Office Environmental Satisfaction: Focusing on Personal and Common Spaces

Mikyoung Ha1, Hong-kyu Kim2, Haeseong Je3 and Byung-Ho Min4

1Professor, Department of Housing & Interior Design, Yonsei University, Korea
2Associate Professor, Department of Urban Planning, Yonsei University, Korea
3Professor, Department of Architecture, Ajou University, Korea
4Associate Professor, Department of Architecture, Ajou University, Korea

Abstract
This study is intended to provide useful information for the design and management of effective workplaces by evaluating existing office environments. Renovations in the office environment have improved the amount of work-surface, function of furniture, amount of storage, function of storage, and style of furniture. The analysis identified that the open floor plan of a work environment, over time, is a source of noise problems and deprives office workers of privacy and personalized space. Respondents replied that meeting spaces are few and small, and they lack privacy and quality. In order to improve the quality and efficiency of work this study proposes that companies should provide ergonomic office environment through in-dept study of work-type and workspace.

Keywords: office environment; privacy; deficit; renovation; personal space; common space

Introduction
The importance of intellectual productivity is highly recognized in this information technology society and leads organizations to investigate elements of the work environment affecting the capabilities of workers. The work environment is like a home to workers who spend a long time there. As a result, providing a pleasant environment through adequately planned space means not only an improvement in qualitative productivity, but also an eventual improvement in the quality of life itself. It is known that the physical quality of the work environment has a direct effect on the health of workers and their quality of life (Sundstrom, 1991); however, organizations have not taken this point seriously. Regular appraisal of the work environment by experts benefits office design and management, and contributes to the development of positive office environments. It also provides information on how the space is functioning and suggests possible areas of improvement. A pleasant environment may increase work efficiency, pride in the job and the organization. The quality of the work environment and its role in increasing productivity must not be overlooked because of the potential benefits.

The purpose of this research is to provide information on planning functional office environments through an evaluation of current workspaces. The following are the specific objectives: an evaluation of personal and common space in the workplace, a comparison of each factor in the workplace dependent on individual characteristics, and identification of factors that affect satisfaction with the workplace.

Physical Environment Elements
Space is a precious commodity for organizations. However, in order to cut down space costs, organizations should not take work performance lightly. Sundstrom (1991) presented a basic framework of workers, people and their work environment as interdependent elements of a system. The framework explains the relationship between the physical elements of the work environment and the product outcome. The factors at work in the physical environment are divided into individual levels, interpersonal levels and organizational levels. The relationship between the human and his environment is classified at each level and physical characteristics are also evaluated at each level.

The individual level focuses more on direct physical conditions and includes circumstances such as lighting, temperature, air, noise, music and color, equipment, chairs and floor finishing of workstations (Sundstrom, 1991). Factors that influence work performance are arousal, stress, distraction, and overload (fatigue). Physical work conditions are related to worker satisfaction. The work environment that induces stress, overload, distraction, and fatigue rapidly influences the
individual’s work performance. These influences can be controlled by the adoption of a positive attitude.

The physical environment is not the only factor that influences worker satisfaction. Impartiality in relationships between staff and supervisors is important psychologically. The physical elements influencing interpersonal relationships are workplace differentiation, office layout and building layout. In addition, the work itself, self-regulation, chances for self-education, wages, relationships with others, safety, and organizational policy are included (Sundstrom, 1986).

According to Luckiesh (1924), performance is best at moderate levels of arousal but deteriorates when arousal is too high or too low. People perceive 80% through the eyes. Additional lighting installation improved productivity by 79% and decreased work related accidents by 60%. Results from other research have shown that the inadequate level of illumination decreases work performance. An increase in the average lighting level (from about 398 to 796 lux) brought satisfaction; but, when intensity is over that level, lighting was associated with eye problems due to over excessive glare and brightness (Smith & Bertolone, 1986). Inadequate lighting causes employees to make mistakes, and it is associated with profit losses. Organizations, which invest in new lighting systems, may decrease expenses and at the same time improve employee efficiency.

Workplace Index Survey (Steelcase, 1991) showed 14% of respondents selected “better lighting” as an item they would like to change. Lensed-indirect lighting was preferred to parabolic down-lighting and direct-fluorescent lighting in office (Paul, 2000); and the group with the option of “looking out a window” reported less visual strain than others in the VDT (visual display terminal) work environment (Leather, Pyrgas, Beale, & Burns, 1993). The common use of VDTs and related lighting quality in the workplace influences productivity and the health of workers. An increase in the use of computers causes vision problems and contributes to the rise in occupational illnesses such as RSI (repeated stress injuries) and muscle problems in the wrist and the back of the hands. Because of these illnesses, employees have brought lawsuits against their employers. This shows the importance of human engineering in the work environment to organizations and nations.

In developed countries, laws related to VDT have been established, and new anti-noise standards have also been established in response to the noise created in open workspaces and by office automation. Office noise is correlated with dissatisfaction with the work environment and may play a role in job satisfaction (Sundstrom, Town, Rice, Osborn & Brill, 1994). Six out of ten employees consider noise distraction one of the biggest problems in the office. Noise distractions interfere with an employee’s ability to concentrate on work activities and as a result can adversely affect performance (Paul, 2000).

The mission and type of organization determines the design of the workplace; and each individual takes a role within the organization and works with others to accomplish the main goal of the organization. Communication is one of the major factors related to interpersonal relationships influenced by the furniture and office layout. The structure of the organization and physical environment should encourage consensus and efficiency. Thus, space should be allocated in response to the function and types of work performed. In other words, a properly designed space will both increase interpersonal communication and allow for privacy to improve collaboration and creativity. The physical setting has more of an effect on the satisfaction of workers than other factors (Je & Ha, 1996; Wollman, Kelly, & Bordens, 1994). Many organizations are concerned with employee health, standards in the workplace, and the possibility of law suits (IFMA, 1991).

**Methodology**

Data were collected in 1997 by surveying office workers in Seoul, Korea. The sample was from seven companies. Thirty workers were selected from each company. Seven companies and respondents were selected conveniently from a list of companies undergoing renovations in the last four years. Renovations excluded relocations to a new building. The Office Environment Promotion Association (OEPA) provided the list. Two trained interviewers, who participated in pilot study prior to the actual survey, visited each company. Out of 210 responses, a total of 155 were used in the data analysis due to missing information.

The questions were developed based on Becker’s (1990) post-occupancy evaluation of the workplace. Some relationship questions were adopted from the research of Je and Ha (1996). Each characteristic of the work environment was rated from 1 (not important) to 5 (important) to measure expectation level and from 1 (dissatisfied) to 5 (satisfied) to measure current conditions. At this point, a gap between expectation (importance) and actual condition (satisfaction) was the basis for the quality measurement of the space elements (Weber, McCray & Ha, 1993). The difference between the ideal (importance) and the actual condition (satisfaction) was defined as a “deficit” (Morris & Winter, 1978; Weber, McCray, & Ha, 1993).

**Findings**

1. Characteristics of Sample

The respondents range in age from 22 to 58 years, with an average age of 31.4. Forty-four percent of the respondents belong to the age group 26-30 and 38% to the group 31-40. Seventy-two percent of the respondents are male and 28% are female. The average number of years of education of respondents was 16;
and, eighty-six percent have college degrees. Job characteristics were categorized into 3 groups: clerical/secretarial work, sales/services, and research/architectural design. Forty-six percent of the respondents hold clerical jobs; 27% are in sales/services; and, 28% are in the research/design field. The total average work experience was 4.2 years for a range of one year to 17 years. The location of workplaces ranged from the first to the 21st floor. Years of renovation ranged from 1 to 4.

2. Level of Deficit in Work Environment

The findings on each element of the present work place are shown in Table 1. The mean scores of each element are presented to show the deficit level. One out of the 14 items, privacy, shows a full point difference between what was wanted (importance) and the actual condition (satisfaction). This result shows some improvement in the quality of personal workplace, compared with Je and Ha’s (1996) study that presented over a one score difference in 12 out of 14 items. Je and Ha’s (1996) study also indicated privacy as the biggest “deficit.” This means that renovation and/or remodeling have greatly reduced the difference between the ideal and actual level of satisfaction in the personal workplace.

Table 1 shows the results concerning the physical environment of the common workspace. In the common workplace, 3 out of 16 elements have more than a one-point deficit. They are noise level (m=1.27), number of meeting spaces (m=1.24), and privacy of meeting spaces (m=1.19). This result shows a large improvement in common workplaces after renovation. Thirteen out of 17 showed a deficit score of over one point in Je and Ha’s (1996) research that included “visibility” in evaluation and that included offices regardless of renovation in sample. Relationships with others had a deficit of less than one point.

| Items                        | 25   | 26-30 | 31-40 | 41   | Total |
|------------------------------|------|-------|-------|------|-------|
| Personal Location            | 0.67 | 0.73  | 0.28  | 0.13 | 0.44  |
| Arrangement of furniture     | 1.25A| 0.56AB| 1.02A | -0.13B| 0.73  |
| Amount of worksurface        | 0.67 | 1.14  | 1.00  | 0.63 | 0.60  |
| Function of furniture        | 1.33A| 0.36AB| 0.71AB| -0.25B| 0.50  |
| Amount of storage for work materials | 1.67A| 0.84AB| 1.26A | -0.25B| 0.97  |
| Display area for graphic materials | 0.17 | 0.47  | 0.24  | 0.50 | 0.36  |
| Style of furniture           | 0.42 | 0.06  | -0.05 | 0.26 | 0.01  |
| Color of furniture           | 0.00 | -0.10 | -0.28 | -0.25 | -0.15 |
| Comfort of furniture         | 1.27 | 0.82  | 0.98  | 0.63 | 0.83  |
| Degree of privacy            | 1.92 | 1.60  | 1.56  | 0.38 | 1.46  |
| Suitability to work          | 1.45 | 1.14  | 0.74  | 0.25 | 0.88  |
| Opportunity for personalization | 0.67 | 1.14  | 1.00  | 0.63 | 0.96  |
| Image of workplace           | 0.58 | 0.59  | 0.32  | 0.38 | 0.51  |

Note: means with same symbol not significantly different at .05 level

3. Evaluation Compared by Workers

The results of the evaluation by workers are shown in Table 1, 2, and 3. The quality of the work environment, which represents the difference between the ideal and the current condition of the workplace, is analyzed using Duncan’s multiple range tests according to age, occupation, and years of renovation.

1) By Age

For comparison, participants were divided into 4
groups based on age: under 25, 26-30, 31-40, and over 40. The arrangement of furniture, function of furniture, amount of storage for work materials, and function of storage are elements significantly differentiated by age groups (Table 1). With regard to the arrangement of furniture, the age group over 40 is more satisfied than the under 25 and 31-40 age groups. As for the function of furniture, the under 25-age group is less satisfied than the over 40 age group. On the amount of storage for work materials, the under 25-age group and the 31-40 age group are less satisfied than the age group over 40. The 31-40-age group is less satisfied with the function of storage than the over 41-age group.

Table 2. Evaluation by Occupational Classification

| Items                                | Clerical/Secretarial | Sales/Service | Research/Design |
|--------------------------------------|----------------------|---------------|-----------------|
| Personal                             |                      |               |                 |
| Location                             | 0.47                 | 0.58          | 0.36            |
| Arrangement of furniture             | 1.18                 | 0.65          | 0.52            |
| Amount of worksurface                | 0.68                 | 0.75          | 0.52            |
| Function of furniture                | 0.75                 | 0.39          | 0.32            |
| Amount of storage for work materials | 0.83                 | 1.17          | 1.04            |
| Function of storage                  | 0.30                 | 0.48          | 0.52            |
| Display area for graphic materials   | 0.21                 | 0.67          | 0.29            |
| Style of furniture                   | -0.13                | 0.25          | 0.04            |
| Color of furniture                   | -0.28AB              | 0.65A         | 0.16B           |
| Comfort of furniture                 | 1.31A                | 0.35B         | 1.00AB          |
| Degree of privacy                    | 2.00A                | 1.17B         | 1.40AB          |
| Suitability to work                  | 0.87                 | 1.00          | 1.04            |
| Opportunity for personalization      | 0.95                 | 1.35          | 0.76            |
| Image of workplace                   | 0.38                 | 0.58          | 0.48            |
| Common                               |                      |               |                 |
| Overall workplace size               | 0.78                 | 1.58          | 1.20            |
| Shape of workplace                   | 0.85                 | 0.79          | 0.88            |
| Density of people                    | 1.32                 | 0.87          | 1.00            |
| Location of workplace on the floor   | 0.17                 | 0.13          | -0.12           |
| Quality of lighting                  | 0.80                 | 0.78          | 1.08            |
| Quality of air-conditioning          | 0.78                 | 0.87          | 1.48            |
| Color of floor covering              | -0.27                | 0.00          | -0.52           |
| Color of overall furniture           | -0.29                | -0.43         | 0.04            |
| Noise level at workplace             | 1.63                 | 1.33          | 1.12            |
| Overall image                        | 0.12                 | -0.04         | -0.20           |
| Overall environment comfort          | 0.85                 | 0.87          | 0.44            |
| Number of meeting spaces             | 1.24                 | 1.48          | 1.52            |
| Size of meeting spaces               | 1.15                 | 1.43          | 1.08            |
| Privacy of meeting spaces            | 1.54                 | 1.30          | 0.80            |
| Location of meeting spaces           | 0.66                 | 0.70          | 0.64            |
| Furniture of meeting spaces          | 0.05                 | 0.17          | 0.44            |
| Relationship                         |                      |               |                 |
| Visibility to co-workers             | 0.50                 | 0.83          | 0.80            |
| Relationship with higher officers    | 1.27                 | 1.48          | 0.84            |
| Relationship with colleagues         | 0.95                 | 0.78          | 0.60            |
| Relationship with workers in other department | 0.76 | 0.65 | 0.36 |

Note: means with same symbol not significantly different at .05 level

Among the elements concerning common workplace, 2 out of 16 showed significant difference in “deficit.” They are location of workplace on a floor and the number of meeting spaces. The age group between 26-30 is less satisfied with the location of the workplace than the over 40-age group. The under 25-age group is less satisfied with the number of meeting spaces than the 31-40 age group and the over 40 age groups, and the 31-40 age group feels they are short of meeting spaces more than the over 40 age group.

Among the elements concerning relationship, one out of four shows a significant difference in deficit. The age group under 25 has more problems with their relationships with co-workers than any other age group.

2) By Occupational Classification

Occupational classification is divided into clerical/secretarial work, sales/services, and research/design. Three out of fourteen items concerning personal workplace show significant differences according to occupation while no significant difference appeared regarding common workplace and relationship with workers. Significantly different appraisal was given to color of furniture, comfort of chair, and privacy (Table 2). Concerning color of furniture, the sales/service group is less satisfied than the research/design group. Concerning color of furniture, the sales/service group is less satisfied than the research/design group. The clerical/secretarial group complains about the discomfort level of chairs more than the sales/services group, and also feels the lack of privacy more strongly than the sales/services group.
Workers in the clerical/secretarial group stay much longer in the office than the sales/services groups and have more occasions to feel uncomfortable.

3) By Years Since Renovation

The work environment evaluation by years of renovation is divided into 1, 2, and 4 years based on data availability. The results of the analysis show that 9 out of 14 items in the personal workplace are significantly different at the .05 significant level (Table 3). In general, workers in buildings renovated within one year show a significantly higher level of dissatisfaction than workers in buildings renovated 2-4 years earlier. Respondents in one-year-old renovated buildings feel significantly less satisfied with the arrangement of furniture, degree of privacy, workstation suitability, and overall personal space than respondents in 2-year-old renovated buildings. Concerning the amount of work-surface and function of furniture, the group in one-year-old renovated buildings feels significantly less content than those 2-year-old and 4-year-old renovations. However, concerning the function of storage and the amount of storage, the group in one-year-old renovated spaces feels a significantly higher deficit than those in buildings renovated within four years. However, concerning style of furniture, the latter group feels less satisfied than the former. The result is consistent with O’Neill’s (1994) study, which shows that workplace adjustability and storage contribute directly to satisfaction and worker performance.

| Items                                      | 1     | 2     | 4     |
|--------------------------------------------|-------|-------|-------|
| Personal Location                          | 0.61  | 0.18  | 0.54  |
| Arrangement of furniture                   | 1.13A | 0.24B | 0.83A |
| Amount of worksurface                      | 1.19A | 0.35B | 0.06B |
| Function of furniture                      | 0.94A | 0.24B | 0.17B |
| Amount of storage for work materials       | 1.37A | 0.88AB| 0.49B |
| Function of storage                        | 0.69A | 0.45AB| -0.14B|
| Display area for graphic materials         | 0.48  | 0.27  | 0.29  |
| Style of furniture                         | -0.07A| -0.20A| 0.44B |
| Color of furniture                         | -0.28 | -0.22 | 0.14  |
| Comfort of furniture                       | 0.89  | 0.65  | 1.00  |
| Degree of privacy                          | 1.74A | 0.96B | 1.74A |
| Suitability to work                        | 1.38A | 0.34B | 0.88AB|
| Opportunity for personalization            | 1.15  | 0.75  | 0.97  |
| Image of workplace                         | 0.64  | 0.45  | 0.42  |
| Common Overall workplace size              | 1.15A | 0.58B | 1.31A |
| Shape of workplace                         | 0.87AB| 0.60A | 0.23B |
| Density of people                          | 1.11  | 0.67  | 1.23  |
| Location of workplace on the floor         | 0.19  | -0.05 | -0.09 |
| Quality of lighting                        | 1.02  | 0.58  | 0.83  |
| Quality of air-conditioning                | 0.91AB| 0.98A | 0.23B |
| Color of floor covering                    | -0.15 | -0.18 | -0.60 |
| Color of overall furniture                 | 0.19  | -0.13 | -0.31 |
| Noise level at workplace                   | 1.46  | 1.11  | 1.25  |
| Overall image                              | 0.37A | -0.07B| -0.06AB|
| Overall environment comfort                | 0.92A | 0.48B | 0.89AB|
| Number of meeting spaces                   | 1.48  | 1.16  | 1.00  |
| Size of meeting spaces                     | 1.26A | 0.56B | 1.20A |
| Privacy of meeting spaces                  | 1.41  | 0.93  | 1.29  |
| Location of meeting spaces                 | 0.94A | 0.41B | 0.82AB|
| Furniture of meeting spaces                | 0.52  | 0.05  | 0.29  |
| Relationship Visibility to co-workers      | 0.94A | 0.33B | 0.88AB|
| Relationship with higher officers           | 1.46A | 0.35B | 1.14A |
| Relationship with colleagues               | 0.98A | 0.32B | 0.51B |
| Relationship with workers in other departm  | 0.72  | 0.33  | 0.57  |

Note: means with same symbol not significantly different at .05 level

The evaluation of common workplace by years of renovation shows significant difference in 8 out of 16 items. The group in 2-year old renovations feels significantly more satisfied with overall workplace size, and the size of meeting space than the one-year and 4-year-old renovation groups. The deficit in shape of workplace is higher in the 4-year-old renovation group than in the 2-year-old renovation group. Concerning the quality of air, the latter group is less satisfied than the 4-year-old renovation group. Deficits in overall image, overall environmental comfort, location of meeting space, and visibility of co-workers is higher for the group in buildings most recently renovated when compared with workers in buildings renovated within 2 years.

Workers in the 2-year-old renovation group have a
better relationship with senior management than others, while workers in the one-year-old renovation group have more problems with their coworkers than the 2-year and the 4-year renovation groups. Workers in the one-year-old renovated environment expressed less satisfaction with the workplace and relationships, while workers in the 2-year-old renovation environment show higher satisfaction than the others do.

The over 40-age group feels less of a deficit than the other age groups. Clerical/secretarial workers feel more dissatisfaction concerning comfort of chairs and degree of privacy than the sales/services group. This means that workers spending more time in the office need more consideration regarding the comfort of personal space. Results showing that workers in the most recently renovated buildings feel more deficits than other groups indicate that workers need time to adjust to their new environment. Groups in buildings renovated within 2 years are generally more satisfied than the other groups. The effect of years since renovation is apparently affected by the quality of the renovations. Attachment to the workplace increases when workers are accustomed to the environment regardless of the condition of the physical setting of the workplace.

Conclusions
Renovation and/or remodeling of the office environment, whether it is personal or common space, reduces the deficit between the ideal and actual conditions. Privacy appears as a deficit in the personal environment; while noise, lack of meeting space and privacy are deficits in common workplaces. Less consideration is given to meeting spaces. Renovation has improved the quality of the furniture but the overall quality of the renovation has not yet reached the expectation of workers. Newly renovated environments also gave some discomfort to the occupants. They need time to adjust themselves to the new work environment. Tension with other workers is increased in newly improved environments. This means that like in the home, attachment to the workplace improves with time regardless of the quality of the physical environment.

The trend in the work environment is moving toward a reduced office with shared work and limited workspaces; yet workers still feel more satisfaction with more workspace. The design of the workplace and workstation should be based on the work performed; however, the survey shows that the same layout and the same size are generally used regardless of task. Companies need to base their workplace design policy on work performed. Workstations are configured to accommodate differences in office size and support status distinctions among workers. They are not configured to encourage or enhance the ability to perform task requirements. Corporations need to balance the need for organizational controls with the individual’s and group’s needs to be able to influence aspects of their work life and workplace. The present study is not the whole approach. A triangulation method would be more appropriate. Further research should extend the scope to the audit of physical quality of environment and behavioral ratings as a complement to experiential measures. Other factors, which could be more influential to worker satisfaction, should be included in future research.

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