

Physical Environmental Factors Affecting Job Satisfaction

- Focused on Office Environment of Oklahoma State University's Faculty Members-

직업 만족도에 영향을 미치는 물리적 환경 요소들

- 오클라호마 주립대학 교수의 연구환경을 중심으로 -

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Abstract

본 연구는 사무공간에 영향을 주는 물리적 환경 요소 (공간, 가구배치, 미, 주변요소)를 제시하고 각 환경 요소들과의 관계를 파악하며 각 물리적 환경요소들과 직업 만족도 (급여, 진급, 책무, 상사와의 관계, 물리적 공간과 배치, 수업방법의 향상, 현재 직업 만족도)와의 관계를 분석하는데 연구의 목적이 있다. 또한 물리적 환경 요소들, 직업 만족도와 개인 신상 (나이, 성별, 지위, 교육수준, 교육 경력)의 특성들과의 상관관계를 알아보려고 한다.

본 연구는 오클라호마 주립대학교의 종신 재직권을 가진 교육대학 교수들을 대상으로 세 가지 가설을 바탕으로 작성된 설문지를 배포하여 조사되었다. 각 교수들의 사무공간은 1997년에 개보수를 마치고 그 해 여름부터 사용하고 있다. 설문은 현재 사용하고 있는 사무공간에 대한 평가, 직업 만족도에 대한 평가와 개인 신상의 특성에 대한 질문으로 조사되었다. 조사 결과 사무공간에 영향을 주는 물리적 환경 요소들 간에 밀접한 관계가 있다는 가설이 입증되었고, 또한 조사 결과 물리적 환경의 만족도가 증가할수록 직업 만족도가 증가하는 것으로 물리적 사무환경에 대한 만족도와 직업에 대한 만족도가 직접적인 관계가 있다는 가설 또한 입증되었다. 물리적 환경요소, 직업 만족도와 개인 신상의 특성들과의 상관관계가 있다는 가설은 전체적으로는 입증되지는 않았지만 부분적으로 요소들 간에 관계를 보여주고 있다. 남성이 여성보다 가구배치에 대해 불만족스러웠고 교육경력이 적을수록 사무공간의 냉난방과 환기에 대한 불만족을 보였다.

본 연구의 결과는 교수들의 사무환경의 부정적, 긍정적 견해를 지각하여 사무 환경의 질을 높이는데 도움이 되는데 중요한 역할을 할 수 있겠다. 본 연구는 교육대학의 교수들에 국한되어 있었던 바 추후에는 전체 교육자들을 대상으로 장기간의 관찰을 통한 연구가 요구되어진다.

키워드 : Physical Environmental Factor, Job Satisfaction, space, office, Personal Variable.

1. Introduction

1.1. Background Information

With the tendency toward an information society, work environments may influence production and increase efficiency for the achievement of tasks. Therefore, with the recognition that the concept that the office is not a just workspace but can be a life space that nurtures the creation of knowledge, the importance of improvement in the work environment should be recognized. Psychological, social, and psychological environment support is necessary. Paul(1996) indicated that

today's workers who are engaged in new forms of knowledge work are especially unprotected from workplace stress. If a comfortable work environment is offered responding to needs that influence what is valued, it can enhance not only physiological and psychological satisfaction but also the quality of workers' lives. In early research on job satisfaction¹⁾, employees ranked a series of job factors on their importance for general job satisfaction.

A survey in 1957(Herzberg et al.) found that among ten job factors identified as important, the physical environment,

1)The satisfaction that individuals receive from their employment is largely dependent upon the extent to which the job and everything associated with it meets their needs and wants (Chruden & Sherman, 1984).

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was labeled as working conditions. A later survey conducted by Lunden(1972) included 450 office workers in Sweden. Participants were asked to rank ten job factors for their contentment in the office; type of work was first, with office environment seventh.

The results of several surveys constantly report that the office environment as one of several job factors is important for job satisfaction, and although less important than the work itself and several other factors, office environment remains important.

In recent years, improvement in the efficiency of work environments has been investigated. Specifically, a professor's office was found to be not only a space for general tasks but also a core place in a university education that should provide an environment for creative work. As an individual space, a professor's office has more private characteristics than where in general workspaces.

The physical work environment represents one of several facets of employment that contribute to job satisfaction (Sundstrom, 1980). Notably, one important source of dissatisfaction for faculty members is their working conditions (Tack and Patitu, 1992). Therefore, job satisfaction among higher education faculty seems important to study and the problem of similar dependent variables should not dissuade a researcher (Cohen, 1974).

Although the office of the professor is a small space, individual preference, personality, and inclination are important elements that affect the design and ones image of the space. Therefore, to create a comfortable work environment in the professor's office, the professor's satisfaction with office environment related to their job should be considered.

Limited published research is available on the relationship between factors of physical work environment²⁾ and job satisfaction for university faculty members. Few studies have targeted physical factors in the work places that related to the identified environmental satisfaction and job satisfaction.

Therefore, identification of factors which influence and relate the work environment and job satisfaction of university faculty members could be useful to help

2)Previous study related to the environmental factors with offices (Farrenkopf & Roth, 1980) investigated the eight environmental factors derived from a university faculty. They are ranked in order: location, privacy (quiet), space (amount, type), HVAC, furniture (equipment), lighting, windows (view), aesthetics (appearance, decoration).

universities understanding more about the perceptions faculty that have about their work environments and how these environments may or may not contribute to their satisfaction.

1.2. Purpose of the Study

The purpose of this study is to explore the relationship between selected factors³⁾ of the physical work environment and job satisfaction of university faculty members. Professors' office satisfaction may have direct implications for the design and assignment of university offices (Farrenkopf & Roth, 1980).

Hypotheses In this study, three hypotheses are postulated about the relationship of physical work environment and job satisfaction:

H1: Space, furnishings, aesthetics, and ambient conditions are significantly related to one another as factors that affect the physical work environment of faculty offices.

H2: Satisfaction with the physical work environment and job satisfaction are significantly related.

H3: The personal variables of age, gender, rank of faculty, and years of experience are significantly related to the factors of physical work environment and job satisfaction.

2. Methodology

2.1. Selection of the Sample

The sample of this study is limited to full-time faculty members who are in the College of Education at Oklahoma State University, in Stillwater, Oklahoma⁴⁾. The total number of faculty were 79 in spring, 2001. The tenure track faculty that have offices in Willard Hall employed by the College of Education were selected. Willard Hall was renovated in 1997

3)Four factors measure the degree, to which an employee is satisfied with the office setting: space, furnishings, aesthetics, and ambient conditions in this study.

4)This study is limited to faculty members who are in the College of Education in Oklahoma State University and the results can therefore only be generalized to this group. The study concerns the difficulty of obtaining a randomized sample of faculty members. All tenure track faculty who have offices in Willard Hall and are employed by the College of Education received questionnaires; thus the sample is not truly random. The lack of a randomly selected sample makes it imprudent to generalize to the population of faculty members. However, Singleton, Strait, and Strait (1993) state that as long as a survey is designed only for those volunteers who wish to participate, self-selection should permit reasonable generalization to the target population.

for the College of Education. The faculty of the College of Education moved into Willard Hall in mid-semester, 1997. Because these faculty members have recently moved into this building, the office spaces were expected to influence the job satisfaction of the faculty members. Each subject was queried about the physical environment and their satisfaction level on the job.

2.2. The Instrument

In order to gather data, the questionnaire was developed. The design of the instrument was developed using concepts from studies that have been conducted by researchers who measured satisfaction of office environment and job satisfaction in varying fields, Sundstrom, E., etc. (1994), Konar, E., etc. (1982), Crouch, A. and Nimran, U. (1989). The research instrument consists of three parts: existing workspace assessment, job satisfaction, and demographic information.

(1) Existing Workspace assessment

Existing workspace assessment questions were selected for four variables: space; furnishing; aesthetics; and ambient conditions that would most likely influence the physical work environment satisfaction and job satisfaction of university faculty members. The first question asked if the respondents were able to plan to arrange the furnishings in the office with yes/no response. The second and third questions were asked if the respondents were able to choose the objects displayed in the office and amount of furniture items they have. Eighteen questions asked the respondents to indicate their level of agreement with statements regarding various physical aspects of the work environment. Level of agreement is from 1 (strongly disagree) to 5 (strongly agree).

(2) Job Satisfaction

Job satisfaction questions include salary, promotion, relationship with their supervisor and colleagues, responsibility, and benefits. The first and second questions were asked that how much time respondents spend in the office alone or with others each day. The researcher believes that the amount of time faculty members spend in their own office impacts their level of job satisfaction. Nine questions asked the respondents to indicate their level of agreement with statements regarding their level of job satisfaction for each statement on a 5-point scale.

(3) Demographic Information

Demographic information included: age, gender, current job rank, level of education, and number of years teaching. Age was grouped by four categories and education level was asked with the highest level of education completed. Respondents were asked to record their number of years teaching at Oklahoma State University in the College of Education.

2.3. Data Collection

The instrument was mailed at January 13, 2001 to faculty in the College of Education at Oklahoma State University, in Stillwater, Oklahoma. Sixty-three faculty were given a cover letter and a copy of the questionnaire with a return envelope. The subjects asked to complete the instruments and return the survey in the enclosed envelope by campus mail. Two weeks after the initial distribution of the questionnaire, reminder letters with questionnaires were sent to those who had not responded.

3. Results

3.1. Description of the Sample

The population for this study consisted of 63 tenure track faculty members who have offices in Willard Hall and are employed by the College of Education at Oklahoma State University. The College of Education office reported that one faculty is not at this university anymore and one faculty will not be in their office until October 2001. Therefore, the total potential sample was 61 faculty. The study is for the collection of data from faculty who occupy offices that are very similar in size and shape. The furnishings are similar and are from one manufacturer. Although faculty who were here during the renovation project had some input into furnishings, it was mainly for color selection or type of chair from prototypes that were developed. The major source of data for this study was the three-part questionnaire completed by 35 respondents, which represented a response rate of 57.4 percent. <Table 1> summarizes the demographic information of the sample used in this study.

3.2. Physical Environmental factors

Respondents answered questions about the amount of control they had over physical aspects of their work area.

Mean score revealed that the most faculty members were able to plan the furnishings used in their office and almost twenty-six percent of the faculty were not able to select the furnishings in their office. The distribution of the respondents' ability to select the furnishings in their work area is found in <Table 2.>

<Table 1> Demographic Information of the Sample (N=35)

Variable	Frequency	Percent(%)
Age		
35-44	6	17.1
45-54	19	54.3
55-64	10	28.6
Gender		
Male	18	51.4
Female	17	48.6
Rank		
Assistant Professor	11	31.4
Associate Professor	15	42.9
Professor	9	25.7
Level of Education		
Ph.D	26	74.3
Ed.D	8	22.9
Other	1	2.9
Years of Teaching		
Less than 5years	10	28.6
6-10 years	8	22.9
11-15 years	8	22.9
16-20 years	2	5.7
21-25 years	4	11.4
Over 25 years	3	8.6

<Table 2> Listings of Furnishings Selected by Faculty Members

Type of Furnishing	Frequency of Response	Percentage of Total
Desk type	16	45.7
Type of storage	13	37
Chair Type	17	48.6
Lighting	1	2.85
Wall Color	1	2.85
Chair Color	6	17
Desk Top Color	1	2.85
Nothing	9	25.7

There were four physical factors defined for this study. The series of factors included space⁵⁾, furnishings, aesthetics, and ambient condition.

(1) Space The concept of space was measured by creating an index of three questions directed at learning the perception of space in the respondent's workspace.

5)Workspace: a work-station assigned to a specific individual including furniture, machinery, equipment, supplies, decorative items, and other things that occupy the area designated for one person who works there.

Nearly 65 percent of the respondents liked the amount of space around their desk. Twenty percents of respondents disagreed with the statement, "the amount of space around the desk is adequate to accommodate visitors".

Eighty percents of the respondents were satisfied with office size⁶⁾. Nearly eleven percent of the respondents disagreed with the statement, "overall, my office size is adequate to work efficiently".

Over seventy percent of the respondents agreed with the statement, "I have enough space to display what I want in my office". The distribution of satisfaction of amount of space is detailed <Table 3.>

<Table 3> Summary of Responses under the Amount of Space Satisfaction (N=35)

Factor	Strongly disagree		disagree		Neither agree or disagree		Agree		Strongly Agree		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
Amount of space around the desk	3	8.6	4	11.4	4	11.4	16	45.7	7	20.0	3.58	1.21
Overall office size	2	5.7	1	2.9	4	11.4	21	60.0	7	20.0	3.86	0.97
Space to display	2	5.7	3	8.6	5	14.3	16	45.7	9	25.7	3.77	1.11

(2) Furnishings The furnishings in the workspace⁷⁾ were measured by five questions directed at amount of work comfortable chairs, and proper equipment.

Twenty percent of the respondents strongly believed that the amount of work surface around them supports their work tasks. Fifty-one percent of the respondents agree with the statement, "the amount of work surface in my office supports my work tasks". sixty percent of the respondents agreed with the statement, "the amount and type of storage space in my office is adequate".

Only fourteen percent of the agreed with the statement, "the furnishings in my office can be easily arranged". Over seventy percent of the respondents indicated that their furnishings could not be easily arranged with the statement.

Sixty-eight percents of the respondents agreed with the statement, "my office chair is comfortable". Fourteen percent of the respondents indicated that their office chair is uncomfortable.

6)According to Sundstrom, E. and Sundstrom, M. G. (1986), without enough space an individual may not be able to change posture, change positions, extend his or her legs, stretch or walk around. When people have assigned work places, floor space may be important to individual satisfaction. Floor space is the amount of space that a given workplace for an individual worker contains.

7)The arrangement of the basic furniture set for any individual office worker to support his/her tasks, communicate status, facilitate control over interactions with others, and offer delight.

Nearly seventy-one percent agreed or strongly agreed with the statement, "I have proper equipment to do my work satisfactorily". The distribution of satisfaction with furnishings is detailed in <Table 4.>

<Table 4> Summary of Responses under the Furnishings Satisfaction

Factor	Strongly disagree		disagree		Neither agree or disagree		Agree		Strongly Agree		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
Amount of work surface	2	5.7	6	17.1	2	5.7	18	51.4	7	20	3.63	1.17
amount of storage space	2	5.7	6	17.1	5	14.3	15	42.9	6	17.1	3.50	1.16
Furnishing arrangement	12	34.3	13	37.1	4	11.4	5	14.3	1	2.9	2.14	1.14
Comfortable chairs	2	5.7	3	8.6	6	17.1	16	45.7	8	22.9	3.71	1.10
Proper equipment	1	2.9	3	8.6	6	17.1	18	51.4	7	20.0	3.77	0.97

(3) Aesthetics⁸⁾ Over ninety percent of the respondents indicated that they had a satisfactory office wall and floor color. Only six percent of the respondents disagree with the statement, "existing wall/floor colors are pleasing."

Seventy-seven percent of the respondents had objects (pictures, artworks, or plants) in their office. Fourteen percent of the respondents disagreed with the statement, "many objects (pictures, artwork, or plants) are present in my office"⁹⁾. Nearly fifty percent of respondents agreed with the statement, "I had input into the design of space in my office". The distribution of satisfaction with aesthetics is detailed <Table 5.

<Table 5> Summary of Responses under the Aesthetics Satisfaction (N=35)

Factor	Strongly disagree		disagree		Neither agree or disagree		Agree		Strongly Agree		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
Wall/floor colors	0	0	0	0	2	5.7	18	51.4	15	42.9	4.37	0.60
Having many objects	1	2.9	4	11.4	3	8.6	14	40.0	13	37.1	3.97	1.10
Input into the design of space	9	25.7	8	22.9	6	17.1	7	20.0	5	14.3	2.74	1.42

(4) Ambient Conditions¹⁰⁾ The satisfaction of ambient conditions was measured by five questions. Seventy-seven percent of those respondents responding to the questionnaire indicated they agreed with the statement, "The lighting in my office is satisfactory to work efficiently". Only six percent of the respondents disagreed that the lighting in their

8)The appearance of an office and visual quality such as quality of light, the colors and materials.

9)Campbell(1979) indicated that decorated spaces make people feel more comfortable than ones, which have not been decorated.

10)Atmosphere of a working environment includes the quality and movement of the air, the temperature, the humidity, the ambient sound, and the lighting.

office was satisfactory to work efficiently. Sixty-three percent of the respondents strongly disagreed with statement, "task lighting or a desk lamp is available for my work surfaces". Eighty-three percent of the respondents agreed that natural light is available in their office. Sixty-three percent of the respondents indicated that the amount of noise in their office did not affect their tasks. Approximately forty-six percent of the respondents agreed that the heating, air conditioning, and ventilation in their office were comfortable to work efficiently. Thirty-four percent of the respondents disagreed with the statement. The respondents reported that office was too warm or too cold since they could not control the temperature in the workspace. Brill (1984) indicated that temperature and air quality are environmental conditions that affect a person's perception of comfort. The distribution of satisfaction with ambient condition is detailed <Table 6.>

According to tables presenting the means, respondents were most satisfied with wall/floor color (M=4.37), the lighting in their office (M=4.00), and available natural light (M=4.17) and least satisfied with easy arrangement of their furniture (M=2.14), input into the design of space (M=2.74), task lighting (M=2.38), and HVAC (M=2.40).

<Table 6> Summary of Responses under the Ambient conditions Satisfaction

Factor	Strongly disagree		disagree		Neither agree or disagree		Agree		Strongly Agree		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
Office Lighting	1	2.9	1	2.9	5	14.3	17	48.6	1	28.6	4.00	0.92
Task lighting/ Desk lamp	15	42.9	7	20.0	2	5.7	4	11.4	6	17.1	2.38	1.58
Natural Light	2	5.7	0	0	4	11.4	13	37.1	16	45.7	4.17	1.04
The amount of noise	8	22.9	14	40.0	7	20.0	3	8.6	3	8.6	2.40	1.19
HVAC	4	1.4	7	20.0	7	20.0	9	25.7	7	20	3.24	1.33

(5) The Overall Office Environment

The final question was related to overall office environment. How the personal workspace is designed has a significant relationship to a person's satisfaction with his or her personal workspace. Nearly eighty-three percent of the respondents agreed with the statement, "overall, my office environment is designed to allow me to do my tasks efficiently".

3.3. Job Satisfaction factors

(1) Job Satisfaction Factors

The job satisfaction index was composed of nine factors, the amount of responsibility, salary, relationship with

supervisor, the physical space and arrangement, promotion, developing teaching methods, feeling isolated in the work space, degree of work, and satisfaction of current job.¹¹⁾

The mean score revealed that faculty were satisfied with the physical space and arrangement, feelings about the workspace, and degree of work and the opportunity to express their own ideas. Faculty members were neutral on amount of responsibility, relationship with supervisor, and chance for promotion. They were dissatisfied with salary and time to develop teaching methods. Although the mean of overall job satisfaction was neutral, sixty percent of the faculty were satisfied with their overall job. Faculty were most satisfied with feeling about their work area, physical space and arrangement, degree of their work and least satisfied with salary and the development of teaching methods. The distribution of job satisfaction factors is detailed in <Table 7>.

<Table 7> Summary of Responses under the Job Satisfaction (N=35)

Factor	Strongly disagree		disagree		Neither agree or disagree		Agree		Strongly Agree		Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%		
My Salary	8	22.9	14	40	6	17.1	6	17.1	1	2.9	2.37	1.11
Relationship/w supervisor	5	14.3	1	2.9	5	14.3	17	48.6	6	17.1	3.53	1.26
Physical space & arrangement	1	2.9	3	8.6	5	14.3	20	57.1	6	17.1	3.77	0.94
My chance for promotion	6	17.1	2	5.7	6	17.1	14	40	7	20	3.40	1.35
Developing teaching method	4	11.4	8	22.9	9	25.7	13	37.1	1	2.9	2.97	1.10
Feeling in work space	4	11.4	0	0	3	8.6	16	45.7	12	34.3	3.91	1.22
Degree of work	1	2.9	2	5.7	3	8.6	21	60	8	22.9	3.94	0.91
Satisfaction of current job	0	0	7	20.0	7	20.0	15	42.9	6	17.1	3.57	1.01

(2) The overall Job Satisfaction

The final question was overall job satisfaction. Sixty percent of the respondents were satisfied and twenty percent of the respondents were not satisfied with the current job. <Table 7.> presents the mean of overall job satisfaction.

(3) Hours Per Day spent in the Office

The two additional questions asked the respondents to indicate how much time was spent in the office alone and with others each day. Most faculty members spent more time alone than time with others. The result of the relationship between the amount of time spent per day in

their office and job satisfaction indicated that the more time spent alone and less time spent with others increased job satisfaction. The results of these questions are found in <Table 8.> and <Table 8.1>

<Table 8> Number of Hours Spend Alone per Day in the Office

Number of Hours Spent	Frequency of Response	Percentage of Total
Less 1 hours	3	8.6
1 1/2 - 2 hours	5	14.3
2 1/2 - 3 hours	6	17.1
3 1/2 - 4 hours	6	17.1
4 1/2 - 5 hours	8	22.9
More than 5 hours	7	20

<Table 8.1> Number of Hours Spend with Others per Day in the Office

Number of Hours Spent	Frequency of Response	Percentage of Total
Less 1 hours	10	28.6
1 1/2 - 2 hours	14	40
2 1/2 - 3 hours	7	20
3 1/2 - 4 hours	3	8.6
More than 5 hours	1	2.9

3.4. Data Analysis

(1) Relationship between Selected Furnishing and Job Satisfaction Factors

The result was expected that the more choices for furnishings were positively correlated with their job satisfaction. The more choices the faculty had to select their furnishings were positively correlated with their satisfaction of their salary, the amount of time to develop innovative teaching methods, and feelings about their workspace. The results are shown in <Table 9.>

<Table 9> Pearson's Correlation Coefficient Matrix of Relationship between Selected Furnishings and Job Satisfaction Factors

Factor	Amount of respon	My Salary	Relations hip w/ super-	space & arrange ment	My chance for promot	teach/m ethod	Feel in Work	Degree of Work	Satisfacti on of current job
Selection of Furnishing	.246	.470**	-.017	.097	.202	.412**	.357*	.120	.281

*Significant p <.05 (two-tailed) **Significant p <.01 (two-tailed)

(2) Measures of Relationship between the Amount of Time Spend per Day in Office with Job Satisfaction

Analysis indicated that there was a significant relationship between the amount of time to spend per day in the office and job satisfaction. The result showed that respondents who spend more time alone and less time with others have higher job satisfaction (see Table 10).

11)Tack and Patitu (1992) stated that certain factors in the workplace significantly affect a faculty member's satisfaction or dissatisfaction with their professional work. Therefore, higher education institutions must consider carefully the impact of several factors on faculty: salary, tenure, faculty rank, supervision, interpersonal relationships, and working conditions.

<Table 10> t-Test of the Amount of Time spend per Day in the Office with Job Satisfaction

Factor	Mean	S/D	t-score	df	sig.(2-tailed)
Pair Time alone* Job Score	-21.8571	5.4132	-23.888	34	.000
Pair Time w/other* Job Score	-23.5714	5.5322	-25.207	34	.000

3.5. Hypothesized Relationships

Three hypotheses were presented in this study.

(1) Hypothesis #1. Pearson's correlation coefficient proved that the majority of physical work environment factors were generally positive and significantly correlated to one another.

As expected, those who were satisfied with the space in their work area were positively correlated with their furnishings and aesthetics. Those who were satisfied with the furnishings in their work areas showed positive correlations with aesthetics and ambient conditions. Positive correlations were displayed between aesthetics and ambient conditions in their work area. Additionally, those who were satisfied with their space, furnishings and aesthetics showed positive correlations with their satisfaction of overall office environment. The first hypothesis was supported.(see table 11)

<Table 11> Pearson's Correlation Coefficient Matrix among Physical Work Environment Factors

Factor	1.	2.	3.	4.	5.
1. Space					
2. Furnishings	.705**				
3. Aesthetics	.355*	.471**			
4. Ambient Condition	.186	.490**	.519**		
5. Overall Satisfaction	.722**	.708**	.400*	.305	

*Significant p <.05 (two-tailed) **Significant p <.01 (two-tailed)

(2) Hypothesis #2. Analysis indicated that there was a significant relationship between physical environment and job satisfaction. The result indicated that respondents who were satisfied with their physical work environment were satisfied their job. The second hypothesis was supported(see <Table 12>).

<Table 12> t-Test of Satisfaction of Physical Work Environment Factors with Job Satisfaction Factors.

Factor	Mean	S.D.	t-score	df	Sig. (Two-tailed)
Pair Physical Factors * Job Factors	33.2571	8.8728	22.175	34	.000

(3) Hypothesis #3. Chi-square analysis was used to examine the relationship between personal variables, which

are age,¹²⁾ gender, current rank, education level, and years of teaching, and the factors of physical work environment and job satisfaction.

The chi-square analysis indicated that there were no significant relationship between personal variables and physical work environment. Most respondents were satisfied with their office environment regardless of personal variables (see Table 13).

Even though they were not significantly related, some individual factors showed significant correlation with personal variables. Male respondents were more dissatisfied with their furnishings than female respondents and female respondents were more satisfied with the available natural light than males.

The amount and type of storage space and enough space to display were positively correlated with level of education. Those with less years of teaching experience were not satisfied the heating, air conditioning, and ventilation in their office. (see Table 13-1).

<Table 13> Chi-square for the Relationship between the Physical Work Environment Factors and Personal Variables

Chi-square	Value	df	Sig. (2-tailed)
Age	33.195	42	.832
Gender	25.125	21	.242
Rank	47.732	42	.251
Education	55.888	42	.074
Year of Teaching	106.575	105	.439

<Table 13-1> Pearson's Correlation Coefficient Matrix for the Relationship between Physical Work Environment Factors and Personal Variables

Personal Variables	Factor	Storage Space	Furniture Arrangement	Enough Space to Display	Natural Light	HVAC
Gender		-.155	.334*	-.006	.394*	-.125
Education		.349*	.177	.371*	.016	.290
Year of Teaching		.000	-.074	.048	-.232	.470*

*Significant p <.05 (two-tailed) **Significant p <.01 (two-tailed)

The chi-square analysis indicated that there were no significant relationship between personal variables and job satisfaction (see <Table 14>).

Even though they were not related, some individual factors showed significant correlation with personal variables (see <Table 14-1>). Assistant and associate professors were not satisfied with their salary and the amount of time to develop innovative teaching methods and professors were

12)Weaver (1978) found that age is positively related to job satisfaction. As workers grow older they are more satisfied with their job because of the intrinsic and extrinsic rewards of work, including income, authority, and autonomy on the job.

more satisfied these two factors. Those with more years of teaching experience were not satisfied the relationship with supervisor and level of education were negatively correlated with satisfaction of promotion chance. Although they were not significantly related, there was a possibility that the relationship between physical work environment and level of education and number of years teaching approached significance. The third hypothesis was not supported.

<Table 14> Chi-square for the Relationship between the Job Satisfaction Factors and Personal Variables

Chi-square	Value	df	Sig. (2-tailed)
Age	42.400	36	.241
Gender	19.454	18	.364
Rank	37.470	36	.402
Education	30.928	36	.708
Year of Teaching	100.212	90	.217

<Table 14-1> Pearson's Correlation Coefficient Matrix for the Relationship between the Job Satisfaction Factors and Personal Variables

Factor	My salary	Relationship w/supervisor	My chance for promotion	Developing teaching methods HVAC
Rank	.336*	-.173	-.006	.348*
Education	.015	-.151	-.377*	.170
Year of Teaching	-.091	-.344*	-.284	.193

*Significant $p < .05$ (two-tailed)

4. Conclusions

The following conclusions are drawn based upon the data analysis.

1. Previous research indicated that a number of physical work environment factors such as ambient environment, arrangement of furnishings, size and shape of the room, aesthetics affect the comfort of workers and their satisfaction (Wineman, 1982; Lunden, 1972; Davis, 1984; Farrenkopf & Roth, 1980). This study supports these previous findings that physical work environment factors significantly affect faculty members' satisfaction and are related to one another. Faculty in this study were satisfied with most factors of the physical work environment. This result may conclude that the physical factors contribute to positive ratings of faculty members' satisfaction based on the physical work environment.

2. Several job satisfaction factors significantly affect faculty members' satisfaction. Faculty in this study were satisfied with physical space and the arrangements in their

office supporting the activities and the degree to which their work give them the opportunity to express their own ideas.

3. A relationship was found between physical work environment and job satisfaction in this study. The result indicated that as satisfaction with physical work environment increased, so did satisfaction with job. The findings of this study supported previous research that the correlation between the work space and job satisfaction was examined among office workers (Crouch & Nimran, 1989) and Tack and Patitu (1992) suggested that poor working conditions lead to job dissatisfaction. This appears to be the most significant finding of the study because many researchers overlooked this issue for the past fifteen years.

4. None of the personal characteristics of the faculty emerged as being significant influential factors of physical work environment and job satisfaction. Previous research indicated that variables such as age (Weaver, 1978), rank (Farrenkopf and Roth, 1980), and number of teaching years (Gaziel, 1986) are related to physical work environment and job satisfaction. Although differences may exist in the level of the physical work environment and job satisfaction among faculty with different demographic characteristics (i. e., rank, years of teaching, level of education) these factors do not appear to significantly impact the relationship between physical work environment and job satisfaction. The results conclude that faculty did not perceive their office environment and job satisfaction differently based on demographic characteristics.

5. Implications

Many have suggested that the employee's satisfaction is critical for all segments of the workforce. Researches consistently points to the importance of faculty satisfaction and the effects of working conditions on faculty work place have looked at numerous aspects of the university environment. Faculty are essentially educational resources and they are required full responsibility for teaching, performing research, advising students, and performing professional and university service. To enhance these roles among faculty, knowing about the level of satisfaction of faculty on campus is the first step for this valuable educational resources.

In order to improve effectiveness and satisfaction of the functioning and identify areas in need of change, factors affecting physical work environment and job satisfaction need to be addressed. This study is important because of the approach to assessing faculty work life. The findings in this study provide a better understanding of the influence of faculty members' perception toward their physical work environment related to job satisfaction. Also this study raises awareness of the importance of positive or negative perceptions of their work environment. These findings may be useful in enhancing the workplace environment.

Because physical work environment has been found to influence job satisfaction, the results of this study should be considered when implementing related programs. When universities and interior designers are aware of the relationship between satisfaction of office environment and faculty' job, it may be possible to design more productive spaces.

6. Recommendations

The following recommendations are offered for future studies based upon the results of this study.

1. Based on the findings of this study, future studies might focus on more detailed information about current conditions of work environment using other factors(i.g., desk placement, window preference) that were not measured in this study.

2. Research is needed relating to the barriers of faculty physical work environment in order to gain a better understanding of these constraints which may influence university faculty' job satisfaction.

3. The study provides information concerning relationships between physical work environment and job satisfaction of university faculty. Research investigating this relationship among other educators is needed to gain a more accurate view of educator's physical work environment and the influence on job satisfaction.

4. Assuming the results remained consistent, significant differences would be found for the relationship between physical work environment and job satisfaction. A researcher would survey a larger sample to gain more additional findings.

5. Further research is suggested that would compare the physical work environmental and job satisfaction of those faculty who have worked in new offices with that of faculty who have been in old offices.

6. A longitudinal study is recommended to determine if faculty' physical work environment and job satisfaction remain constant over a period of time.

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