A Study of the Environmental Elements Affecting Campus Images

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Abstract
The purpose of this study is to identify the environmental factors that affect the image of a school campus. To achieve this objective: the campuses of 28 four-year universities in Seoul, which has more colleges than any other area in Korea, were examined. A survey using campus maps showed the following. First, those in a college group with better campus images use a greater variety of places than those in the other group. Second, with regard to the places chosen as environmental factors that affect the campus image, the respondents gave the following answers. The respondents of the college group with better campus images reported that architecture, places of social interactions, and the natural environment affect the campus image, along with related activities. However, the respondents of the other group stated that visual aspects such as landmark buildings affect the campus image. Third, when the campus maps were analyzed, it was found that flows of traffic were longer at colleges with a better image, which indicates that: these colleges strive to boost the usability of the overall campus by designing various places to be used for various purposes. This finding demonstrates that the factors which affect campus images include not only visual aspects but also both social interactions and natural environments.

Keywords: campus image; environment elements; Kevin Lynch

1. Introduction
1.1 Background
Universities in Korea are recently experiencing substantial changes. Following the 'Liberalization of the University Establishment' act by the government in 1995, Korea's four-year universities nearly doubled in 16 years, from 108 in 1995 to 196 in 2011. As a result, the university entrance rate increased from 51.4% in 1995 to more than 83% in 2008 (Yang, 2011). It is predicted that the supply will soon exceed the demand with regard to the number of those seeking to enroll. The present research question has emerged based on the survival of the many universities in Korea.

In order to compete and survive, diverse strategies have been established, such as a broader range of educational programs, campus planning activities, and public relations campaigns. Kwon (2011) noted that universities in Korea have entered a new ‘image marketing’ era in an effort to survive, trying to reform their images by constructing large-scale landmark buildings. These buildings can certainly accommodate an increasing number of students and can provide a visual focus. However, they do not always match the existing campus environment and allow the fostering of a distinct image for the university. “An image does not simply suggest a feeling or impression towards a particular subject but is rather a complicated concept which combines emotional feeling with perceptual judgment. In other words, it is the fruit created through the interaction of beliefs, thoughts, feelings, and memories of a particular object” (Kunkel & Berry, 1968). The campus image is recognized by the users as they move around the campus, and this image influences the competitiveness of the university (Seo et al., 2010). It is, in other words, a concept interrelated with human behavior as well as the physical environment. However, there has been little research in the form of comprehensive studies on this topic, whereas fragmentary studies about the main entrance or about libraries are repeatedly conducted. For a fuller understanding of the concept of the campus image, it is essential to approach this subject with a solid framework that can determine the fundamental resources with which to realize effective campus planning in the future.

1.2 Objectives
The main purpose of this study is to identify the environmental elements that affect campus images. The specific purposes are as follows: 1) to understand the campus usage habits of students, 2) to analyze
the environmental elements that affect campus images based on the theories of Kevin Lynch, and 3) to identify the reasoning behind the indicated environmental elements.

2. Literature Review
2.1 Image

Each physical environment possesses an intrinsic image, and this image can deliver significance to the people who use the environment. Image can be defined as subjective knowledge as a result of the combination of direct sensory data, historical experiences, and behavioral values (Kim, 2009), and such subjective awareness involves the emotions of like, dislike, trust, or distrust (Boulding, 1956). Specifically, the visual image presented by the physical environment can be regarded as an effective means of delivering significance to users. Subjective images include both cognitive and evaluative elements (Embacher & Buttle, 1989). An image formed with various elements over a long period of time eventually establishes an identity. Assael (1992) defined an image as an overall perception formed in the process of collecting information from diverse sources, and Jain & Etgar (1997) defined an image as the characteristics, emotions, and impressions formed over a long period of time.

2.2 Campus Image Elements

A university is a single society formed as an intellectual community, and the university campus is an environment which supports the basic functions of universities. It is also a place where diverse actions take place in one's everyday life, including education, research, leisure, residential living, and cultural activities. Thus, the community known as a university campus is a society which equally displays all of the scenes displayed within a city. Universities develop independent characteristics based on their educational levels, organization size, history, and traditions. These independent characteristics are added to the physical environment to form an intrinsic image. The campus image refers to the recognized image of not only the campus's physical characteristics (Moon, 2005) but also the visual image perceived by its users (Kim & Ryu, 1999). Universities try to represent their philosophy and vision through environmental elements. In other words, the campus image consists of tangible elements of the physical environment and tangible elements of experience. It is recognized by experiencing the campus (Ryu et al., 1999).

Kevin Lynch (1960) stated that an image of a certain environment is the result of an exchange process between the observer and the environment. When exposed to the environment, the observer selects, organizes, and bestows significance on what is seen.

Lim (1991) stated that the landscape and work we face in our daily lives do not take place instantly in a certain period or at a certain time; rather, we experience continuous changing landscapes depending on our movements. Furthermore, people not only react after observing a physical environment, but they also remember the image of that environment as a whole. Moreover, their behaviors are influenced by such images (Park & Kim, 2000).

3. Methodology
3.1 Research Subjects

The campuses selected for this survey are all in Seoul, Korea. Among the 47 universities and colleges in Seoul, 28 universities were selected with the following criteria: 1) those with physical environments corresponding to the definition of a 'campus', 2) those that were not small colleges with mainly buildings as a campus, and 3) those that were not single-major colleges with a small number of students.

3.2 Research Procedure

For this study, the survey was conducted from February of 2012 to April of 2012. It was administered by directly visiting the targeted campuses. Campus maps were provided to the respondents to indicate accurately the locations or places which affect the campus image. Out of 1,540 surveys distributed to 28 universities, 1,445 valid surveys were used in the analysis. In order to analyze the campus usage habits, the campus image evaluation, and the environmental elements, SPSS 18.0 was used for frequency, crossover, t-test and cluster analyses.

4. Results
4.1 General Characteristics

Through an analysis of the responses to the survey, school year, gender, and age were investigated as general characteristics (Table 1.).

Of the 1,445 respondents in total who participated in the survey, females numbered 859 (59.4%). They outnumbered males at 558 (38.6%) with regard to gender. This slight imbalance arose because, among the 28 universities, six were women's universities. In terms of the school year of the participants, 126 (8.7%) were freshmen, 417 (28.8%) were sophomores, 414 (28.6%) were juniors and 461 (31.9%) were seniors.

Table 1. General Characteristics of the Respondents

| Year   | Male   | Female | Sub-total | Missing |
|--------|--------|--------|-----------|---------|
| Freshman | 32 (2.2) | 94 (6.5) | 126 (8.7) |         |
| Sophomore | 153 (10.6) | 263 (18.2) | 417 (28.8) |         |
| Junior   | 163 (11.2) | 249 (17.2) | 414 (28.6) | 21 (1.5) |
| Senior   | 208 (14.4) | 253 (17.5) | 461 (31.9) |         |
| Sub-Total | 558 (38.6) | 859 (59.4) | 1418 (98.1) | 1445 (100.0) |
| Missing  | 18 (1.25) |        |           |         |

The subject campuses in this study are shown in Table 2. A total of 1,445 users of 28 campuses were surveyed to evaluate the overall levels of the image and design of their campuses on a five-point scale (Table 3.). The average of the overall images and design levels
were 3.39 and 3.21, respectively, which are considered to be high. Using this overall image evaluation score, a cluster analysis (SPSS 21.0) was conducted in which the 28 universities were divided into two groups. The first group, with an average score of 3.0, was termed 'Group A', and the second group, with a fairly high score of 3.78, was termed 'Group B'. Having an average score for image evaluation, Group A also had a low score for design, at 2.93. Having a relatively good score for image evaluation, Group B also had a good score for design, at 3.50. Therefore, universities with a relatively low score for image and design were sorted into 'Group A', while universities with relatively high scores for image and design were placed in 'Group B'.

Table 2. Subject Campuses and Image Evaluation

| University                  | f (%) | Image evaluation | Standard deviation | Cluster |
|-----------------------------|-------|------------------|--------------------|---------|
| DD Women's Univ.           | 52 (3.6) | 2.72             | 0.69               | 1       |
| DK Univ.                   | 50 (3.5) | 3.08             | 0.77               | 1       |
| DS Women's Univ.           | 52 (3.6) | 3.16             | 0.58               | 1       |
| HI Univ.                   | 51 (3.5) | 3.01             | 0.70               | 1       |
| HS Univ.                   | 52 (3.6) | 2.96             | 0.58               | 1       |
| K Foreign Univ.            | 52 (3.6) | 3.21             | 0.84               | 1       |
| KU Univ.                   | 52 (3.6) | 2.85             | 0.94               | 1       |
| SJ Univ.                   | 52 (3.6) | 2.87             | 0.63               | 1       |
| SK Univ.                   | 52 (3.6) | 2.64             | 0.73               | 1       |
| SM Univ.                   | 50 (3.5) | 2.57             | 0.64               | 1       |
| S Science Univ.            | 52 (3.6) | 3.23             | 0.53               | 1       |
| S Woman's Univ.            | 52 (3.6) | 3.28             | 0.67               | 1       |
| SS Women's Univ.           | 52 (3.6) | 2.95             | 0.67               | 1       |
| SY Univ.                   | 52 (3.6) | 3.06             | 0.66               | 1       |
| KU Univ.                   | 52 (3.6) | 3.42             | 0.67               | 2       |
| KH Univ.                   | 52 (3.6) | 4.04             | 0.59               | 2       |
| K Univ.                    | 52 (3.6) | 4.23             | 0.69               | 2       |
| KM Univ.                   | 50 (3.5) | 3.44             | 0.48               | 2       |
| CA Univ.                   | 52 (3.6) | 3.39             | 0.55               | 2       |
| EH Woman's Univ.           | 50 (3.5) | 3.92             | 0.63               | 2       |
| HY Univ.                   | 52 (3.6) | 3.39             | 0.74               | 2       |
| S City Univ.               | 52 (3.6) | 3.47             | 0.67               | 2       |
| SKK Univ.                  | 52 (3.6) | 3.67             | 0.69               | 2       |
| SG Univ.                   | 52 (3.6) | 3.49             | 0.56               | 2       |
| SM Women's Univ.           | 51 (3.5) | 3.46             | 0.59               | 2       |
| S National Univ.           | 51 (3.5) | 3.67             | 0.69               | 2       |
| SS Univ.                   | 52 (3.6) | 3.41             | 0.62               | 2       |
| YS Univ.                   | 52 (3.6) | 4.02             | 0.77               | 2       |
| Total                      | 1445   | 3.31*            | 0.78               |         |

*p<0.01(F=20.724)

Table 3. Evaluation of the Overall Image and Design Levels

| Groups     | N   | Average | Standard deviation | T     |
|------------|-----|---------|--------------------|-------|
| Overall    |     |         |                    |       |
| Image      | Group A | 723 | 3.00 | 0.86320 | 17.488*** |
|            | Group B | 721 | 3.78 | 0.82106 |         |
| Design     | Group A | 723 | 2.93 | 0.93723 | 11.291*** |
| level      | Group B | 721 | 3.50 | 0.98474 |         |

*p<0.01

4.1 Campus Usage Habit

In order to determine campus usage habits, frequently used locations or important places on campuses were determined from a review of the literature. Eight places were found: administrative buildings, libraries, student union buildings, lecture buildings, cafeterias, amenity areas, the natural environment and sports facilities. Accordingly, the frequency of usage was calculated to understand the campus usage habits (Table 4).

The results are shown in Table 4. In general, there was a relatively high frequency of use of lecture buildings, cafeterias, libraries and student union buildings. Regarding the difference between Group A and Group B, it was observed that Group A showed the highest usage frequency of 'almost every day' according to 132 people (18.3%) and '3~4 times per week' at 107 (12.8%) for administrative buildings. On the other hand, Group B showed the highest usage frequency for libraries (191, 26.5%), student union buildings (181, 25.1%), lecture buildings (561, 77.7%), cafeterias 368, 51.0%, amenity areas (150, 20.8%), and sports facilities (27, 3.7%) as compared to Group A. It is considered that high usage of libraries, student union buildings, lecture buildings, cafeterias, amenity areas, and sports facilities influenced the high score for campus images.

4.2 Environmental Elements Affecting Campus Images

The concept of the campus image was analyzed based on Kevin Lynch's (1960) 'Elements of Urban Image and Physical Characteristics of a City'. These elements are as follows: landmarks, districts, paths, nodes, and edges (Table 5.). According to Kevin Lynch's theory, a 'node' is an element similar to a focal point, where people gather for particular activities. It is a point of contact that serves as a destination or a point of departure. Generally, local nodes are intersections of roads or a hub of a community. On a university campus, nodes are generally buildings that serve as a destination or a point of departure, such as the following: libraries, main buildings, classroom buildings, and student centers. 'Landmarks' are places easily identifiable to observers. Unlike nodes, landmarks are clearly recognized by outsiders and don't involve the experience of insiders as much. A landmark should serve as a unique reference point for observers. In this study that targets college campuses, the following can be landmarks: a unique main gate, buildings with an original design, historic buildings, symbolic objects, and monuments. 'District' is a place with a two-dimensional area that is perceived as a type of urban territory. Each district has certain characteristics recognized by both insiders and outsiders. The theme of each district should be clear and easily recognizable. On a college campus, the following belong to the district category: places of social interaction, such as squares and meeting places; natural environments such as parks and lakes; facilities complexes for various activities; and cultural spaces. 'Path' is a place that people use for travelling from one

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place to another, such as a street, sidewalk, or a trail. On college campuses, central roads and footpaths are paths. Because many people observe a campus while walking or driving, a path is a critical element of a campus image. ‘Edge’ plays the role of forming the outline of a city while connecting similar areas. On a college campus, dorms and parks that are usually located on the edges of campuses, thus belong to the edge category. However, these are not significant elements that affect the campus image, as they are not used by the majority of students.

Overall, the frequency of the environmental element of nodes was highest, at 1,049 (39.1%), indicating they have the greatest impact on the campus image.

The results by building are as follows: libraries (374, 13.9%), administrative buildings (311, 11.6%), lecture buildings (228, 8.5%), and student union buildings (136, 5.1%). The second largest impact was the environmental element of landmarks, with a frequency of 1,002 (37.3%).

They include the following: landmark buildings (489, 18.2%), main entrances (304, 11.3%), and monuments (209, 7.8%). The frequency of the environmental element of districts stood at 454 (16.9%), including the following places: social places (squares) (221, 8.2%), natural environments (95, 3.5%), complex facilities (91, 3.4%), and cultural facilities (47, 1.8%). Finally, the frequency of the main thoroughfare of paths stood at 179 (6.7%).

Table 4. Frequency of Campus Usage (n=1445)

| Frequency     | Administrative building | Library | Student union | Lecture building | Cafeteria | Amenity areas | Natural environment | Sports facility |
|---------------|-------------------------|---------|---------------|------------------|-----------|---------------|----------------------|----------------|
| Almost Every day | 132 (18.3) | 103 (14.3) | 156 (21.6) | 191 (26.5) | 153 (21.2) | 181 (25.1) | 97 (71.1) | 561 (77.7) | 286 (39.6) | 368 (51.0) | 123 (17.0) | 150 (20.8) | 34 (4.7) | 33 (4.6) | 18 (2.5) | 27 (3.7) |
| 3~4 times per week | 107 (14.8) | 59 (8.2) | 173 (23.9) | 162 (22.4) | 108 (14.9) | 100 (13.9) | 144 (19.9) | 102 (14.1) | 194 (26.8) | 188 (26.0) | 124 (17.2) | 125 (17.3) | 31 (4.3) | 25 (3.5) | 17 (2.4) | 23 (3.2) |
| 1~2 times per week | 105 (14.5) | 68 (9.4) | 163 (22.5) | 196 (27.1) | 111 (15.4) | 109 (15.1) | 31 (4.3) | 28 (3.9) | 164 (22.7) | 122 (16.9) | 170 (23.5) | 157 (21.7) | 98 (13.6) | 100 (13.9) | 72 (10.0) | 58 (8.0) |
| 1~2 times per month | 41 (5.7) | 60 (8.3) | 106 (14.7) | 95 (13.2) | 78 (12.0) | 58 (8.0) | 15 (2.1) | 1 (0.1) | 51 (7.0) | 18 (2.5) | 57 (7.9) | 54 (7.5) | 92 (12.7) | 95 (12.3) | 48 (6.6) | 26 (3.6) |
| Hardly ever used | 290 (40.1) | 408 (56.5) | 96 (13.3) | 73 (10.1) | 271 (37.5) | 265 (36.7) | 14 (1.9) | 23 (3.2) | 43 (5.9) | 26 (3.6) | 239 (33.1) | 228 (31.6) | 456 (63.1) | 460 (63.7) | 559 (77.5) | 575 (79.6) |
| Missing | 48 (6.6) | 10 (1.4) | 28 (4.0) | 5 (0.9) | 22 (3.0) | 9 (1.2) | 5 (0.7) | 7 (1.0) | 5 (0.7) | 8 (1.3) | 8 (1.3) | 9 (1.6) | 9 (1.3) | 13 (2.3) | 9 (1.8) |

\( \chi^2 = 58.910*** \)
\( \chi^2 = 29.371*** \)
\( 8.731 ** \)
\( 25.817*** \)
\( 24.170*** \)
\( 6.529 \)
\( 1.144 \)
\( 12.445* \)

*Pearson’s Chi-square

Table 5. Environmental Elements Affecting the Campus Image

|         | Group A | Group B | Total |
|---------|---------|---------|-------|
| Frequency | % among elements | % among all | Frequency | % among elements | % among all | Frequency | % among all |
| Nodes   |         |         |       |
| Libraries | 165 (15.6) | 6.1 | 209 | 12.9 | 7.8 | 374 | 13.9 |
| Administrative buildings | 173 (16.3) | 6.4 | 138 | 8.5 | 5.1 | 311 | 11.6 |
| Lecture buildings | 115 (10.8) | 4.3 | 113 | 7.0 | 4.2 | 228 | 8.5 |
| Student union buildings | 84 (7.9) | 3.1 | 52 | 3.2 | 1.9 | 136 | 5.1 |
| Sub-Total | 537 | 50.7 | 20.0 | 512 | 31.5 | 19.1 | 1049 | 39.1 |
| Landmarks |         |         |       |
| Landmark buildings | 40 (3.8) | 1.5 | 449 | 27.6 | 16.7 | 489 | 18.2 |
| Main entrances | 147 (13.9) | 5.5 | 157 | 9.7 | 5.8 | 304 | 11.3 |
| Monuments | 66 (6.2) | 2.5 | 143 | 8.8 | 5.3 | 209 | 7.8 |
| Sub-Total | 253 | 23.9 | 9.4 | 749 | 46.1 | 27.9 | 1002 | 37.3 |
| Districts |         |         |       |
| Social places (plaza) | 99 (9.3) | 3.7 | 122 | 7.5 | 4.5 | 221 | 8.2 |
| Natural environment | 58 (5.5) | 2.2 | 37 | 2.3 | 1.4 | 95 | 3.5 |
| Complex facilities | 27 (2.5) | 1.0 | 64 | 3.9 | 2.4 | 91 | 3.4 |
| Culture facilities | 9 (0.8) | 0.3 | 38 | 2.3 | 1.4 | 47 | 1.8 |
| Sub-Total | 193 | 18.2 | 7.2 | 261 | 16.1 | 9.7 | 454 | 16.9 |
| Paths |         |         |       |
| Main thoroughfare | 77 (7.3) | 2.9 | 102 | 6.3 | 3.8 | 179 | 6.7 |
| Total | 1060 | 100.0 | 39.5 | 1624 | 100.0 | 60.5 | 2684 | 100.0 |

*1* Choice: \( \chi^2 = 73.475*** \)
*2* Choice: \( \chi^2 = 60.982*** \)
*3* Choice: \( \chi^2 = 89.947** \)
| Reasons                                      | N         | L         | D         | P         | Main thorough | Total   |
|----------------------------------------------|-----------|-----------|-----------|-----------|--------------|---------|
| An example of unique modern architecture     | 192 (2.9) | 146 (2.2) | 115 (1.7) | 73 (1.1)  | (12.4)       | 91 (1.4) | 1299.0 (19.4) |
| Symbolizing history                         | 94 (1.4)  | 121 (1.8) | 44 (0.7)  | 31 (0.5)  | (5.6)        | 63 (1.2) | 64 (0.9)      |
| Eco-friendly                                 | 39 (0.6)  | 18 (0.3)  | 14 (0.2)  | 15 (0.2)  | (1.7)        | 83 (1.2) | 37 (0.4)      |
| Symbol of higher education                  | 44 (0.7)  | 12 (0.2)  | 37 (0.6)  | 6 (0.1)   | (1.3)        | 55 (0.8) | 30 (0.4)      |
| Great social exchange                        | 42 (0.6)  | 35 (0.5)  | 16 (0.2)  | 36 (0.5)  | (1.4)        | 27 (0.4) | 89 (0.3)      |
| Pleasant and convenient                      | 63 (0.9)  | 38 (0.6)  | 30 (0.4)  | 30 (0.4)  | (1.6)        | 27 (0.4) | 108 (0.5)     |
| Unique identity                              | 50 (0.7)  | 25 (0.4)  | 19 (0.3)  | 11 (0.2)  | (1.0)        | 100 (1.5) | 15 (0.2) | 70 (0.1) | 16 (0.1) | 21 (0.3) | 38 (0.6) | 31 (0.5) | 8 (0.1) | 387.0 (5.8) |
| Architecture showing philosophy              | 28 (0.4)  | 28 (0.4)  | 30 (0.4)  | 10 (0.1)  | (1.4)        | 8 (0.1)  | 91 (0.5)      |
| Shows the college’s top majors               | 22 (0.3)  | 24 (0.4)  | 68 (0.1)  | 7 (0.0)   | (1.3)        | 22 (0.4) | 26 (0.4)      |
| Frequent usage by students                  | 68 (1.0)  | 13 (0.2)  | 21 (0.3)  | 5 (0.1)   | (0.9)        | 20 (0.3) | 58 (0.3)      |
| Good learning atmosphere                     | 32 (0.5)  | 16 (0.2)  | 15 (0.2)  | 22 (0.3)  | (1.1)        | 17 (0.3) | 76 (0.1)      |
| Conspicuous                                  | 21 (0.3)  | 12 (0.2)  | 12 (0.2)  | 7 (0.3)   | (0.9)        | 27 (0.4) | 62 (0.3)      |
| High awareness                               | 21 (0.3)  | 19 (0.3)  | 5 (0.1)   | 5 (0.1)   | (0.7)        | 33 (0.5) | 47 (0.1)      |
| Significant impact on campus image           | 14 (0.2)  | 21 (0.3)  | 8 (0.1)   | 6 (0.1)   | (0.6)        | 14 (0.2) | 10 (0.1)      |
| Having native culture                        | 13 (0.2)  | 16 (0.2)  | 6 (0.1)   | 13 (0.2)  | (0.7)        | 11 (0.1) | 11 (0.1)      |
| Holds various university events              | 10 (0.1)  | 13 (0.2)  | 7 (0.1)   | 4 (0.1)   | (0.6)        | 21 (0.3) | 3 (0.1)       |
| Large scale                                  | 9 (0.1)   | 7 (0.1)   | 5 (0.1)   | 9 (0.1)   | (0.6)        | 19 (0.3) | 5 (0.1)       |
| Campus core                                  | 11 (0.2)  | 17 (0.3)  | 1 (0.0)   | 4 (0.1)   | (1.0)        | 6 (0.1)  | 12 (0.1)      |
| Easily accessible                            | 10 (0.1)  | 14 (0.2)  | 3 (0.0)   | 6 (0.0)   | (0.4)        | 8 (0.1)  | 24 (0.0)      |
| It's our administrative building            | 11 (0.2)  | 8 (0.1)   | 5 (0.1)   | 6 (0.1)   | (0.2)        | 6 (0.1)  | 15 (0.1)      |
| It's our library                             | 9 (0.1)   | 5 (0.1)   | 6 (0.1)   | 4 (0.1)   | (0.1)        | 7 (0.1)  | 3 (0.0)       |
| Future oriented                              | 8 (0.1)   | 20 (0.3)  | 2 (0.0)   | 3 (0.0)   | (0.2)        | 4 (0.1)  | 55 (0.0)      |
| Has rest areas                               | 7 (0.1)   | 2 (0.0)   | 4 (0.0)   | 5 (0.0)   | (0.1)        | 5 (0.0)  | 4 (0.0)       |
| Has the university logo                      | 13 (0.2)  | 5 (0.1)   | 1 (0.0)   | 1 (0.0)   | (0.1)        | 6 (0.1)  | 9 (0.0)       |
| Total                                        | 831 (12.4)| 635 (9.5) | 474 (7.1) | 314 (4.7) | (28.5)       | 1909 (10.0)| 669 (7.2) | 471 (7.0) | 199 (3.0) | 193 (2.9) | 113 (1.7) | 410 (6.1) | 6697.0 (100.0) |

Meanwhile, there were statistically significant differences between Group A and Group B. With regard to Group A, the frequencies of the environmental element of nodes, such as the following, were higher than this value for Group B: main buildings (173, 6.4%), classroom buildings (115, 4.3%), and student centers (84, 3.1%). For Group B, the frequencies of the environmental element of landmarks, districts, and paths were higher than those of Group A. The frequencies of landmarks are as follows: landmark buildings (449, 16.7%), main entrance (157, 5.8%), and monument (143, 5.3%). The frequencies of districts are...
as follows: social places (plazas) (122, 4.5%), complex facilities (64, 2.4%), and cultural facilities (38, 1.4%). Finally, the frequency of the main thoroughfare, the environmental element of paths, stood at 102 (3.8%). Overall, universities with a high image score provide a greater visual focus as well as more social places. One remarkable issue is that social places are closely related to the respondents' place attachments. Place attachment can be defined as an emotional bond that people feel toward a place (Bonaiuto, 1999). Providing more chances of becoming involved in campus activities could have a positive influence on campus image.

4.3 Reasons for Environmental Elements

The reasons why the students chose certain environmental factors as those affecting their campus image are shown in Table 6. In terms of nodes, the reason they chose the library was that it is an example of 'unique modern architecture,' with the highest frequency of 192 (2.9%), followed by 'pleasant and convenient' at 94 (1.8%). As for 'main building,' the reasons were 'unique modern architecture' as before and a 'building that symbolizes history,' with 146 (2.2%) and 121 (1.8%) respectively. As for classroom buildings, the most popular reason was 'unique modern architecture' as above, with a frequency of 115 (1.7), followed by 'shows the college's top majors' at 68 (1.0). For 'student center,' the frequency of 'unique modern architecture' stood at 28 (1.2).

In terms of landmarks, the reasons they affect the campus image are as follows. For 'landmark architecture,' the most commonly given reason was 'unique modern architecture,' with a frequency of 377 (5.6%), followed by 'architecture that symbolizes history,' at 364 (5.4%), and 'extensive exchanges among students.' The landmarks perceived by the respondents include not only libraries, student centers, facilities complexes, and cultural spaces and facilities that are used frequently, but also college memorial halls, religious halls, and museums. For the 'main gate,' the most common reason was 'showing the identity of my school,' with a frequency of 100 (1.5%), followed by 'eco-friendly' at 83 (1.2%). For 'symbol tower,' which represents the philosophy of the school, the most popular reason was that it was a 'symbol of my school,' with a frequency of 133 (2.0). The results for district are as follows. The most common reason for 'places of social interaction' was 'extensive exchanges among students,' with a frequency of 89 (1.3%). For 'natural environment' was 'eco-friendly,' with a frequency of 51 (0.8%). As for 'facilities complex,' the
most popular reason was 'unique modern architecture,' with a frequency of 43 (0.6%), followed by a 'building that symbolizes history', at 32 (20.5%). As for 'cultural space and facilities,' the most common reason was that it was a 'building that symbolizes history', at 29 (0.4%), followed by 'unique modern architecture' and a 'building that represents the philosophy of the school', at 22 (0.3%) and 16 (0.2%) respectively. In terms of the 'campus central road,' one of the factors of paths, the most popular reason was 'unique modern architecture' with a frequency of 91 (1.4%), followed by 'architecture that symbolizes history' and 'eco-friendly,' at 49 (0.7%) and 38 (0.6), respectively. This is obvious because the campus central road enables people to see various environmental factors, such as landmark-like examples of architecture and the natural environment.

4.4 Analysis of the Campus Maps

The environmental elements marked by the respondents on the campus maps are indicated in Table 7. The elements are displayed in the categories of nodes, landmarks, districts, and paths, based on the theories of Kevin Lynch. The flows of human traffic are displayed as well. There are differences between Group A, which scored relatively low in terms of campus image, and Group B, with higher scores. The flows of Group B campuses, which connect the frequently used buildings, are longer than those of Group A campuses. This indicates that students use various places sufficiently on campus. Around the flows, the numbers of nodes, landmarks, and districts of Group B are much greater than those of Group A. Also, Group B campuses have much more natural environment areas. Along with the environmental elements, the locations and the layouts of the buildings are noted in Table 7. The data were collected by visiting the sites and referring to the homepage and journals (Im et al., 2000). Regarding the location, the universities in Group A tend to be near residential areas, while those in Group B tend to be near commercial areas. It is considered that universities in commercial areas are easily accessed, and campus activities can be extended to nearby areas. Ultimately, these may have influenced the high evaluation of the campuses. Regarding the layout, the universities in Group A have more dispersal types, while the universities in Group B have more central types. It can be considered that a central layout can offer the respondents more comfort and efficiency when using the facilities.
5. Discussion

The purpose of this study is to identify and analyze the environmental factors that affect campus images. The analysis led to the following results.

First, in terms of campus usage habits, there were differences between the users of Group A campuses and Group B campuses. While the former use administrative buildings more frequently, the latter use the following more often: libraries, lecture buildings, student cafeterias, and sports facilities. This indicates that there are differences between the two groups with regard to where they visit and spend time while on campus.

Second, Group B received higher evaluations than Group A on the overall campus image and design. This is related to the campus usage habits and indicates that evaluations from people using various places on campus are generally higher than those of people who use only a few buildings.

Third, there was a difference in terms of which environmental elements affect the campus image. Buildings that are used frequently by students, such as lecture buildings and student centers, largely determined the campus image. On the other hand, combinations of the following places determined the images of Group B campuses: visual focus areas such as landmark buildings, main gates, and symbolic objects; and places of social interaction, such as those for social exchanges, facilities complexes, and cultural spaces. Such diverse facilities and places are recognized by people as they travel by way of the central road. Thus, building suppliers should consider the space usage of customers, rather than simply offering facilities.

Fourth, in terms of the reasons why they chose particular factors that they felt affected the campus image, the following two were the most popular: examples of 'unique modern architecture' and a 'building that symbolizes history.' This finding suggests several aspects with regard to the statuses of college campuses in Korea, as follows. First, development has revolved around facilities that support education, the most basic function of these institutions. Second, their first priority was building landmark buildings that stand out, due to their desire to boost their image within a short period of time.

Fifth, the analysis of the campus maps revealed the following: institutions that had boosted their campus usability by offering natural environments, places for social interactions, and cultural facilities received higher evaluations than those which only used main buildings as their visual focus. Social interaction can also be related to the concept of user attachment. It can be considered that more facilities providing social interaction can lead to high rates of attachment, which eventually influence the image.

Thus, Korean colleges should strive to boost the quality of life of their users and create unique images for their campuses, beyond the current supplier-led development trends. This study is significant, as it can serve as data that helps others explore how to plan and form spaces.

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