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The Consciousness and Current use of Residents for Community Spaces of Rental Housing by Post-Occupancy Evaluation

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ABSTRACT

This study aims to POE(Post-Occupancy Evaluation) analyze the characteristics of residents and their demands on community facilities by types of supplying housing, which can be the basis for making the housing regulations. The following five types of housing are considered in this study ; 1) National Rental Housing(L), 2) Public Rental Housing(L), 3) Permanent Rental Housing(S), 4) Public Rental Housing(S), 5) Private Rental Housing. We surveyed 527 residents from 20 housing complexes in those four housing types. First, each housing type has different household characteristics. Second, the criteria for housing selection are different. Third, local community activities and satisfaction are different in each housing type. Lastly, residents are generally satisfied with service facilities, but their satisfaction level and the facilities they need are different depending on housing type, accordingly. The housing community space plan be should be improved to the amount of areas of community facilities.

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1. Introduction

1.1. Background and Objective

While a large-scaled housing becomes a main residential stream in our society, a sense of community that had been traditionally established gets weak, which leads to isolation of residents from neighbors, deepened individualism, reduction of commonly shared and living space and increase of inhumane physical environment. In the meantime, apartment building became apparent as a main type of residental space.

However, in general, actual conditions of using community space are not well understood once the residents move in a Housing complex, so that diverse needs, complaints or improvements for the residents are not converged in time. In addition, since the service facilities in a Housing complex vary in size of area by the number of households, construction period, region and mandatory facility, it is true that they do not properly reflect the diverse characteristics of the Housing complex and demands of the residents.

To tackle these problems, the government revised the existing regulations into 'The Guideline of Housing Construction Standards(December 13th, 2013)'. The revised guideline is flexible in that it allows the planing and construction of the common facility for residents to reflect the regional characteristics and diverse needs of the residents by applying the concept of aggregate size of area to the facilities rather than individual construction area. In addition, the guideline stipulates existing required facilities to be obligatory facilities and, if necessary, it allows a local government to decide the types and area size of obligatory facility.

The present study aims to conduct POE(Post-Occupancy Evaluation) on legally required service facilities and other indoor and outdoor spaces within a rental residental complex; examine the consciousness and usage of community spaces; and propose basic data for the improvement of the construction standards for the spaces.

2. Research Method and General Characteristics of Residents

2.1. Method and Contents[1]

First, face-to-face interview was employed as research method. Random sampling was used to select samples by construction and

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1) Research areas include rental housing complexes supplied in Seoul, Kyunggi Province and Inchon city. The consciousness and usage of the residents on community space were compared and analyzed by rental housing type. Since obligatory facilities are different by size, number of households and region of rental housing complex, the research objects were categorized into 3 groups with reference to a related installation guideline: 1) less than 500 households, 2) 500 to 1,000 households and 3) more than 1,000 households.

age. For research area, rental housing complexes located in Seoul, Kyunggi Province and Incheon City were chosen. Second, a total of 23 questions comprises a questionnaire including 'Characteristics of Residents and Their Consciousness' and 'Usage and Satisfaction with Community Spaces'. The questionnaire (Table 1) was prepared on the basis of precedent studies and related literature in consideration of the researcher's intent and research direction in the present study. Third, the rental housing complexes were groups by the number of household: 1) less than 500 households, 2) 500 to 1,000 households and 3) more than 1,000 households, and a total of 20 rental housing complexes were chosen by rental type: 8 national rental housing(L), 3 public rental housing(L), 4 permanent rental housing(S), 2 public rental housing(S)[2], and 3 private rental

Table 1. Survey information

Division	Details	Note
Characteristics & consciousness of residents	- Considerations when selecting housing - Exchange activities, etc.	-
Utilization and satisfaction of community space	- Satisfaction and reasons for using of community space - Dissatisfied reasons of community space and reasons for not using - Necessary facilities and unneeded facilities	Welfare center for permanent rental housing
Plan and satisfaction of community space	- Considerations when planning a community space - Proper allocation plan / desired Arrangement - Open and non open of a community space - Operational and management practices etc.	-

Table 2. Location and distribute of survey

Division	Location	Move-in	Number of households	distribute	Significant figures
NRL	Seoul A	'04.10	350	30	27
	Suwon B	'01.08	341	28	26
	Ansan C	'01.11	796	30	28
	Uijeongbu D	'02.11	1,450	28	26
	Seongnam E	'10.10	210	30	28
	Kimpo F	'12.12	2,230	28	26
	Incheon G	'04.08	1,696	28	27
	Incheon H	'12.07	1,525	30	30
PRL	Seongnam P	'09.05	428	30	27
	Suwon H	'11.11	1,029	30	27
	Koyang H	'07.11	1,000	32	32
PRS	Seoul K	'91.08	2,411	26	24
	Seoul G	'91.10	1,563	26	24
	Seoul N	'92.11	2,619	26	24
	Seoul D	'00.10	905	26	25
PrS	Seoul K	'95.02	598	26	23
	Seoul N	'07.11	775	26	23
PR	Seoul K	'10.10	585	26	26
	Seoul L	'12.12	838	27	27
	Seoul M	'04.08	1,060	27	27
Total		20 housing complex	560	527	

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2) For 'public rental housing(S)', this study chose the complexes recommended by 'S'. Therefore, it is useless to compare 'public rental housing(L)', which was randomly selected, with the results of the study. Accordingly, this study limited its focus to understanding overall awareness and current status when using the findings from the analysis. And the types of rental housing are expressed with initials of each type: 'NRL' for National Rental Housing(L), 'PRL' for Public Rental Housing(L), 'PRS' for Permanent Rental Housing(S), 'PrS' for Public Rental Housing(S) and 'PR' for Private Rental Housing.

housing (Table 2). 550 questionnaires were distributed and 527 were used for analysis excluding 23 questionnaires that hadn't bee collected and turned out less sincere in answering. Frequency analysis, average and mean, X^2-test, F-test and cross analysis were performed.

The reason why the present study limited research area to rental housing complex is that the researcher thought that the community spaces and service facilities within the rental housing complex that was built and supplied in the past can't reflect the diverse needs and characteristics of residents. It is also to propose the basic data with which the future community spaces, facilities and programs within rental housing complex can be provided for residents to form and activate cooperative communality.

2.2. General Characteristics of Residents

The results of the questionnaire survey showed there were more female residents and residents in their 40s or older: male residents (42.9%) and female residents (57.1%) by sex and residents in their 40s (20.1%), 50s (20.9%) and 60s or older (20.9%) by age.

And the results showed there live more married residents and most of the respondents were with their families: single (24.1%), married (60.9%), separation by death/devoiced (14.8%) and other (0.2%).

3. Characteristics of Residents by Type of Rental Housing and Their Consciousness

3.1. Considerations in Choosing a Rental House by Type

When choosing a national rental house, it turned out that they consider 'housing expenses(rent and maintenance fee) (51,4%)' first and most and then 'the distance from work or school (11.9%)', 'peripheral environment (6.9%)'. In choosing public rental house(L), they consider 'housing expenses(rent and maintenance fee) (27.9%)' and then 'peripheral environment (17.4%)', 'the distance from work or school (12.8%)'. More details are shown in Table 3. The considerations slightly vary by rental type but mostly similar.

It indicates that they place most of weight on housing expenses (rent and maintenance fee) in selecting rental house and then put other factors like distance from work or school, neighboring atmosphere and environment(continence facilities and natural environment) and safety and stability of peripheral areas.

Table 3. Housing selection consideration

Division		housing expenses	Distance (work& school)	Education	Environment	Internal structure	Scale and arrangement	Safety of residential area	Transportation Convenient	Investment	community space	Other	Non response	Total
NRL	N	112	26	9	15	3	5	14	8	1	2	1	22	218
	%	51.4	11.9	4.1	6.9	1.4	2.3	6.4	3.7	0.5	0.9	0.5	10.1	100.0
PRL	N	24	11	3	15	1	7	11	2	3	1	0	8	86
	%	27.9	12.8	3.5	17.4	1.2	8.1	12.8	2.3	3.5	1.2	0.0	9.3	100.0
PRS	N	40	6	3	10	0	6	10	4	0	1	5	12	97
	%	41.2	6.2	3.1	10.3	0.0	6.2	10.3	4.1	0.0	1.0	5.2	12.4	100.0
PrS	N	19	2	1	4	0	0	0	14	0	0	0	6	46
	%	41.3	4.3	2.2	8.7	0.0	0.0	0.0	30.4	0.0	0.0	0.0	13.0	100.0
PR	N	14	15	9	2	1	3	4	15	4	0	5	9	80
	%	17.5	18.8	11.3	2.5	1.3	3.8	5.0	18.8	5.0	0.0	6.3	10.1	100.0
Total	N	209	60	25	46	5	21	39	43	8	4	11	56	527
	%	39.7	11.4	4.7	8.7	0.9	4.0	7.4	8.2	1.5	0.8	2.1	10.6	100.0
X^2		152.533***												

* $p<.05$ ** $p<.01$ *** $p<.001$

3.2. Activity Exchange with Neighbors/Acquaintance Space for it

1) Activity Exchange by Rental Housing Type

Regarding activity exchange with neighbors/acquaintance, the residents living in national rental housing(L) answered 'No, I don't' (51.8%)', which is higher than 'Yes, I do (48.2%)'. And the residents living in public rental housing(L) answered 'Yes, I do (53.5%)', which is higher than 'No, I don't (46.5%)'. In the meantime, the residents living in permanent rental housing(S) responded 'Yes, I do (58.8%)', which is higher than 'No, I don't (41.2%)'. The residents living in public rental housing(S) answered 'Yes, I do (60.9%)', which is higher than 'No, I don't (39.1%)'. Last, the residents living in private rental housing 'Yes, I do (53.3%)', which is a bit higher than 'No, I don't (48.8%)'. Though slightly different by rental housing type, but most of the residents revealed that they exchange activities with neighbors/acquaintance. It seems that more residents living in national rental housing(L) answered 'No, I don't' because they are relatively younger than those in other types of rental housing and so they have to go to work on weekdays, which naturally leads to be distant from community activities.

Table 4. Exchange activities by types of supplying housing(yes or no)

Division		Yes	No	Total
NRL	N	105	113	218
	%	48.2	51.8	100.0
PRL	N	46	40	86
	%	53.5	46.5	100.0
PRS	N	57	40	97
	%	58.8	41.2	100.0
PrS	N	28	18	46
	%	60.9	39.1	100.0
PR	N	41	39	80
	%	51.3	48.8	100.0
Total	N	277	250	527
	%	52.6	47.4	100.0

2) Space for Activity Exchange by Rental Housing Type

There was no notable difference in the space for activity exchange by rental housing type. The percentages of using the community space within Housing complex. were national rental housing(L) (46.7%), public rental housing(L) (58.7%), permanent rental housing(S) (77.2%), public rental housing(S) (57.1%) and private rental housing (63.4%). It suggests most of activity exchange happen in the community space in a Housing complex.

Table 5. Exchange activities space

Division		Housing complexes		House	Non response	Total
		in	community space			
NRL	N	30	49	25	1	105
	%	28.6	46.7	23.8	1.0	100.0
PRL	N	8	27	11	0.0	46
	%	17.4	58.7	23.9	0.0	100.0
PRS	N	4	44	9	0.0	57
	%	7.0	77.2	15.8	0.0	100.0
PrS	N	5	16	7	0.0	28
	%	17.9	57.1	25.0	0.0	100.0
PR	N	8	26	7	0.0	41
	%	19.5	63.4	17.1	0.0	100.0
Total	N	55	162	59	1.0	277
	%	19.9	58.5	21.3	0.4	100.0
X^2		19.835*				

* $p<.05$ ** $p<.01$ *** $p<.001$

4. Characteristics of Community Space Usage

4.1. Frequency of Using Community Space by Rental Housing Type

The frequency analysis of community space usage by rental housing type showed that community space in national rental housing(L) was used 'one or twice a month' (25.2%); community space in public rental housing(L) 'wasn't used at all' (32.6%); that in permanent rental housing(S) was used 'everyday' (40.2%); that in public rental housing(S) wasn't used at all (32.6%); and that in private rental housing 'wasn't used at all' (37.5%), which is the highest among other types of rental housing. More details are shown in Table 6.

Table 6. Frequency of using community space

Division		Daily	Week			Month	Not use	Total
			4-5	2-3	1	1-2		
NRL	N	38	9	29	32	55	55	218
	%	17.4	4.1	13.3	14.7	25.2	25.2	100.0
PRL	N	10	5	9	10	24	28	86
	%	11.6	5.8	10.5	11.6	27.9	32.6	100.0
PRS	N	39	5	12	6	13	22	97
	%	40.2	5.2	12.4	6.2	13.4	22.7	100.0
PrS	N	6	3	5	3	14	15	46
	%	13.0	6.5	10.9	6.5	30.4	32.6	100.0
PR	N	19	6	12	3	10	30	80
	%	23.8	7.5	15.0	3.8	12.5	37.5	100.0
Total	N	112	28	67	54	116	150	527
	%	21.3	5.3	12.7	10.2	22.0	28.5	100.0

Notably, residents in permanent rental housing(S) answered that they use the community space 'everyday (40.2%)', which is relatively higher than any other types of rental housing. It seems that they use it everyday because a social welfare center, located inside of permanent rental housing complex, runs various programs.

4.2. Co-Users of Community Space by Rental Housing Type

The analysis on the co-users for community space showed that there was no considerable deference by the type of rental housing. On average, 41% said 'Use it alone', which is the highest and followed by 'family (29.4%)' and 'neighbor or friend(28.6%)', 'friend from outside (0.8%)' in the order. See Table 7. It turned out that they generally use community space alone or with family members. By rental housing type, 43.6% of residents in national rental housing(L) use the space alone; 37.9% of the residents in public rental housing(L) use it with their neighbors or friends; 40.0% of the residents in permanent rental housing(S) use it alone; 45.2% of the residents in public rental housing(S) use it alone; and 46% of the residents in private rental housing use the community space alone.

The high rate of along-use of the community space seems to result from community spaces lacking in facilities and programs that can meet various needs and demands of multiple user segments who want to enjoy the space alone or with family or friends. Another reason can be the increase of single or two-member households. Especially, more senior citizens live in a permanent rental housing complex. So it is also one of the explanations.

Table 7. Type of community space for rent with someone using

Division		Alone	Family	Neighborhood	Friend	Total
NRL	N	71	50	40	2	163
	%	43.6	30.7	24.5	1.2	100.0
PRL	N	17	19	22	0	58
	%	29.3	32.8	37.9	0.0	100.0
PRS	N	30	16	28	1	75
	%	40.0	21.3	37.3	1.3	100.0
PrS	N	14	7	10	0	31
	%	45.2	22.6	32.3	0.0	100.0
PR	N	23	19	8	0	50
	%	46.0	38.0	16.0	0.0.	100.0
Total	N	155	111	108	3	377
	%	41.1	29.4	28.6	0.8	100.0

4.3. Reasons for Using Community Space by Rental Housing Type

First, it turned out that the reasons were similar by rental housing type. Most reason was answered 'To Keep Good Health (34.0%)' and it was followed by 'As Leasure And Hobby (27.6%)', 'To Exchange with Neighbors (23.3%)' and 'Because It Is Nearer Than External Facility (8.8%)'. Therefore, it was known that most of the users use community space for 'good health' and 'leisure and hobby'. See Table 8.

Second, the participants revealed the reasons why they do no use community space as follows. They answered 'No facility Worth Using' which is relatively higher than other reasons. These responses indicate that the residents do not use the community space not because the facility is old but because it is not equipped

Table 8. Reason of using community space

Division		Leisure and hobbies	Exchanges with neighboring	Health Maintenance	Program	Near	Inexpensive	Other	Play with children	Non response	Total
NRL	N	35	35	71	0	14	0	1	6	1	163
	%	21.5	21.5	43.6	0.0	8.6	0.0	0.6	3.7	0.6	100.0
PRL	N	23	13	8	2	7	1	0	4	0	58
	%	39.7	22.4	13.8	3.4	12.1	1.7	0.0	6.9	0.0	100.0
PRS	N	22	24	22	2	2	0	2	1	0	75
	%	29.3	32.0	29.3	2.7	2.7	0.0	2.7	1.3	0.0	100.0
PrS	N	10	9	6	0	5	1	0	0	0	31
	%	32.3	29.0	19.4	0.0	16.1	3.2	0.0	0.0	0.0	100.0
PR	N	14	7	21	1	5	0	0	2	0	50
	%	28.0	14.0	42.0	2.0	10.0	0.0	0.0	4.0	0.0	100.0
Total	N	104	88	128	5	33	2	3	13	1	377
	%	27.6	23.3	34.0	1.3	8.8	0.5	0.8	3.4	0.3	100.0
X^2		58.214***									

* p<.05 ** p<.01 *** p<.001

Table 9. Reason of not using community space by types of supplying housing

Division		Do not know community space	Not enough of available facilities	Inconvenient of outdated	Not interested	No time available	Other	Total
NRL	N	6	25	1	12	11	0	55
	%	10.9	45.5	1.8	21.8	20.0	0.0	100.0
PRL	N	1	11	1	8	7	0	28
	%	3.6	39.3	3.6	28.6	25.0	0.0	100.0
PRS	N	1	8	2	4	5	2	22
	%	4.5	36.4	9.1	18.2	22.7	9.1	100.0
PrS	N	0	7	0	6	2	0	15
	%	0.0	46.7	0.0	40.0	13.3	0	100.0
PR	N	0	17	1	7	5	0	30
	%	0.0	56.7	3.3	23.3	16.7	0.0	100.0
Total	N	8	68	5	37	30	2	150
	%	5.3	45.3	3.3	24.7	20.0	1.3	100.0
X^2		46.952***						

* p<.05 ** p<.01 *** p<.001

with proper and enough equipment that meet the needs (mainly 'exercise and hobby activity') of its users. Therefore, proper equipments that can reflect the characteristics and needs of the residents should be considered in following construction. See Table 9.

5. Residental Unit and Satisfaction with Community Space[3)]

5.1. Satisfaction with Residental Unit by Rental Housing Type

The analysis of the satisfaction with current housing complex showed that the average was 3.43 (out of 5), which indicates that most of the respondents were quite satisfied with their residential unit. By rental housing type, residents in public rental housing(S) showed the highest level of satisfaction (3.46) and followed by permanent rental housing(S) (3.36), private rental housing (3.33), public rental housing(L) (3.24), national rental housing(L) (3.23) and national rental housing(L), which is the lowest. See Table 10.

Table 10. Residential rental Satisfaction

Division	Total	N	Std. Deviation	F
NRL	3.41	218	.876	
PRL	3.34	86	.928	
PRS	3.28	97	.887	2.099*
PrS	3.50	46	.837	
PR	3.63	80	.700	
Mean	3.43	527	.863	

* : P<.05, **: P<.01, ***: P<.001, Likert -5-scale

5.2. Satisfaction with Community Space by Rental Housing Type

The analysis of the satisfaction with the current community space in housing complex showed that the average was 3.29 (out of 5), which indicates that most of the respondents were satisfied with the community space in their housing complex more than average. By rental housing type, residents in public rental housing(S) showed the highest level of satisfaction (3.46) and followed by permanent rental housing(S) (3.36), private rental housing (3.33), public rental housing(L) (3.24), national rental housing(L) (3.23) and national rental housing(L), which is the lowest. See Table 11.

Table 11. Complex community space Satisfaction

Division	Mean	N	Std. Deviation	F
NRL	3.23	218	.886	
PRL	3.24	86	1.095	
PRS	3.36	97	1.324	6.242***
PrS	3.46	46	1.005	
PR	3.33	80	1.077	
Total	3.29	527	1.051	

* : P<.05, **: P<.01, ***: P<.001, Likert -5-scale

5.3. Impact of Residental Environment upon Community Space

The analysis of the impact of residential environment on community space showed as follows. First, the respondents said "Yes, It Has Impact on It (considerable and general impact on community space) (35.3%), 'No, It Doesn't Have Impact (no impact + generally do not have impact on community space) (21.3%)'. Therefore, it turned out that community space has impact on satisfaction with residential environment. See Figure 1.

Second, the cross analysis of satisfaction with community space and that with housing complex shown that when satisfaction with community space is high, satisfaction with housing complex was also high (69.3%), which is highly correlated. It indicates that the higher the satisfaction with community space is, the higher the

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3) As mentioned in '2.1', the result does not intend to simply list the rank of the satisfaction with rental housing by type. It can be used as basic data in establishing the installation standards of community space in consideration of the characteristics of rental housing by type.

satisfaction with housing complex. It also indirectly demonstrates that satisfaction with community space has impact on the satisfaction with housing complex. See Table 12.

Table 12. Satisfaction only in accordance with the community space satisfying

Division	N	Satisfaction of housing complex			
		Dissatisfaction	Normal	Satisfaction	Total
Dissatisfaction	113	32.7	28.4	38.9	100.0
Normal	208	9.6	45.2	45.2	100.0
Satisfaction	179	10.1	20.6	69.3	100.0
Total	500	15.0	32.6	52.4	100.0
X^2 = 64.918 * *					

* : P<.05, * * : P<.01, * * * : P<.001
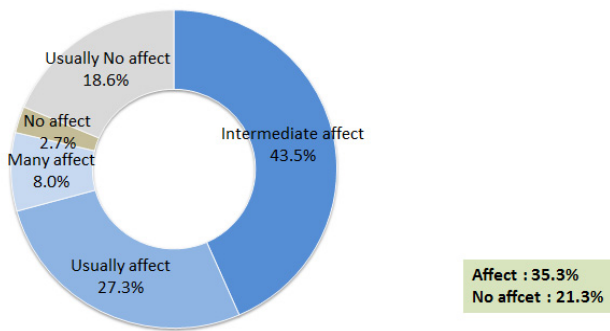
Figure 1. Affect of the residential community space environment

5.4. Satisfaction with Community Subspaces by Rental Housing Type

Community spaces (e.g. service/convenience facilities) within a housing complex are provided in accordance with related laws and regulations such as Housing Act and Housing Construction Standards but there are differences by housing complex. The present study carried out satisfaction survey on obligatory community facilities (e.g. service/convenience facilities) in housing complex and analyzed the collected data from the survey.

Table 13. Details community space selection

Facilities		Welfare facilities	
Facilities	Criteria(household)	Facilities	Criteria(household)
Management Office	More than 50	Playground	More than 50
Parking lot	1lot/ household	Senior center	More than 100
		Community facility	More than 500
		Child Care Centers	More than 300
		Rest facilities	More than 300
		Social Welfare	PRS

First, the satisfaction survey with community facilities by rental housing type. On average, senior citizen center was most satisfied (4.55 out of 5) and followed by parking lot (3.77), bench and pavilion (3.49) and maintenance office (3.47). And the figures of playground, bench and pavilion, senior citizen center, and maintenance office turned out statistically signifiant. It indicates that the residents are satisfied with community facilities more than

average. See Table 14.

Table 14. Satisfaction of Community space per

Division		Outdoor exercise space	Play -ground	Bench summer -house	Senior center	Manage -ment Office	Parking lot
NRL	N	80	81	180	25	157	107
	Likert -5-scale	3.43	3.31	3.36	4.68	3.39	3.89
PRL	N	36	36	81	9	56	57
	Likert -5-scale	3.25	3.25	3.41	4.33	3.95	3.74
PRS	N	33	46	74	10	65	28
	Likert -5-scale	3.58	3.52	3.7	3.7	3.45	3.32
PrS	N	3	21	26	0	24	25
	Likert -5-scale	3.67	3.67	3.77	0	3.2	3.84
PR	N	18	39	61	5	53	41
	Likert -5-scale	3.67	3.56	3.61	3.5	3.34	3.78
Total	N	170	223	422	49	355	258
	Likert -5-scale	3.45	3.42	3.49	4.55	3.47	3.77
F		1.424*	2.385*	2.502*	1.606**	3.308***	1.724 (N.S)

* : P<.05, **: P<.01, ***: P<.001, Likert -5-scale

Second, the negative responses on community facilities showed by rental housing type that they were dissatisfied with community facilities in national rental housing(L) for 'less various kinds of facility (29.3%)', which is the highest, and followed by 'small scaled (26.8%)', 'poor physical conditions of facilities (22.0%)' and 'insufficient operation of facilities (7.3%)'. For the community facilities in public rental housing(L), the residents answered for dissatisfaction 'less various kinds of facility (61.9%)', which is most mentioned, and followed by 'insufficient operation of facilities (19.0%)' and 'poor physical conditions of facilities (9.5%)'. The reasons for dissatisfaction with community facilities were answered by the residents in permanent rental housing(S) like 'do not like the users (56.5%)', which is the highest, and then 'Small Scaled (13.0%)'. The residents in public rental housing(S) were dissatisfied with community facilities for 'small scaled (77.8%)', which is the highest, and followed by 'less various kinds of facility (22.2%)'. Meanwhile, the residents in private rental housing responded on the reasons as 'less various kinds of facility (78.9%)', which is followed by 'poor physical conditions of facilities (14.2%)' and 'do not kike the users (13.3%)'. See Table 15.

Most of the residents complained of community facilities for 'less various kinds of facility'. It implies that they feel inconvenient with community space due to its small size lack, so this should be considered in planning community space in future.

Especially, exercising (fitness) facility (both indoor and outdoor) and educational facility were found necessary because the residents thought they are necessary to increase and activate the use of community space.

However, most of fitness and educational facilities are built in

Table 15. Reason for dissatisfaction community space

Division		Small-scale facility	Type shortage	Environment bad	Operating inadequate	Location	Complaints about the user	Other	Total
NRL	N	11	12	9	3	0	2	4	41
	%	26.8	29.3	22.0	7.3	0.0	4.9	9.8	100.0
PRL	N	1	13	2	4	1	0	0	21
	%	4.8	61.9	9.5	19.0	4.8	0.0	0.0	100.0
PRS	N	3	3	3	0	0	13	1	23
	%	13.0	13.0	13.0	0.0	.0	56.5	4.3	100.0
PrS	N	7	2	0	0	0	0	0	9
	%	77.8	22.2	0.0	0.0	0.0	0.0	0.0	100.0
PR	N	0	15	2	2	0	0	0	19
	%	0.0	78.9	14.2	8.0	0.9	13.3	4.4	100.0
Total	N	22	45	19	9	1	15	5	113
	%	19.5	39.8	14.2	8.0	0.9	13.3	4.4	100.0
F		8.206 ***	5.317 **	6.013 **	4.206 **	(N.S)	(N.S)	(N.S)	-

* : P<.05, ** : P<.01, *** : P<.001, Likert-5-scale

accordance with existing laws and regulations, so that they lack in variety and size, which can't meet the various needs of the residents. Therefore, it is necessary to reflect their voices to designing community space from the initial stage for future construction.

6. Designing and Operational Planning of Community Space

6.1. Consideration for Designing Community Space

The most considerations in planning community space in an Housing complex tuned out to be 'Spatial Variety (24.1%)', 'Proper Area (Size) (21.4%)', 'Easy Accessibility and Allocation (18.8%)', 'Pleasantness (13.7%)', 'Security and Safety (9.9%)', 'Proper Number of Facility (6.1%)' and 'Economic Feasibility of Management and Operation (5.7%)'.

According to the responses on the considerations by rental housing space, the residents living in national rental housing(L) and permanent rental housing(S) answered that 'Spatial Variety' should be considered most while the residents living in private rental housing and public rental housing(L) responded 'said' 'Proper Area (Size)' most. See Table 16 .

Table 16. Considerations of community space planning (Unit : %)

| Division	Total	NRL	PRL	PRS	PrS	PR
Case number	218	218	86	97	46	80
Diversity of space	23.4	23.4	16.3	30.9	41.3	16.3
Adequacy of scale	19.3	19.3	23.3	20.6	15.2	30
Accessibility & Arrangement	17.4	17.4	8.1	19.6	28.4	27.5
Amenity	11.5	11.5	15.1	20.6	4.3	15
Secure & safety	11.5	11.5	18.6	6.2	4.3	3.8
Adequacy of the installation number	8.3	8.3	8.1	0	6.5	5
Economics of management operations	8.1	8.1	10.5	1.1	0	2.4
Other	0.5	0.5	0	1	0	0
total	100	100	100	100	100	100
X²	56.665**					

* p<.05 ** p<.01 *** p<.001
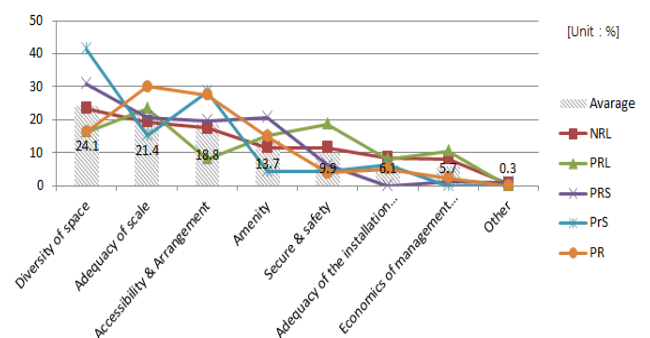
Figure 2. Considerations of community space planning

6.2. Direction for Planning 'Hoped' Community Space

The residents were asked about what space they want community space to be in housing complex and showed the following opinions. They preferred most 'to design the community space properly divided into indoor and outdoor space (34.9%)' and 'to design the space to mainly be outdoor space' where 'park', 'strolling path' and 'playground for children', 'can fit to (29.6%)'. See Table 17.

The residents in public rental housing(S), permanent rental housing(S) and private rental housing preferred community space to be outdoor space for outdoor activities such as park, trail, playground and so on while the residents in national rental housing(L) and public rental housing(L) preferred to be indoor space for library, senior care center, fitness center and so on.

Table 17. Preferred Planning of community space   (Unit : %)

Division	Total	NRL	PRL	PRS	PrS	PR
Case number	527	218	86	97	46	80
Proper distribution of Indoor and outdoor space	34.9	25.2	20.9	20.6	21.7	21.3
Mainly outdoor spaces	29.6	15.6	20.9	49.5	63	33.8
Mainly indoor spaces	22.8	39.4	54.7	19.6	10.9	33.8
Not interested	12.7	19.8	3.5	10.3	4.4	11.1
Total	100	100	100	100	100	100
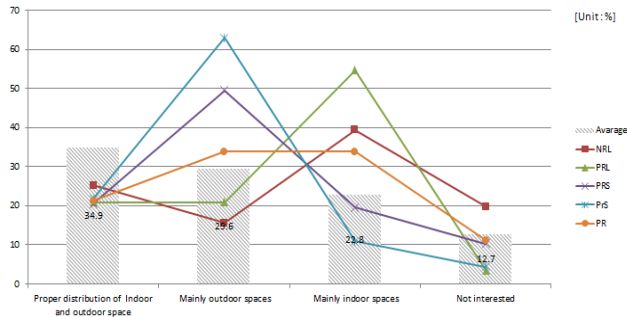
Figure 3. Preferred Planning of community space

6.3. Necessity and Requirements of Community Space

1) Necessary Facilities (Top 5 in order)

It turned out that the most necessary facilities in community space are 'indoor fitness center (35.5%)', which is the highest in needs, and followed by 'indoor exercising space (7.8%)', 'reading room (7.8%)', 'trail (5.3%)', and 'playground (4.9%)'. See Table 18.

These responses are well matched with those of the reasons for using community space. Most of the respondents were hoping that facilities for exercise, education and resting would be built.

Table 18. Required facilities of among the community space 1 ranking(top 5%)   (Unit :%)

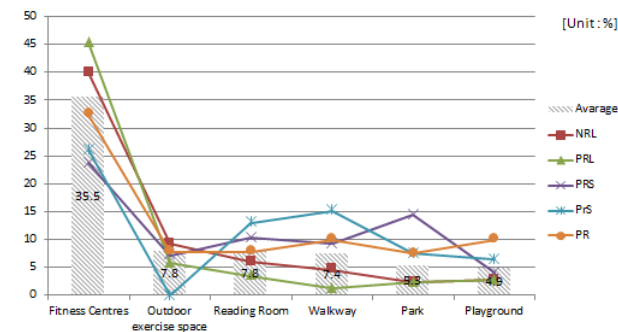| Division	Total	NRL	PRL	PRS	PrS	PR
Case number	527	218	86	97	46	80
Fitness Center	35.5	39.9	45.3	23.7	26.1	32.5
Outdoor exercise space	7.8	9.2	5.8	7.2	0	7.8
Reading Room	7.8	6	3.5	10.3	13	7.8
Walkway	7.4	4.6	1.2	9.3	15.2	10
Park	5.3	2.3	2.3	14.4	7.5	7.5
Playground	4.9	2.8	2.8	4.1	6.5	10
X^2			46.265**			

* p<.05 ** p<.01 *** p<.001

Figure 4. Required facilities of among the community space 1 ranking(top 5%)

2) Unnecessary facilities (Top 5 in order)

It turned out that the most unnecessary facilities in community space are 'golf driving range (39.8%)', which is the highest in needs, and followed by 'kitchen garden (7.8%)', 'internet room (6.5%)', 'multi-purpose room (5.3%)', and 'don't know/no response (12.79%)'. The average of these responses was similar by rental housing type. See Table 19.

The residents in national rental housing(L) mentioned 'golf driving range' as the most unnecessary facility. By age, the residents in their 20s (38.3%), 30s (37.1%), 40s (37.7%), 50s (31.8%) and 60s or older (55.5%) said that 'golf driving range' was most unnecessary. By martial status, separation from death/diverse group were most unfavored of it as community facility. This result suggests that the demands or needs of golf range is very limited to a certain segment of the residents in rental housing complex and thus it should be considered in future construction of community facilities.

Table 19. Not required facilities of among the community space 1 ranking(top 5%)   (Unit : %)

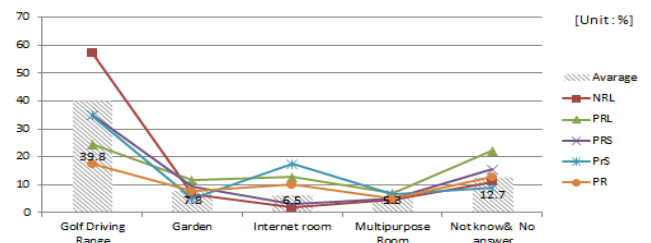| Division	Total	NRL	PRL	PRS	PrS	PR
Case number	527	218	86	97	46	80
Golf Driving Range	39.8	57.3	24.4	35.1	34.8	17.5
Garden	7.8	6.4	11.6	9.3	5.0	7.8
Internet room	6.5	1.8	12.8	3.1	17.4	10.0
Multipurpose Room	5.3	4.6	7.0	5.2	6.5	5.0
Not know& No answer	12.7	11	22.1	15.5	8.8	12.7

Figure 5. Not required facilities of among the community space 1 ranking(top 5%)

6.4. Hoped Allocation of Community Space

The comparative analysis on the hoped allocation and location of community facilities showed that most of the residents wanted the facilities to be located in the middle of housing complex as separate structure.

In addition, the most hoped placement of community space was 'in separated structure (57.7%)'. By rental housing type, the residents in national rental housing(L) (56.9%), public rental housing(L) (65.1%), public rental housing(S) (54.3%) and private rental housing (55.0%) responded that such facilities should be placed 'inside a separate structure'. Meanwhile, relatively more residents living in public rental housing(S) answered that they wanted the facilities to be allocated ;on the 1st and 2nd floor of the

main unit of Housing complex'. See Table 20.

Table 20. Desire Arrangement of community space   (Unit : %)

Division	Total	NRL	PRL	PRS	PrS	PR
Case number	527	218	86	97	46	80
Extra community center arrangement	57.7	56.9	65.1	56.7	54.3	55
1-2 floor arrangement	24.7	21.6	22.1	26.8	39.1	25
Placed with commercial	17.6	21.5	12.8	16.5	6.6	20
Total	100	100	100	100	100	100
X^2	36.215**					

* p<.05 ** p<.01 *** p<.001
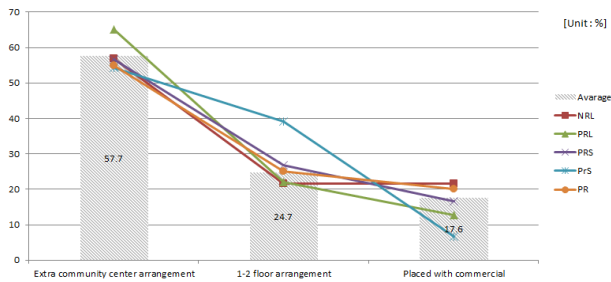
Figure 6. Desire Arrangement of community space

6.5. Hoped Location of Community Space

For the optimal location of community space, the residents said, 'intensive allocation in the center of housing complex (44.2%)', which is the highest, and followed by 'in the middle of housing complex and all over the complex harmoniously (33.4%)' and 'multiple small-scaled allocation in a complex (22.4%)'. 'intensive allocation in the center of housing complex' was relatively more answered by the residents in public rental housing(S) (54.3%) and residents in their 30s (56.2%). Placement 'in the middle of housing complex and all over the complex harmoniously' was relatively more answered by the residents in private rental housing (36.3%), residents in their 40s (37.7%) and 50s (37.3%). See Table 21.

Table 21. Desire installation of community space   (Unit : %)

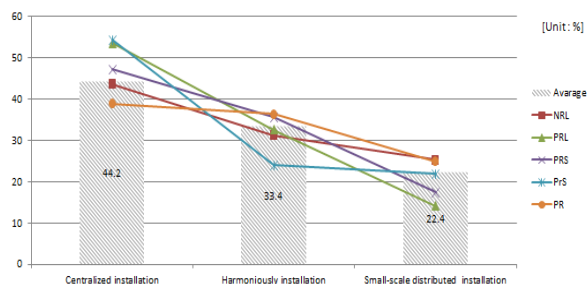| Division	Total	NRL	PRL	PRS	PrS	PR
Case number	527	218	86	97	46	80
Centralized installation	44.2	43.6	53.5	48.1	54.3	38.8
Harmoniously installation	33.4	31.2	32.5	32.6	23.9	36.2
Small-scale distributed installation	22.4	25.2	14	19.3	21.8	25
Total	100	100	100	100	100	100
X^2	56.515**					

* p<.05 ** p<.01 *** p<.001

Figure 7. Desire installation of community space by type of supplying housing

6.6. Openness of Community Space

70.2% of the residents said that it is good to open community space only to 'complex dwellers'. It is equal to 7 out of 10 and so it showed they preferred closeness to outside users. And 26% answered that it is proper to open community space to 'residents in neighboring Housing complex in the same village'. Only 3.8% responded that it is fine to open it to 'outside users living in other areas'. See Table 22.

The mean and distribution of the reponses on the openness were similar by rental housing type. Particularly, 43.5% of the residents in public rental housing(S) said that it is OK to open community space to 'residents in neighboring Housing complex in the same village'.

Table 22. Adequate opening of community space   (Unit : %)

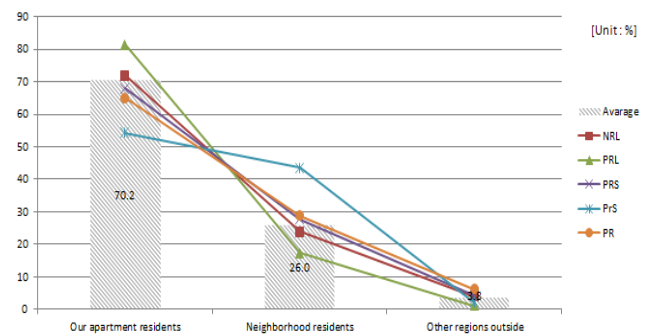| Division	Total	NRL	PRL	PRS	PrS	PR
Case number	527	218	86	97	46	80
Our apartment residents	70.2	72	81.4	68	54.3	65
Neighborhood residents	26	23.9	17.4	27.8	43.5	28.8
Other regions outside	3.8	4.1	1.2	4.2	2.2	6.2
Total	100	100	100	100	100	100

Figure 8. Adequate opening of community space

6.7. Operational and Managing Method of Community Space

The responses upon the operating and managing community space showed that the residents thought it was appropriate for it to be managed in 'managing of resident representative meeting (33.2%)', which is the highest, and followed by 'managing of the apartment management office (33.0%)', 'outsourcing management agency (19.0%)' and 'I dont know (14.0%)'. See Table 23.

By rental housing type, the residents in national rental housing(L) and private rental housing, permanent rental housing(S) responded most that it should be run by 'maintenance office' while the residents in public rental housing(L) wanted ' outsourcing mangement agency' and public rental housing(S) wanted 'managing of resident representative meeting' to be in

charge of the operation and management of community space. The opinions of the residents on the operation and management of community space were similarly divided into 'managing of resident representative meeting' and 'managing of the apartment management office'. It indicates that the residents do not converge their opinions on the issue.

Table 23. Operational and management methods of community space
(Unit : %)

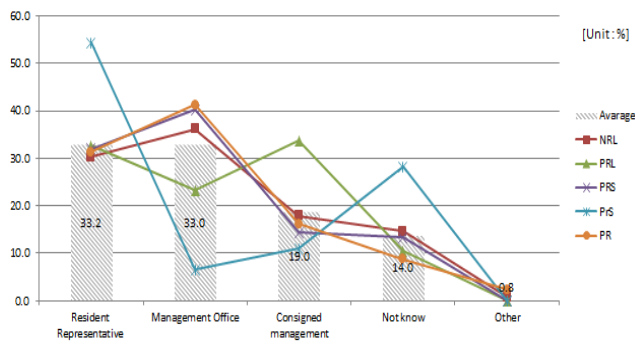| Division	Total	NRL	PRL	PRS	PrS	PR
Case number	527	218	86	97	46	80
Resident Representative	33.2	30.3	32.6	32	54.3	31.3
Management Office	33	36.2	23.3	40.2	6.5	41.3
Consigned management	19	17.9	33.7	14.4	10.9	16.3
Not know	14	14.7	10.4	13.4	28.3	8.8
Other	0.8	0.9	0.0	0.0	0.0	2.3
Total	100	100	100	100	100	100

Figure 9. Operational and management methods of community space

7. Conclusion

To show the actual conditions of usage of community space and propose a direction to improvement, the present study examined and analyzed the characteristics and consciousness of the residents, characteristics of usage, satisfaction of residents with housing complex and community space and the planning and operational plan of community space. And the findings are summarized as follows.

First, the analysis of the characteristics and consciousness of the residents showed that most of the residents consider housing expenses (rent and maintenance fee) as the most influential factor in selecting rental housing. And others include the distance from work or school.

For activity exchange with neighbors, more than half of the residents said that they were exchanging activities with neighbors and use community space for it most.

This finding implies that although most of the residents living in rental housing complex concentrate on making living, they are gradually aware of the importance of community space for

exchanging activity with others and spending time on leasure and hobby.

Second, the characteristics of usage of community space were analyzed and the findings are shown as below.

Regardless of the type of rental housing, most of the residents use community space more than once a week. Particularly, the residents (40.2%) in permanent rental housing(S) responded that they use the space everyday, which is higher than the residents living in other types of rental housing complex. It can be explained by relatively more space and programs provided from a social welfare center located in a permanent rental housing.

For the reason why the residents use community space, most of the respondents, though slightly different by rental housing type, said they use to 'keep a good heath'. And others include 'for leasure and hobby' and 'exchange activities with neighbors'.

The residents also answered on the reasons for not using community space. Most of the respondents said, 'lack of facility worth using'. It may evidence that existing community space does not meet the needs and demands of the residents.

The satisfaction with existing community facilities turned out to be similar by rental housing type. Senior citizen center was most satisfied (4.55 out of 5) and followed by parking lot (3.77) and bench and pavilion (3.49).

The results show that most of the residents are satisfied with existing community space. However, lack in variety and space can be factors to lower satisfaction with community space. Therefore, it is necessary to build facilities (planned to be built) that the residents prefer such as fitness facility (both indoor and outdoor) and educational facility to elevate and activate the use of community space by residents.

Worth noting, most if exercising and educational facilities in current use are mostly obligatory facilities to current laws and regulations. Therefore, they are not diverse in kind and not large enough, which causes gap between current status and residents' needs and expectation. Accordingly, their needs and demands should be well reflected in future plans of housing complex.

Third, The survey on the planning and operational plan of community space revealed that the most of residents consider as most important factors diversity of space and proper size of community space in planning it. They prefer community space to be harmoniously divided into indoor and outdoor space and it to be allocated within the housing complex as a separate structure. However, it needs noting that this finding did not put in consideration detailed elements such as the subject of maintenance of community space and financial burden, so that it should be supplemented more later.

The residents prefer community space to be located in the middle of a housing complex most. And they want to open

community space only to the residents in the same complex, which indicates that they wear a closing attitude towards local community or residents in other areas. This finding may evidences that most of the residents living in rental housing complex are less close to and less exchange with adjacent areas. If this distant state persists, it may result in isolation or disconnection, which are detrimental. Therefore, when a next plan is made for building housing complex, the way to enhance organic connectivity with neighboring areas so local community can activate as a whole. To do so, a variety of programs including human and physical infrastructure should be considered to bridge to neighboring residents and areas as well as development of community space within a housing complex.

It was found that the residents want the issue of operation and management of community space to be handled in 'managing of resident representative meeting' and 'managing of the apartment management office'. Particularly, the opinions of the residents on the operation and management of community space were similarly divided into 'managing of resident representative meeting' and 'managing of the apartment management office'. It indicates that the residents do not converge their opinions on the issue.

It also implies that there are many opinions on the operation and management of community space among the residents by rental housing type. Therefore, it seems necessary to establish a systematic framework to designate the subject of management, by which planning and operation of community space can be reasonably and well managed, accepting such diverse opinions from the residents. .

The present study aimed to propose a direction to improving the community space of rental housing complex by type. To do so, it carried out a survey on the residents living (during 1992 to 2012) in the rental housing complexes located in Seoul, Kyunggi Province and Incheone City to examine their awareness and usage of community spaces. However, there was difference in rental type by housing supplier(public or private) and even construction standards of community space differed by year of construction approval. Therefore, the present study tried to be as objective as possible by focusing mainly on the considerations that should be taken in planning rental housing complex in future. Therefore, the findings of this study are worth being basic data for establishing the constriction standards of rental housing complexes to supply in future.

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