【カテゴリー I 】

URBAN SPACE QUALITY EXPERIENCED IN RENOVATED OPEN SPACE WITH GARDENING IN TOKYO

東京における改修による菜園付きオープンスペースで経験される都市空間の質

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This study aims to clarify the user's role in the making of urban space, by examining two renovated open space with urban gardening (OSUG) in Tokyo. Firstly, a mixed survey approached people and OSUG were used to disclose the spatial setting. Secondly, the setting's patterns are interpreted as user's experience. Finally, by connecting the setting and the experience, parameters of qualities will emerge, identified as "usage", "space affordance" and "image of identity". Furthermore, these factors combined will illustrate seven scenarios of OSUG, ranging from a privacy resting spot to a public outdoor playground, as well as a community garden.

1.Introduction

1.1.Background and purpose

Compacts cities are always trying to improve the quality of its neglected open space to accommodate city lifestyle. Especially, renovation concept using user-participation practice such as events, markets, farming or urban gardening (UG)[i] is becoming a noticeable trend in urban area[1]. In Asia where UG plays a critical role in promotion rural area[2], Japan, in particular, focuses on user's well-being, part of social and ecological concept[3]. More than ever, in populous metropolitan like Tokyo, urban space which integrates UG into the existing context has increased[ii] and intrigued the interests for research. This study aims to investigate this type of urban recreation space described above, identified as open space with urban gardening (OSUG), to reveal the qualities of space experienced by users in this environment setting[iii].

1.2 Past studies and relevancy

In people's ethics, it is a common idea to relate farming space to community[5]. Concerning community, social anthropologist like Cohen said that the common belonging existing within its boundary, despite its objectively apparent, could be perceived differently depending on the individual[6]. This concept interprets

community's boundary as the relationship between people and space and supports the study of the user's experiences in OSUG. Concerning farming, an early study on UG by Yuzawa[7] confirmed its main advantages of education, experience, exchange, and a recent survey of UG in Tokyo (Soga, 2017)[3] found its benefits in physical outdoor activities and human well-being. These studies suggest examining the experience of UG as outdoor leisure.

Furthermore, there are several approaches concerning people in public space. Firstly, in the field of environment-behavior, Canter[8] focused on people's purpose to understand how they behave in space. Suzuki[9] rejoins this idea by introducing an observation of several modes of being in places. An elaborated study from Li[10] found that the existence of public space is supported by the variety of possibilities that space allows the user's intention to justify their actions, but Li's main focus was on social communication. Secondly, Gehl[11] in the making of cities for people, confirmed that good quality space shows a significant rate of pass-by and pass-time activity, in other terms walking and lingering. As for walking, Bastoro[12] observed people's route by mapping space affordances, and Chen[13] classified these affordances on a scale of pleasure. As for lingering in public space, Whyte[14] found how people choose to

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sit, Akamine[15] studied how much time they spent, and Tsuchida[16] investigated which factors influenced their choice of stay. These studies confirmed the effect of greenery on user's preference but it limited only to create space delimitation. Lastly, Carmona[17] in the urban design field, proposed a mixed method to study public space, which centers on user's opinion. Almazan[18] developed this idea into a study of space's identity using SD and KJ method. However, these two methods were not directly concerned with users of OSUG. Hence, for this study, a method of CG images composition (Han, 2005)[19] is preferred to capture user's view in real-time.

These above researches introduce a combined method of study interests in user's purpose, time, opinion, and the view from their route defined by the spatial boundary. Transversal analysis of these parameters will reveal the factors that qualified OSUG situation. As to say, this study's purpose is not to evaluate the current situation but to find beneficial elements of renovated OSUG contribute to a better design of this urban recreation space.

2. Method of study

2.1 Framework

The framework is detailed in Fig.1, structured in three steps. Firstly, by using the mixed method of collecting information through questionnaire-observation-rendering, data such as Purpose, Time, Route, Boundary, View, and Opinion are classified into different sets of patterns to reveal the Setting of OSUG. Secondly, these pattern sets are interpreted as parameters belonged to people's Experience, indicating as Activity, Path, and Impression. Finally, the combination of OSUG's Setting and People's Experience will reveal the Qualities of renovated OSUG. This analysis process corresponds to chapters 3,4,5, respectively.

2.2 Case studies

This research targets to examine the beneficial factors of UG during the process of integration into the open space. Here the open space (OS) is chosen as an urban and social context of privately owned building such as commercial or residential. This particular context has an interest in using gardening as a tool for the reconversion to mix-used to accommodate city lifestyle[iv]. Hence, this research focuses on the UG make by private firms which are acquiring at the same time a significant rise in quantity since the release of 「特定農地貸付けに関する農地法等の特例に関する法律」[v]. Additionally, integration by adding new functions requires a new design for the unused space, which defines these project as a renovation. From this viewpoint, the case studies extracted from all listed private UG in Tokyo were screened under conditions such as being a renovation, having a direct connection with open space and a high ratio of UG/OS. Constraint by the restriction for surveys in these private UG, as justified by their status of privately owned public space (POPS)[vii], only two[viii] were selected (detail in Tab.1). Case 1-Ebisu (E) was a pioneer model of OSUG. Renovated from an empty rooftop to a garden with UG,
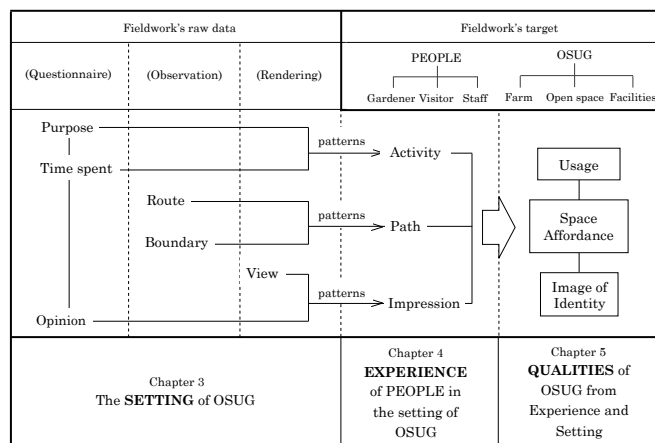

Fig.1 Framework

Table 1 Similarity and singularity of each case study

● Evaluation from Ebisu's user   ● Evaluation from Zama's user
*Data was collected during preliminary survey, responder rate the following information based on Likert scale:
AV1~6 : Actions : work, play, rest, do garden, eat and sleep, meet and talk
AC1~6 : Transport : walk, bicycle, car, train/bus, by wheelchair, using stroller
V1~6 : Clear vision on scenery elements : sky, building, landscape, farm, floor, surroundings
AM1~6 : Environment : lively, natural, comfortable, spacious, kid friendly, clean
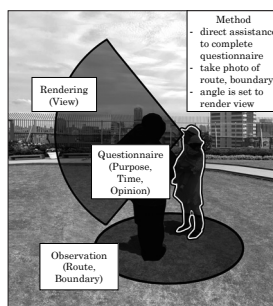
Fig.2 Fieldwork data sample

Table 2 Questionnaire Part I: Purpose

Gender: male, female
Age range: 20-35, 35-50, 50+
Companion: alone, family, friend
Proximity: work/home nearby, >15', >30', >1h
Frequentation: everyday, sometimes, rarely, first time
Transport: bus/train, bicycle, walk, car, with stroller
How did they know : by self, by others people or media
Intended to: - go out & play - eat, sleep, rest - work (OSUG facilities) - do gardening - meet someone, chat, talk
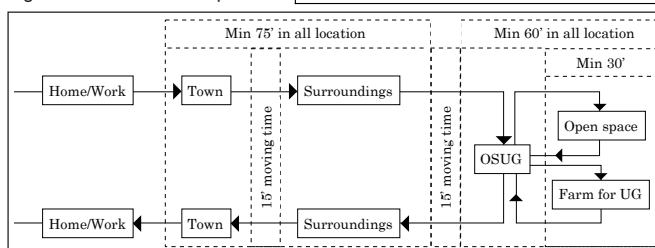
Fig.3 Questionnaire Part II : Time spent

Table 3 Questionnaire Part III : Opinion

Scoring method		Element	Criteria		Element	Criteria
Based on Likert scale	Related to Nature	Sky	Wide and spacious	Related to Artificial	Farm	Lively community life
Excellent (5)		Sky	Generate good wind		Built environment	Comfortable furniture
Good (4)		Landscape	Bio-diversity green scenery		Built environment	Cozy shade
Average (3)		Landscape	Full of trees, plants		Floor	Material is kid-friendly
Fair (2)		Farm	Healthy looking vegetables		Floor	Beautiful pavement
Poor (1)						

Table 4 Survey schedule

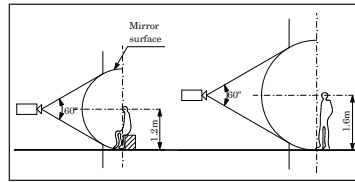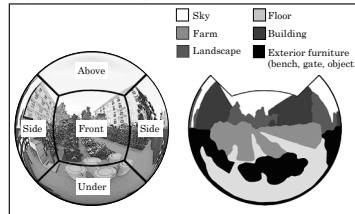| Case	Time	Date	Sample collected	Total
Ebisu	12:00-14:00	Jul 22	14	50
		Aug 7	10	
	15:00-17:00	Jul 24	4	
		Aug 5	6	
		Aug 24	9	
		Aug 10	7	
Zama	12:00-14:00	Jul 16	5	52
		Jul 17	7	
		Jul 23	5	
		Jul 28	11	
	15:00-17:00	Jul 29	18	
		Aug 18	6	

Fig.4a Rendering method

Fig.4b Cutout frame

Table 5a Parameters of Purpose

Purpose (motivation to spent time influenced by external factors) / Case study	Companion		Proximity		Frequency		How to know	
	Alone	Not alone	Far > 30'	Close < 30'	Rarely	Once/week	By self	Others
Ebisu	50	21	29	11	39	20	30	37	13
Zama	52	19	33	16	36	17	35	24	28

*In this table, the number represent the collected sample

Table 6a Parameters of Time

Time spent in a location, delimit by 30' interval / Case study	Farm for UG /Open space		OSUG		Town + Surroundings		All	
	<30'	>30'	< 60'	>60'	<75'	>75'	<150'	>150'
Ebisu	50	22	28	33	17	19	31	20	30
Zama	52	14	38	38	14	41	11	35	17

*In this table, each time interval is defined by Fig.3
*The number represent the collected sample

Table 5b Patterns of Purpose

Sample 102 (50/52)	Companion	Proximity	Frequency	Know it by	Purpose patterns
E10					P0 — No motivation 3 (2/1)
Z05					
E02					P1 — One motivation 18 (10/8)
E03					
Z06					
Z08					
E01					
E15					
E06					
E20					P2 — Two motivation 46 (23/23)
Z01					
Z27					
Z17					
Z04					
Z51					
E23					
E46					
E04					P3 — Three motivation 35 (15/20)
E11					
Z10					
Z13					
Z02					
Z03					

*In this table, the use of ○ and ● is referring to parameters defined in Tab.5a.
*Picked sample is the first one from collected list where specific pattern was showed.
*Number represent the collected sample

Table 6b Patterns of Time

Sample 102 (50/52)	UG or Open space (min 30')	OSUG (min 60')	Town + Surroundings (min 75')	All locations (min 150')	Time spent patterns
E33					T0 — No time spent 5 (3/2)
Z06					
E16					T1 — One time spent 13 (7/6)
E42					
Z03					
Z14					
E02					T2 — Two time spent 31 (14/17)
E04					
Z01					
Z11					
Z50					
E12					T3 — Three time spent 16 (7/9)
E13					
E18					
Z12					
Z21					T4 — Four time spent 37 (19/18)
Z23					
E01					
Z02					

*In this table, the use of ○ and ● is referring to parameters defined in Tab.6a.
*Picked sample is the first one from collected list where specific pattern was showed.
*Number represent the collected sample

it aimed to enhance the green area of Tokyo center. Case 2-Zama (Z) is a recent project. Being part of a revitalization around the central station, it aimed to promote the neighborhood of Zama by using community gardening. Despite singularities in ownership, size, period, and renovation's purpose, these sites present a similarity in activities, accessibility, visibility, atmosphere.

2.3.Fieldwork

This sub-chapter explain the fieldwork, with a combined method targeting people directly in OSUG (Fig.2). There is a questionnaire asking their purpose, time spent and opinion. Parallelly, there is an observation recording their used route defined by zones and boundaries. And lastly, a rendered image displays their views.

The questionnaire has three parts: Purpose, Time spent and Opinion. Information of Part I-Purpose is shown in Tab.2. In Part II-Time spent, users precise their time spent in each location belongs to the illustrated circuit of Fig.3. And, in part III-Opinion (Tab.3), users rate two sets of elements related to Nature or Artificial and the whole OSUG, using the scoring of Likert scale. Besides, since gardening is a seasoning activity and mostly performs in summer, the content of questionnaire was checked via an antecedent screening (details in Tab.1) to be ready for the official survey during the period of 2017 July-August (Tab.4). Collection method uses on-site assistance and online completion and the target of each site is a minimum of 50 samples.

Next, the observation focuses on mapping zones (free walk, farm for UG, playground, facility) and boundaries. It was conducted at the same time of questionnaire, by another member taking photos to locate the responder's position in OSUG. The picture (Fig.2) captures the route, view angle and the nearby zones/boundaries.

Finally, the rendering aims to provide the real-time vision of responder by using a reversed mirror semi-sphere positioned as human eye level[ix](Fig.4a). By applying the idea of Ashihara[21] in the design of exterior architecture, the following process of analysis removes the above part of the frame, then defines each major components outline for further pixel calculation[x](Fig.4b).

3. The settings of OSUG

Data of 102 samples were classified and combined into three sets of patterns: Purpose-Time, Route-Boundary, and Opinion-View. The first one aims to clarify the background that attracts people to come and stay. The second one examines the spatial structure which orients people in space. And the last one exposes the furnishing affecting user's feeling. The analysis of these three sets describes the Setting composition of renovated OSUG.

3.1 Space supports long time spent and multiple purposes

In this study, Purpose is interpreted as the motivation influenced by external factors, such as a companion, location proximity, frequency and from where the user knew about this place. The classification of purposes in Tab.5a finds that both sites attract people by proximity, frequency, and companion (more than 50%

responds). And the Purpose patterns of Tab.5b shows the highest rate in P2 and P3. It is also where the most variety exists, and a similar quantity appeared from both cases. Therefore, the high percentage of these patterns combined (80%) justifies the characteristics of accommodation for user's multiple purposes.

As for Time, 30' interval separates the time spent as being inside or outside of OSUG. As shown in Tab.6a, there are a lot of people spent more time at the Open space/Farm for UG than in the whole system of OSUG. Additionally, Ebisu has a higher rate of people using the Town-Surroundings. This is justified by its location in the city center, which also results in a high rate of time spent in all locations. Consequently, classified patterns of Time spent in Tab.6b highlights T2 and T4, with a close number from both sites. Representing more than 60%, the quantity confirms that the OSUG supports a long time spent, despite the discontinuity in T3.

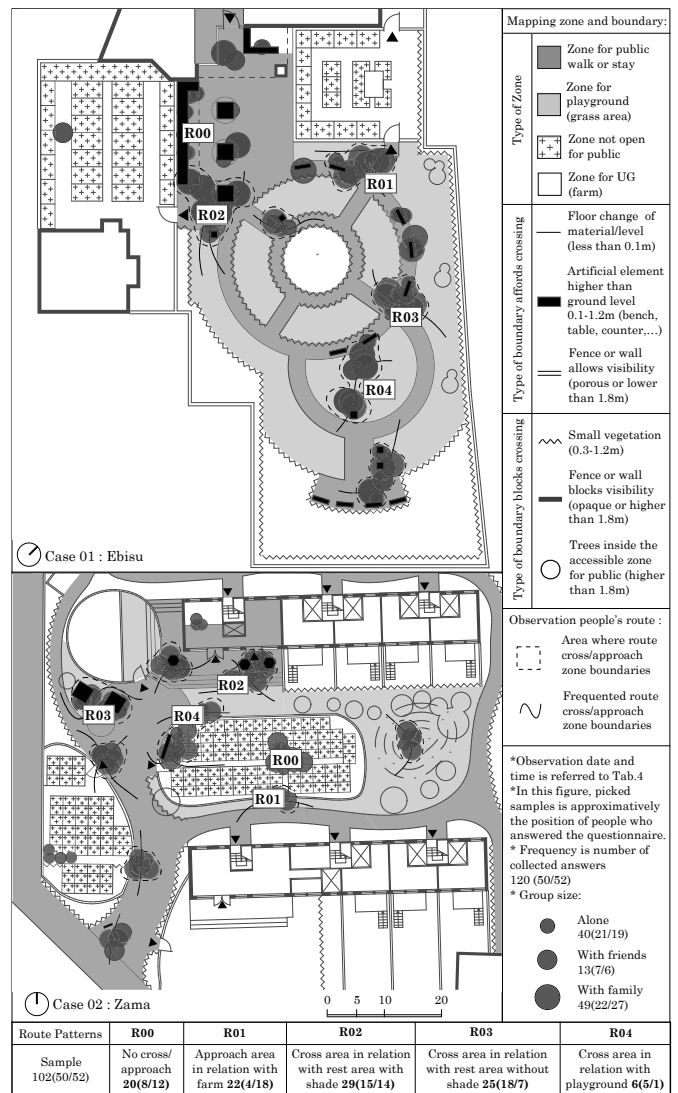### 3.2 Space allows a potential route to cross boundaries

As being a POPS, zoning of OSUG have different public level. As illustrated in Fig.5, farm for UG is a nonpublic facility, delimited by a fence and located along the sidewalk. Others public facilities like the resting area or cafe are mostly facing the farm and the landscaped garden. There is also the lawn space, using as playground zones for children. Besides, physical elements are found at the transition between zones, materialized as Boundary. It is where people stay, sit or linger around. The variety of its height, material, nature divides Boundary into two categories: allows or blocks crossing. Consequently, observation on Route focuses on neither if users continuously stay inside a zone or tend to cross/approach different zones by passing the physical boundaries.

As grouped in the bottom part of Fig.5, Route is distributed into five patterns, ranging from the no cross/approach to different cross zone related to a rest area with or without shade, farm or playground. Additionally, related to group size, at near playground zone, there are mostly families while adjacent to the rest zone there are more samples of sample coming alone. This observation results in a higher rate of patterns near rest area R02, R03 comparing to R04. As an overview, the percentage of patterns tending to cross area R02, R03, R04 (nearly 60%) supports the characteristic of offering a potential route for exploring, despite the random variation in quantity between E and Z.

3.3 Space induces diverse views and a nature-oriented opinion

As proved by past researches[xi], green factor influences how people adopt their way of being in places. Accordingly, Opinion on OSUG is divided follow up to the high rating on Nature, Artificial or both (Fig.6). Here, O1 occupied more than 50% with a high rate in both E and Z. This data suggest the preference of having a natural landscape in OSUG but not exclusively dominant.

Besides, open space is known for offering a View with a minimal screening surface and widely places objects. However, Fig.7 presents a diverse range of occupation by the sky, floor, and others

Fig.5 Observation in OSUG and Route patterns

Route Patterns	R00	R01	R02	R03	R04
Sample 102(50/52)	No cross/ approach 20(8/12)	Approach area in relation with farm 22(4/18)	Cross area in relation with rest area with shade 29(15/14)	Cross area in relation with rest area without shade 25(18/7)	Cross area in relation with playground 6(5/1)

*In this table, number represent the collected sample from people who answered the questionnaire

Fig.6a Patterns of Opinion

*In this table, the rating parameter are defined in Tab.3
*Picked sample is the one that represent at least 20% of specific pattern from collected list of sample
*Number represent the collected sample

Fig.7 Patterns of View

*In this table, the image area is defined in Fig.4b
*Picked sample is the one that represent at least 20% of specific pattern from collected list of sample
*Number represent the collected sample

Table 7a Range of Activity

Range of **Activity** (Purpose and Time Spent relationship)	Passive (eat, rest, watch, read) (P)	Active (farm, work, exercise, assist) (A)	Multiple (go out, meet, sightsee) (M)	P+A	P+M	A+M	P+A+M
Sample (102)	31	6	4	0	15	10	36

*In this table, the number represent the collected sample

Table 7b Tendency of Activity conditionned by Purpose/Time spent

Tendency of Activity / Patterns of Purpose	Patterns of Time spent	T0 No time spent (5)	T1 One time spent (13)	T2 Two times spent (31)	T3 Three times spent (16)	T4 Four times spent (37)
P0 No motivation (3)		(0)	(0)	(1)	(1)	(1)
		0 ┊ 0 ┊ 0	0 ┊ 0 ┊ 0	1 ┊ 0 ┊ 0	1 ┊ 0 ┊ 0	1 ┊ 0 ┊ 0
		0 ┊ 0 ┊ 0	0 ┊ 0 ┊ 0	0 ┊ 0 ┊ 0	0 ┊ 0 ┊ 0	0 ┊ 0 ┊ 0
P1 One motivation (18)		(2)	(1)	(6)	(3)	(6)
		2 ┊ 0 ┊ 0	0 ┊ 0 ┊ 0	5 ┊ 0 ┊ 0	2 ┊ 0 ┊ 0	5 ┊ 1 ┊ 0
		0 ┊ 0 ┊ 0	1 ┊ 0 ┊ 0	1 ┊ 0 ┊ 0	1 ┊ 0 ┊ 0	0 ┊ 0 ┊ 0
P2 Two motivations (46)		(2)	(6)	(13)	(8)	(17)
		0 ┊ 0 ┊ 1	4 ┊ 0 ┊ 0	4 ┊ 0 ┊ 0	4 ┊ 0 ┊ 0	2 ┊ 1 ┊ 2
		1 ┊ 0 ┊ 0	0 ┊ 0 ┊ 2	3 ┊ 2 ┊ 4	0 ┊ 0 ┊ 4	5 ┊ 0 ┊ 7
P3 Three motivations (35)		(1)	(6)	(11)	(4)	(13)
		0 ┊ 0 ┊ 1	0 ┊ 0 ┊ 0	0 ┊ 0 ┊ 0	0 ┊ 1 ┊ 0	0 ┊ 3 ┊ 0
		0 ┊ 0 ┊ 0	1 ┊ 1 ┊ 4	1 ┊ 5 ┊ 5	0 ┊ 0 ┊ 3	1 ┊ 2 ┊ 7

*In this table, Patterns of Purpose result from the analysis in Tab.5b, Patterns of Time spent result from Tab.6b
*Number in each unit is explained as follow, using the symbol and parameters defined in Tab.7a
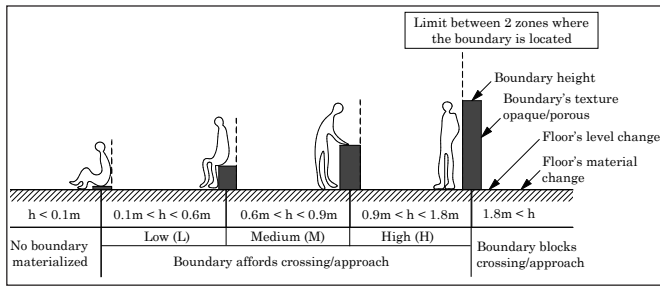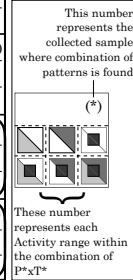
This number represents the collected sample where combination of patterns is found

These number represents each Activity range within the combination of P*xT*

Fig.8 Boundary between zones and related features

h < 0.1m	0.1m < h < 0.6m	0.6m < h < 0.9m	0.9m < h < 1.8m	1.8m < h
No boundary materialized	Low (L)	Medium (M)	High (H)	Boundary blocks crossing/approach
	Boundary affords crossing/approach			

Table 8a Path conditionned by Route

Route Patterns	Path	Sample (102)
R00	Stay	20 (8/12)
R01	Approach	22 (4/18)
R02 R03 R04	Cross	60 (38/22)

* Route patterns result from the analysis in Fig.5
*In this table, the number represent the collected sample of observed people

*In this table, the use of ● indicate whether the features is appearing in the spatial configuration of boundary
*In this table, numbers indicate the amount of boundary's configuration relate to their features present on sites

Table 8b Tendency of Path conditioned by Boundary
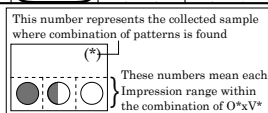
Tendency of Path (Route Patterns)	Height L : 0.1m - 0.6m	Height M : 0.6m - 0.9m	Height H : 0.9m - 1.8m	Texture Opaque	Texture Porous	Floor level change	Floor's material change	Main configuration	Variant of main configuration
Stay (R00)		●		●				Pa1(8/3)	Pa2(1/1)
		●	●	●					
Approach (R01)			●	●	●		●	Pb1(2/7)	Pb2(0/1)
			●	●		●	●		
Cross (R02 R03 R04)		●		●				Pc1(8/2)	Pc2(0/1)
		●		●		●	●		
	●			●				Pd1(5/0)	Pd2(0/1)
	●			●		●	●		

Table 9a Range of Impression

Range of **Impression** (Opinion and View relationship)	Sample (102)
Good	72
Average	24
Bad	6

*In this table, the numbers represent the collected samples

Table 9b Tendency of Impression by Opinion/View

Tendency of Impression / Patterns of Opinion	Patterns of View	V1 Large Sky area (11)	V2 Large Floor area (57)	V3 Large area Sky+Floor (20)	V4 Small area Sky+Floor (14)
O1 High rating on Nature (57)		(3)	(32)	(11)	(11)
		3 ┊ 0 ┊ 0	25 ┊ 6 ┊ 1	9 ┊ 1 ┊ 1	5 ┊ 4 ┊ 2
O2 Equal rating (19)		(4)	(11)	(4)	(0)
		3 ┊ 1 ┊ 0	6 ┊ 4 ┊ 1	3 ┊ 1 ┊ 0	0 ┊ 0 ┊ 0
O3 High rating on Artificial (26)		(4)	(14)	(5)	(3)
		1 ┊ 3 ┊ 0	10 ┊ 3 ┊ 1	4 ┊ 1 ┊ 0	3 ┊ 0 ┊ 0

*Patterns of Opinion result from the analysis of Fig.6
*Patterns of View result from the analysis of Fig.7
*Number in each unit is explained in the beside figure, using symbol and parameters defined in Tab.9a

This number represents the collected sample where combination of patterns is found

These numbers mean each Impression range within the combination of O*xV*

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components. Even though V2 represents more than 50%, the disproportion between E/Z shows that OSUG could offer a variety of ratio occupied by different view components.
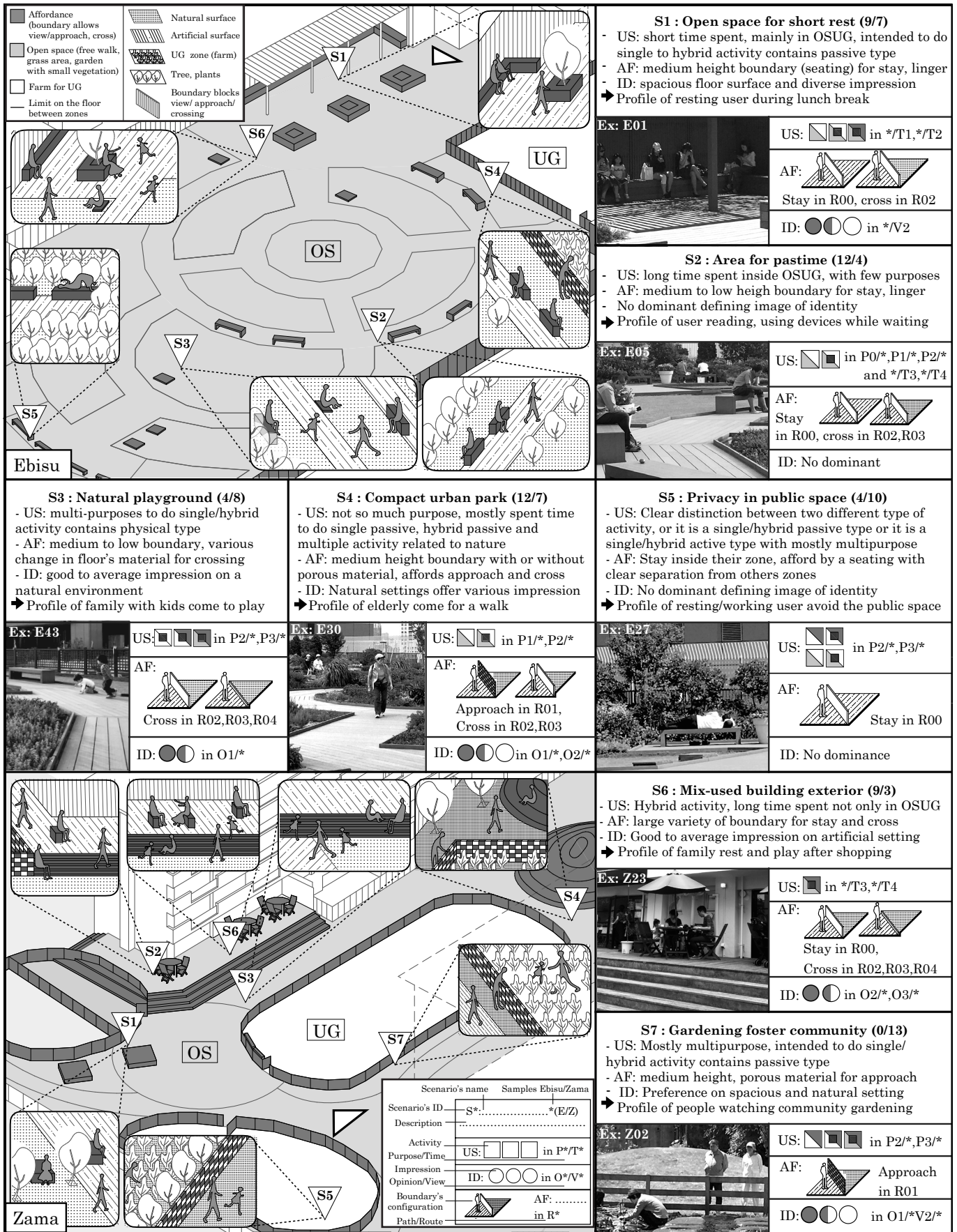
4. People's experiences in OSUG

In user-participation research, Thiel (1997)[4] mentioned that the user adopts their unique way of understanding the stimulant in the physical environment. Hence, to convert the nondiscriminant information given by the environment to subjective interpretations of people, it is necessary to connect the above setting patterns to the related experience parameters. These factors are identified as Activity, Path, Impression corresponding to Purpose/Time, Route/Boundary, Opinion/View, respectively. This interpretation will reveal the particular user's standpoint describes as Experience.

4.1 Activity

OSUG is a multipurpose environment where people could spend a long time, but in there exist a variable order in Activity range. Collected data concerning intended activity (from Tab.2) are classified into in Tab.7a where single type P and hybrid type P+A+M are dominant (nearly 60%) while hybrid type P+A is absent. Tab.7b connects this data to the cross patterns of Purpose and Time spent. It is results in a strong tendency of */T2,*/T4 and a significant change from P2/* to P3/*. Firstly, concerning Time pattern, T2 and T4 are dominant at every level. As for the single/hybrid proportion ranging from T2 to T4 in the case of P2 and P3, while single type didn't change much, the hybrid type decreased and absent the most in the case of T3. Secondly, concerning Purpose pattern, while Passive type present in the most case of P0 to P2, in P3 it is thoroughly absent and Active type emerges in a later part. As an overview of Activity tendency, even though type P and P+A+M occupy similar value, P is quite scattered distributed, while P+A+M concentrates only inside or near the dominant cases.

4.2 Path

Reveal by the mapping of Fig.5, people in OSUG are most likely following specific Path determined by the Boundary's configuration. For instance in Tab.8a, Tendency of Path is interpreted by the combination of Route pattern, defining as Stay, Approach, Cross. While in Tab.8b, it follows the order of boundary's configurations represented by selected features, such as height, texture opaque/porous, and if the connected floor under presents a change in level or material (Fig.8). For example, people near Pa tend to stay, guided by the configuration of medium/high height, opaque texture, and a same floor level/material. Differently, Pb with a porous texture and a change in floor's material affords people to approach the zone's limit. Likewise, a height difference in Pc, Pd appeal to invite people to cross and move between zone. In quantitative analysis, the high presence of Pc1, Pd1 in Ebisu could explain the dominant of Cross patterns. Instead, a strong presence of Pb1 in Zama justify the high rate of Approach, as shown in the Route pattern result (Fig.5).

Legend:
- Affordance (boundary allows view/approach, cross)
- Open space (free walk, grass area, garden with small vegetation)
- Farm for UG
- Limit on the floor between zones
- Natural surface
- Artificial surface
- UG zone (farm)
- Tree, plants
- Boundary blocks view/ approach/ crossing

S1, S6, S4, UG, OS, S2, S3, S5, Ebisu

S1 : Open space for short rest (9/7)
- US: short time spent, mainly in OSUG, intended to do single to hybrid activity contains passive type
- AF: medium height boundary (seating) for stay, linger
- ID: spacious floor surface and diverse impression
➡ Profile of resting user during lunch break

Ex: E01
US: ▧ ■ ▣ in */T1,*/T2
AF: Stay in R00, cross in R02
ID: ● ◑ ○ in */V2

S2 : Area for pastime (12/4)
- US: long time spent inside OSUG, with few purposes
- AF: medium to low heigh boundary for stay, linger
- No dominant defining image of identity
➡ Profile of user reading, using devices while waiting

Ex: E05
US: ▧ ■ in P0/*,P1/*,P2/* and */T3,*/T4
AF: Stay in R00, cross in R02,R03
ID: No dominant

S3 : Natural playground (4/8)
- US: multi-purposes to do single/hybrid activity contains physical type
- AF: medium to low boundary, various change in floor's material for crossing
- ID: good to average impression on a natural environment
➡ Profile of family with kids come to play

Ex: E43
US: ▣ ■ ▣ in P2/*,P3/*
AF: Cross in R02,R03,R04
ID: ● ◑ in O1/*

S4 : Compact urban park (12/7)
- US: not so much purpose, mostly spent time to do single passive, hybrid passive and multiple activity related to nature
- AF: medium height boundary with or without porous material, affords approach and cross
- ID: Natural settings offer various impression
➡ Profile of elderly come for a walk

Ex: E30
US: ▧ ■ in P1/*,P2/*
AF: Approach in R01, Cross in R02,R03
ID: ● ◑ ○ in O1/*,O2/*

S5 : Privacy in public space (4/10)
- US: Clear distinction between two different type of activity, or it is a single/hybrid passive type or it is a single/hybrid active type with mostly multipurpose
- AF: Stay inside their zone, afford by a seating with clear separation from others zones
- ID: No dominant defining image of identity
➡ Profile of resting/working user avoid the public space

Ex: E27
US: ▧ ■ / ▧ ■ in P2/*,P3/*
AF: Stay in R00
ID: No dominance

S6 : Mix-used building exterior (9/3)
- US: Hybrid activity, long time spent not only in OSUG
- AF: large variety of boundary for stay and cross
- ID: Good to average impression on artificial setting
➡ Profile of family rest and play after shopping

Ex: Z23
US: ■ in */T3,*/T4
AF: Stay in R00, Cross in R02,R03,R04
ID: ● ◑ in O2/*,O3/*

S7 : Gardening foster community (0/13)
- US: Mostly multipurpose, intended to do single/ hybrid activity contains passive type
- AF: medium height, porous material for approach
- ID: Preference on spacious and natural setting
➡ Profile of people watching community gardening

Ex: Z02
US: ▧ ■ ▣ in P2/*,P3/*
AF: Approach in R01
ID: ● ◑ ○ in O1/*V2/*

S2, S6, S3, S4, S1, OS, UG, S7, S5, Zama

Scenario's name   Samples Ebisu/Zama
Scenario's ID — S*:.................*(E/Z)
Description
Activity Purpose/Time   US: ☐☐☐ in P*/T*
Impression Opinion/View   ID: ○○○ in O*/V*
Boundary's configuration   AF: ....
Path/Route   in R*

*Usage is composed of Activity and cross patterns Purpose/Time from the analysis of Tab.7a & 7b, with all related symbols of ▧▣■▤
*Identity is composed of Impression and cross pattern Opinion/View from the analysis of Tab.9a & 9b, with all related symbols of ●◑○
*Affordance is composed of Path, Boundary's feature, Route pattern from the analysis of Tab.8a & 8b, with all related drawings of
*Numbers represent the scenario combined by above parameters, all pictures are taken during the observation by the author

Fig.9 Qualities of OSUG in Ebisu and Zama's scenarios

4.3 Impression

The nature-oriented and diversity of views in OSUG affects user's impression and defines their experience in this setting. Data related to Impression (Tab.3) are classified in Tab.9a. The range shows a predominant of G compare to B. Consequently, by combining this range to Opinion/View patterns(Tab.9b), the tendency discloses a dominance of G in most of the cases with the highest in O1/V2. Similarly, a large ratio of G in the second highest O3/V2 could suggest another preference on the artificial setting. Lastly, range B appears only in the dominant case of O1/V2, O1/V3, O1/V4, and O2/V2, O3/V2 presume that the Impression tends to vary according to other parameters of Activity and Path, although users are having the same patterns of opinion and view.

5.Qualities of renovated OSUG

Consequently, Qualities of renovated OSUG emerge from the Setting pattern together with the Experience factor. This incorporation reveals three essential qualities of OSUG, consisting of Usage, Space affordance and image of Identity. By combining these factors, Fig.9 illustrates seven scenarios currently happening in the renovated OSUG of Ebisu and Zama. These results are considered suitable to describe the situation of OSUG during the period when UG was mostly performed compared to the rest of the year and have a significant impact on user's experience. As an overview, there are similar scenarios happening on both sites of Zama and Ebisu (S1 to S6) despite the differentiation in spatial affordance of each site, as shown in the illustrations. Additionally, only scenario S7 is happening in Zama case. This phenomenon could be explained by the renovation's purpose in Zama which focus on community gardening and it justifies the central location of UG in OSUG. Otherwise, for other scenarios, the variation of each parameter of quality leads to an alteration in the scenario's core and corresponds to a different profile of users.

Usage (US), composing of purpose/time patterns and activity, emphasizes the quality of new usage created by renovation projects. This parameter makes a distinction between different profile who come with single or multiple purposes (S2, S3), with the one stay mostly in OSUG (S1) or the one who partly spend time within the surroundings (S6). Meanwhile, these profiles share similar activities according to the facilities present on site. For instance, frequent usage is carried out with various activities ranging from passive types such as having lunch in the seating area, or enjoying nature while watching the farm and garden landscape, to physical types such as gardening, assisting children playing in the lawn space. Meanwhile, occasional usage could consist of resting after a day out in the neighborhood or involving in community practice of gardening. The data shows that a renovated OSUG offering an environment well adapted to local urban lifestyle and responding to the different needs of users. However, perhaps due to the restrictions within the POPS's perimeter, this environment highlighting on sedentary usage and limiting the practice of UG to restraint users group (only in S4, S7) might reduce the effect of UG on the whole usage of OSUG. This finding suggests an attention to the background of local's usage, a concentration effort on establishing the everyday scenarios for locals and extra practices for seasonal events, without missing the quality of renovation's strategy.

Space affordances (AF) in this study represents the effect of boundary not only on users frequented routes but also their paths as stay, approach or cross between zones. It emphasizes the new spatial design integrated into existing context to afford new usages and new identities. This parameter conditions the change in terms of boundarie's configuration between different scenarios as shown in the illustrations of Ebisu and Zama. For example, a change in floor's material will switch the setting of scenario S1 from an rest area to the one of scenario S3 which is a playground. Or a change from opaque to porous texture will orient the stay path of S5 to approach path of S7. Additionally, affordance is flexible regarding the method of combination. For instance, with similar affordance results in S3 and S6, the low height boundary could be multiplied to create stairs intensifying the artificial settings in S6. While in S3, there is a duplicated change in floor's material to construct a natural playground. Lastly, there is a variety of affordance design regarding the site's constraint. For example for S6, by using the same low heigh boudary, Ebisu have a design consist of a zones organization compare to Zama results in change in floor's level creating steps. This result explains that renovation by integrating a new spatial structure into a neglected space requires the flexible design of affordance to guarantee the function, esthetic, and comfort within a controlled environment.

Identity (ID) frame the relationship of the user to OSUG through their vision, opinion and impression within the context. This parameter concludes the reflected image of OSUG in the mind of users, which contribute to the success of renovation projects. It is clear that all scenarios consisted of leisure experience leave mostly a good impression, offered either by a natural setting (S3, S4, S7), artificial setting (S6), or wide open space (S1). As located in a populous metropolitan, Ebisu and Zama remains hidden from the mass tourism but present a significant quality for the neighborhood and contribute to locals well-being. This result shows the positive effect of urban space quality of renovated OSUG in these scenarios. However, the missing identity appeared in S2 and S5 shed light on the insufficiency contribution to construct a complete image of identity for OSUG. This absence in quality not only create a spontaneous situation of S5, might result in a conflict in POPS's usage. This regard suggests an improvement focusing on the design as a positive space with a balanced quality in usage-affordance-identity rather than creating a negative space without control.

6. Conclusion

Attempting to study the spatial qualities of Tokyo renovated OSUG using a combined method of survey, this research aimed to demonstrate the importance of user's experience in urban space design. The finding shows and explains different layers of relationship between people and space, as illustrated as follows. Firstly, combined patterns of people's Purpose-Time, Route-Boundary, Opinion-View deliver the environment settings of OSUG. Although the two case studies differ by situation and purpose, the results clarify a tendency in transforming neglect context to flexible and potential space for contemporary lifestyle, within the constraint system of POPS. Secondly, the experience of people in the environment of OSUG is manifested via Active, Path and Impression. Despite the variety of interpretation, there is a primary in a hybrid type of activities, a strong tendency of path tending to cross boundaries, and users were left with somewhat good impressions about this urban recreation space. Finally, by combining setting and experience, the spatial qualities of OSUG emerged as fundamental elements to compose the scenarios of OSUG in Zama and Ebisu. These qualities illustrate on a broader scale an overview of situations in OSUG of Tokyo. Despite the variation of usage, space affordance and image of identity, these scenarios prove a significant effort to improve urban space quality by different factors of renovation concept such as creating new usage, applying a flexible space affordance, and defining an attractive image of identity. However, the confusion of space identity in two scenarios indicates the unbalance attention given to each factor.

The whole approach shows the benefits and complexities related to the renovation of OSUG in existing context. The method of study has confirmed the role of each parameter discussed in the mentioned literature, concerning human-centered in urban space design. Its existence demonstrates that a successful strategy for urban space integrated user-participation requires an adequacy understanding on the relationship between each spatial qualities composing urban open space. Besides, the quest to understand how these qualities affect each other and how the relationship between them contribute to the overall image of OSUG on a wider scale is left open for further discussions. Also, the finding of this research challenges the concept of integrated user-participation practice in the making of urban space. Without proper control of the balance of quality factors, renovated OSUG carry alongside them the issues of boundaries confusion, conflicts of spontaneous usage and absence the identity of space. The missing quality in the results might affect the outcome of the renovation project on neglected spaces, which could lower the efficiency of integrating these activities into the built environment. Accordingly, the study on experiences of people is essential to design a suitable strategy for social cohesion and revitalizing projects. This study has contributed efforts in this aspect.

Finally, the scope of this study is limited to the case studies in Tokyo, during a specific period according to gardening activities, with a possibility for a survey and also due to the limited availability of on-site assistant for the questionnaire. Whether this result may apply to other locations and situations under different conditions needs further investigation.

Notes

i) In this study, urban gardening defines as a rental leisure activity to be away from the urban lifestyle, differs from farming for food production.

ii) In 2014, Tokyo metropolis count as 1575 UG, occupied 38% of Japan (Data concerned the Private Farmlands for Community Use, in the 89th Statistical Yearbook of - Ministry of Agriculture, Forestry and Fisheries).
（市民農園の農園数及び面積の推移，第 89 次農林水産省統計表，農林水産省）

iii) See reference 4) for the concept of user's experience in a setting.

iv) New business model envisioned creating a new market convincing urban citizen to interest in urban gardening by support and technology (Nikkei Asian Review Dec.2016, available at www.asia.nikkei.com/magazine/fresh-ideas/on-the-cover/a-new-crop-of-farmers-is-revitalizing-japanese-agriculture)

v) Release by MAFF in September 2005.

vi) UG with access by public transport in Tokyo, Kanagawa, Chiba, Saitama.

vii) POPS is defined as the open space accessible to the public during restricted hours. These space integrated to built environment belong to a facility of a commercial or residential program, for the community.

viii) These farms belong to private railway company (JR East and Odakyu). The survey was done within the perimeter of OSUG during their opening hours as public space, and with the user's acceptance. The manager Toho Leo and Agrimedia allows the survey on their staffs and the farm.
（日本語表記：JR 東日本，小田急電鉄、邦レオ株式会社，株式会社アグリメディア）

ix) In reference 20), Bourke explained there are enough approximations between this method and the equiangular fisheye projection generated by computer, hence, this method is suitable for this study.

x) See reference 4) for the method to calculate pixel ratio in fisheye frame.

xi) See reference 15) and 16) for greenery's preference on a tendency of stay.

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和文要約

研究の目的：
本研究は、利用者の参加を統合し都市空間を改修する上でのコンセプトについて、利用者を中心に考えるデザインの重要性を示すものである。そして、都市菜園が付属したオープンスペース（OSUG）の空間的な質に関して、利用者の経験にみられる特徴を明らかにすることを目的としている。本稿では、既存建物へ改修によって付与された OSUG の事例を対象としている。このようなオープンスペースは、私有の公共空間（POPS）と見なされている。そして本研究は、この現代的な都市空間のモデルについて、今後の設計に資する有益な要因を発見することを目指している。

研究の方法：
座間と恵比寿という２つの OSUG を選定し、複合的な実地調査を行う。これらは、東京における改修による OSUG の典型例であると考えられる。はじめに、３つの方法を用いて、OSUG の利用者に関するデータを収集する。その方法とは、目的と時間および意見に関するアンケート、経路と境界に関する観察、視界に関するレンダリングである。各々のパターンの分析によって、OSUG の環境の特徴を明らかにする。次に、これらのパターンを、活動と行路および印象という、利用者の経験に関する観点から説明する。最後に、これらの環境および経験に関する特徴を重ね合わせて検討し、使い方、空間のアフォーダンス、独自の印象という、改修による OSUG の質を明らかにする。これら３つの質は、OSUG における利用者の状態を示すシナリオを構成する主な要因と考えられる。

結論：
１）目的と時間、意見と視界、経路と境界のパターンに関する分析から、OSUG の環境は、多目的で長時間の利用を支援するものとして存在し、潜在的な経路の探索、自然志向の評価、様々な視界の枠組みを提供していることが示された。これは、放置されていたオープンスペースを、柔軟で可能性のある都市空間へと変貌させる傾向を証明している。

２）経験に関する分析からは、複合的な活動が大多数であること、境界の多様な構成に影響されて生じる横断するという行路の傾向、また、良好な印象という結果が示された。 これらは、OSUG の利用者の経験に対する肯定的な効果を示すものである。

３）これらの空間の質が組み合わされたシナリオからは、改修による OSUG の肯定的な成果が見出された。結果、これらの地域における都市的なライフスタイルに適した様々な利用状況、POPS という管理された環境において機能性 - 美しさ - 快適さを保証するアフォーダンスの柔軟なデザイン、余暇の経験に関係する良好な印象といった特徴が明らかになった。しかし一方で、これら７つのシナリオのうち２つは、独自性という質を欠いており、それによって利用状況の衝突や空間的な混乱が無意識的に生じている。