have a considerable impact on user behavior. These areas serve essential functions by addressing students' needs for relaxation, socialization, and informal learning. Green areas and multifunctional spaces, in particular, enhance user satisfaction and promote social interaction.

In this context, future campus design strategies should prioritize flexibility, accessibility, and user-centered planning informed by comprehensive analyses of user behaviors and preferences. Furthermore, campus planning should incorporate a diverse range of recreational and social programs to encourage extended and meaningful use of these spaces. These enhancements not only enrich campus life but also contribute to the overall development and well-being of students.

Declaration of Ethical Standards

The article complies with national and international research and publication ethics.

Ethics Committee Approval was not required for the study.

Conflict of Interest

There was no conflict of interest.

Authors' Contributions

The author contributed alone to the article and takes full responsibility for the content and any modifications made during this process.

Declarations

The author takes full responsibility for the content and any modifications made during this process.

No artificial intelligence-based tools or applications were used during the preparation of this study. The entire content of the study was produced by the author(s) in accordance with scientific research methods and academic ethical principles.

Originality Report

The article has been confirmed that it does not contain any plagiarism according to the originality report obtained from the iThenticate software.

Notes

This study is evaluated under the double-blind peer review system.

Please use **livenarchjournal@ktu.edu.tr** email address for submitting ethical statements.

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