Evaluating Common Spaces in residential communities: An Examination of the Relationship between Perceived Environmental Quality of Place and Residents' Satisfaction

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Abstract: Gated communities as fruits of the high-density urbanism seek for security, prestige and new lifestyle and their common space is known as a significant component that could be one of the main reasons of residential satisfaction and life quality and creating sustainable urban living space in cities. Therefore, this paper presents a way of evaluation the success of a common space with dimensions measuring the quality of the relationship that residents have with their common space. Based on these dimensions, a questionnaire was administered to residents of different residential complexes in the city of Johor in Malaysia. Data was analyzed by SPSS and descriptive analysis to show which items are most important in the context of Malaysia to estimate the level of success in a common space. In addition, the research found which environmental quality aspects have more or fewer effects on residents' satisfaction.

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1. Introduction

At the beginning of this new millennium, majority of the world's population lives in cities and number of urban residents is increasing every day. Therefore understanding about measuring the environmental quality of residential areas becomes essential. There is also growing interest in many parts of the world, in sustainability indicators that reflect conditions in the residential areas. Therefore, residential common space as a vital space by creating a fertile ground for growing social interaction seems to be very significant to enhance a sustainable society. During these two recent decades, many researches have been done in the field of measuring the environmental quality (Amerigo & Aragones, 1997; Adriaanse, 2007). Some of these researches pointed on subjective aspects of place quality, especially residents' satisfaction and some others studied objective features or combination of both. However, there was no integrated system to evaluate common spaces of residential gated complexes. Accordingly, this research has attempted to describe a residential gated community and its type and properties and defined its common space as a very significant space for reaching a sustainable society and has tried to evaluate the reasons of success in residential common space by understanding the interrelationships between objective measures of environmental features and people's responses to them.

2. Gated Community

There are many definitions for the gated communities from the first one by Blakely and Snyder (1997) as a residential area with limited access till more recently definition by Blandy et al. (2003) as walled or fenced housing developments with restricted access, using CCTV and/or security personnel. Among many different opinions about advantages and disadvantages of gated communities like segregation in public space, unsustainable development landscape and offering collective goods; the gated development is still becoming increasingly popular in developing countries. On the other hand, all earlier investigations mainly focus on gated community's forming reasons, limited public physical space and social segregation. Only few of them have explored the residents' perception of common space and their relationship with space. So this research tries to evaluate common spaces in terms of user's satisfaction especially in the Malaysian context.

2.1. Gated Community in Malaysia

"Gated Community and Guarded Neighborhood" was defined by "Department of Town and Country Planning" as a group of residents living in a fenced, guarded area (2010). These areas can be either high-rise property such as condominium or bungalow, terrace and detached houses (section 6 of the Malaysian Strata Title Act 1985). They follow a mixture of security, privacy and wealthy lifestyle of their residents. Therefore, four types of gated

community in Malaysia were categorized as Elite community, Lifestyle community, Security zone community and Security zone community and lifestyle. Characteristics of a gated community are identified by size, hierarchical structures, spatial form, road structure and facilities. However, no matter what their planning forms are or where the public facilities are located; their common space should works as a ground for social activities.

3. Gated Community Common Space

Common space in gated community refers to a space in multi-unit residential complex that can be accessed by all residents. It refers to public amenity and common access area within a residential complex. There are many different definitions for residential common space that were identified by so many researchers, from an extension of living space, semi-public activity point, and buffer zone between the residential community and the outside world to a vital place to establish social interaction (G¨arling and Golledge, 1989). Moreover, the classifications of open space are done based on accessibility, travel time, distance, size and physical resource (Gedikli 2004).

3.1. Architectural quality

Space layout, provision of common access, its dimension and proportion scale, furniture and provision of greenery, sculptures and performances (Whyte, 1980) and Water features, viewpoint, movement pattern, location and building surrounding (architectural style, façade, height, age, form, color, material), are more likely to encourage the observers' interaction with space.

3.2. Residential Environmental Quality

Environmental quality is the specification and feature of the environment which affects human and other organisms in general (Johnson et al, 1997). It can define as a larger concept of "quality of life"; combining of basis qualities as health, safety with aspects of welfare and grace (Shabak et al. 2013). A good quality environment gives sense of welfare and satisfaction to inhabitants by physical, social or symbolic characteristics (Marans and Couper, 2000). Therefore, it is important to determine the link between the properties of residential common space to residents' experience. In this paper, the definition of environmental quality contains both objective characteristics of common space and subjective characteristics of inhabitants' perception based on three main evaluative aspects included physical(feasibility, accessibility, safety), cognitive(comfort, pleasureability) and social quality (crowding, social interaction).

3.2.1. Feasibility: Open space size and necessary provisions are significant factors for optimum open space satisfaction and use (Heng and Chan 2000).

3.2.2. Accessibility: Accessibility is defined as "the freedom or ability of people to achieve their basic needs in order to sustain their quality of life. Variety of access opportunity as a subjective and travel time, distance and proximity (Giles-Corti et al. 2005) as objective measures identified in previous researches.

3.2.3. Safety: Familiarity with space, the fear index, and daytime avoidance are identified as subjective factors that should be measured in terms of evaluating safety. Physical disorders such as graffiti, broken windows and littering, poor building design, poor lighting, and overgrown landscaping are the objective factors of safety (Wilcox 203).

3.2.4. Comfort: When a space is comfortable and presents itself well, it is a key to its success. Comfort includes adaptability, legibility, cleanliness, facilities and the availability of places to use. Also, climatic comfort influences the experience quality, satisfaction and use of open space (Gedikli 2004).

3.2.5. Plaesureability: Measuring the people's perception about diversity of activities in their residential common space, sense of liveliness, naturalness, attraction and beauty of space, relaxation calmness, Relief negative emotions (Maas et al., 2009), could evaluate the rate of pleasureability of the measured space.

3.2.6. Crowding: Various researches confirm that density, number of encounters and crowding, has influence on satisfaction of common space (Mannings, 2003). Also, people's perception and their acceptance of crowding as subjective could be measured.

3.3.7. Social interaction: Gedikli (2004) included social-carrying capacity of community as an important criterion influencing common space use. Interaction with people and degree of socialization and social privacy are subjective factors of social interaction measurement. Therefore, the number of users, types of users, type of activity as objective factors could be measured.

4. Residential Satisfaction

Many researchers defined "satisfaction" as a general indicator to assessment perception of environmental quality. In the content of the residential community, residents' satisfaction could be measured by understanding the users' preference from physical characteristic, social and cognitive quality of space (Adriaanse, 2007). Also, characteristics of potential users, such as demographic and socio-economic status are factors

influencing satisfaction of common space. In this study, a combined model of satisfaction base on residential satisfaction models of Marans and Couper (2000) was developed that shows relationships between objective conditions, subjective responses, and common space use and satisfaction.

5. Methodology

This research aimed to evaluate the success of a common space with dimensions measuring the quality of the relationship that residents have with their common space of gated communities in Malaysia and try to determine the impact of these environmental quality dimensions on satisfaction in this space. Base on this purpose sampling and data collection was done as below:

5.1. Method of Sampling and Data Collection

Based on research aim, a multi-method approach to the research was employed involving the collection of two data types: primary and secondary data. Secondary data that are information on the background of Malaysian gated community development and architectural and environmental quality concepts were collected from previous studies. The primary data is obtained from the field study by semi-structured interviews. Because this study will work as a pilot to test the variables and questionnaire, the 25 respondents are chosen randomly from residents of gated communities in Johor, Malaysia.

5.2. Dependent variable: As it discussed before, use and satisfaction of residential common space was measured using the items of time and frequency of usage, enjoy and satisfying and purpose of use.

5.3. Independent variables: Environmental and architectural variables included subjective quality of common spaces. Subjective quality was measured by asking participants about level of their agreement or disagreement with statements about their common spaces. Statements addressed physical (adequacy, accessibility and safety), cognitive (comfort and pleasurability) and social (crowding and social interaction) quality of space. After factor analysis, these items were summed to create an overall score to measure satisfaction.

6. Data analysis and findings

Based on the construction of semi-structured interview, two types of primary data were collected. The quantitative data that claimed by the questions in Likert scale and qualitative data that was gathered by open-ended questions. The first type analyzed by using SPSS and descriptive analysis was used for the later type.

6.1. Regression analysis

Data analysis were undertaken using SPSS Version 16, started with principal component factor analysis to check which questions must be in a group and whether they are related to a subgroup and significant or not. The result (table.1) illustrated that most of the sub-questions were in their right groups and small numbers of questions like “being in touch with others in the way of reaching common space” are not related to other groups of questions.

Table 1. Exploratory factor analysis of Environmental quality dimension

Environmental quality	Factor 1 feasibility	Factor 2 Accessibility	Factor 3 safety	Factor 4 Climatic comfort	Factor 5 comfort	Factor 6 pleasureability	Factor 7 crowding	Factor 8 Social interaction	Item mean	SD
Enough space	**0.81**	-0.03	-0.03	0.04	0.09	0.14	0.02	0.04	3.55	0.90
Use every time of the day	**0.79**	0.14	0.09	0.04	0.00	-0.04	-0.06	0.04	3.65	0.87
Activity type	**0.69**	0.09	0.08	0.00	0.01	0.25	0.18	-0.02	3.42	1.01
Well-designed walking	0.06	**0.75**	0.16	-0.06	0.14	0.18	0.12	0.06	3.36	1.08
connectivity	0.05	**0.73**	0.15	0.06	0.17	-0.01	0.13	0.02	3.38	1.08
choice of road	0.16	**0.72**	0.03	0.19	0.06	0.14	0.01	0.13	3.52	1.03
visual access	0.02	**0.60**	-0.03	0.26	0.16	0.18	0.25	-0.13	3.31	1.17
Safe during day	0.07	0.05	**0.75**	0.02	0.16	0.00	0.02	-0.15	3.68	0.94
Safe during night	0.10	0.18	**0.71**	0.05	0.16	0.05	-0.01	-0.01	3.81	0.83
Could be alone	0.02	-0.04	**0.64**	0.09	0.24	0.22	0.03	0.13	3.53	0.89
Worry for children	0.16	0.22	**0.52**	0.21	0.04	-0.22	-0.17	0.30	3.98	0.84
safe pedestrian	0.21	0.42	**0.44**	0.14	-0.03	0.26	-0.12	0.02	3.81	0.95
natural ventilation	0.11	0.04	0.19	**0.72**	0.03	0.12	0.12	0.08	3.71	0.88
shading elements	0.00	0.18	0.13	**0.71**	0.09	0.09	0.31	0.00	3.64	1.07
greenery	0.01	0.07	0.11	**0.53**	0.37	0.32	-0.24	-0.22	3.79	0.93
Relief emotion	0.04	0.17	0.23	0.04	**0.70**	0.06	0.14	0.04	3.60	0.97
comfortable	0.00	0.07	0.19	0.02	**0.63**	0.10	0.24	0.03	3.60	1.07
presence of landmark	0.17	0.22	0.04	0.22	**0.58**	0.17	-0.05	0.33	3.64	0.96
clean	0.26	0.14	0.24	0.22	**0.53**	-0.04	0.05	-0.05	3.80	0.92
Variety of activity	0.39	0.13	0.00	0.01	0.17	**0.64**	-0.01	0.06	3.39	0.98
liveliness	0.22	0.15	0.16	0.25	-0.06	**0.57**	0.18	0.02	3.80	1.07
Pleasure view	0.33	0.18	0.01	0.15	0.11	**0.53**	-0.04	0.22	3.46	0.97
naturalness	0.49	0.20	0.17	0.06	0.12	**0.50**	-0.07	0.13	3.78	0.86
Not crowded	0.02	0.19	0.34	0.10	0.29	0.41	**0.85**	-0.11	3.38	1.08
Have a private space	0.04	0.15	0.04	0.23	0.06	0.02	**0.80**	-0.02	2.99	1.26
Community satisfaction	0.00	0.13	-0.09	0.05	0.19	0.03	**0.75**	0.02	2.74	1.29
Allow more interaction	0.41	0.10	0.00	0.09	0.30	0.24	0.07	**0.51**	3.83	0.93
Feel friendlier with others	0.04	0.16	0.49	0.17	0.10	0.21	0.11	**0.50**	3.65	0.96
Organized activity	-0.01	0.18	0.07	0.26	0.06	0.00	0.43	**0.49**	2.94	1.19
Eigenvalue	8.41	2.97	2.29	1.59	1.33	1.27	1.14	1.07		
% of Variance explained	9.24	8.82	8.63	7.30	6.95	6.28	6.01	4.10		
Cumulative variance explained	9.24	18.06	26.69	34.00	40.95	47.23	53.24	57.35		
Cronbach's alpha	0.77	0.77	0.71	0.68	0.69	0.73	0.74	*		
Factor mean	3.60	3.39	3.75	3.68	3.66	3.51	2.87	*		

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Stepwise Multiple Regressions Analysis is used to estimate the relationship between the independent variables and overall satisfaction in residential common space (table.2). The result of regression analysis was illustrated that some factors have more influence on the overall satisfaction of a residential common space. Enough space as an indicator of "Feasibility" variable, connectivity and attractiveness of way of reaching common space from "Accessibility", not worry about children and have privacy in "Safety" part, shading elements and greenery from "Climatic Comfort", comfortable place and comfortable connections from "Comfort", having pleasant view, building surrounding and attractive way in "Pleasurability" part and finally not crowded, community satisfaction from "Sociability" are indicators that have more correlation with satisfaction.

Table 1. Linear regression models

Model		Unstandardized Coefficients	Standardied Coefficient	t	Sig.
	B	Std.Error	Beta		
(constnt)	1.150	0.658		1.747	.002
q9.feasibility.enoughs	.677	.183	.610	3.693	.001
q10.1.acessibility.con	.760	.184	.718	4.132	.001
q10.1.acessibility.attr	.788	.185	.775	4.250	.001
q11.safety.worryforc	.629	.143	.684	4.403	.000
q11.safety.bealone.pri	.735	.211	.587	3.480	.002
Q12.1.climaticcomfor	.745	.162	.691	4.588	.000
Q12.1.climaticcomfor	1.204	.225	1.117	5.343	.000
Q12.2.comfort.comfo	.697	.173	.652	4.033	.001
Q12.2.comfort.wayfo	.890	.206	.670	4.325	.000
Q13.pleasurability.pl	.538	.174	.541	3.088	.005
Q13.pleasurability.bu	.747	.181	.767	4.137	.001
Q13.plesurability.attr	.717	.175	.763	4.089	.002
Q14.sociability.notcr	.537	.223	.449	2.413	.024
Q14.sociability.com	.709	.218	.570	3.251	.004
Q14.sociability.intou	.755	.236	.555	3.200	.004

Dependent variabele : overall.satistsfaction

6.2. Descriptive analysis

To further understand the residents' thought and feeling about common space features, comments made in response to open-ended questions were examined. Some physical properties like adequacy of common space and safety were mentioned as important factors by residents. Also, cognitive attributes like aesthetic quality of space and presence of noise and different culture of neighbors as a social problem was described by respondents. Specific comments illustrate residents' perception and their expectation of residential common space, like:

• There are no water element, and essential facilities.
• Green spaces should be aesthetic but not diluted the optimum function of the inside spaces.
• It is very close to our house. My children enjoy the children's facilities and I enjoy the courts provided.
• The orientation of the court is opposite the sunrise. Too many mounts limited the flat green areas.
• There is a lack of a functional common space.
• Sitting area is not arranged for family group, also lighting for activity at night.
• There is a lack of facilities for old residences.
• It looks nice and attractive, nearby and easy access.
• Facilities are good and comfortable, but the culture of some neighbors forced me disuse the space.
• The view and facilities are excellent. However some neighbors' noise disturbs me during the night.
• Different culture of neighbors makes me not to be relaxed in using this common space.

7. Discussion

Comparing results of two types of analysis show that the satisfaction about access to residential common space will increase the level of overall residents' satisfaction. Also, attractiveness of way of reaching common space and its safety, comfort, and being in touch with people in a way, has a particular influence. Therefore, it shows that the connections to a common space are as important as the space. Also, community satisfaction and social quality of space are initial for a common space to be used based on the result of SPSS software and descriptive analysis. Furthermore, whole analyzing data, from principal component factor analyzing, multiple regression model to descriptive analyzing shows that some questions must be edited in the questionnaire for the next time. For example, it illustrated that fewer people encouraged answering the open-end part of Likert questions, so adding some separate questions that asks about what they like or dislike in their common space is necessary. Also, a visual part must be prepared to ask about their architectural preference and finally, some sub questions that have less value in factor analyzing test should be removed.

8. Conclusion

This study indicated satisfaction of residential environmental quality in common spaces of gated communities in Johor, Malaysia based on the subjective factors of people's perception. However, the objective indicators of environment (architectural design characteristic) should be measured by observation. The combination of subjective and objective evaluation systems as an integrated approach could result in a comprehensive assessment of a residential common space. We can understand dual aspects and problems of environment by evaluation subjective and objective indicators. Therefore, at the next step, the objective indicators must be compared with subjective evaluators to understand which architectural features could influence the use and satisfaction of residential common space. This understanding can be used in planning and designing of a successful common

space in residential complexes and improve their developments.

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