

Relationship of Office Lighting with Productivity of Employees

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Received: May 09, 2018

Accepted: June 13, 2018

ABSTRACT

People who are actively involved in the work force will spend a large proportion of their lives in their place of work. It is important that the physical aspect of the workplace and its impact on organizational productivity is studied. Western research have shown that properly installed and maintained day lighting systems, natural lighting has proved to be beneficial for health, productivity, and safety of building occupants. Aim of the study is to explore the relationship of office lighting with productivity of employees in Indian setting. A total of 660 employees from various offices of Chandigarh were recruited as sample. The age range of the sample was between 25 to 60 years. The questionnaire used was an adapted and modified version of already existing scales of occupants' satisfaction with indoor environment quality (IEQ) components of other buildings by different researchers. Results indicate that in present study employees productivity is not correlated with satisfaction with lighting. Results of present study are contradictory to previous research. One plausible reason could be that Chandigarh being well planned city most of the offices are getting sufficient day light in which the employees can work without much strain so employees doesn't consider lighting as important enough to increase their productivity further.

Keywords: lighting, productivity, environment, performance, comfort

Introduction

Light provides illumination to the environment. Light can be provided from various sources artificial or natural, to achieve some aesthetic or practical effect. Over the years number of studies has been conducted to study the relationship between lighting and employees productivity and previous research indicates that lighting is important to the overall quality of the workspace. According to a 1997 study sponsored by the American Society of Interior Designers (ASID), 68 percent of all office workers were concerned about their lighting. Office workers consistently rated poor lighting as the first or second concern that needed to be addressed. The main purpose of office lighting is to provide a comfortable and an efficient working environment; the presence of visual and psychological comfort conditions ensures user well-being and increases motivation that will lead to a higher performance and improved productivity (Manav and Yener, 1999; Manav, 2007; Odemis et al., 2004). With properly installed and maintained day lighting systems, natural lighting has proved to be beneficial for health, productivity, and safety of building occupants (Abdou, 1997; Finnegan and Solomon, 1981). Studies in west have mainly concluded that the pleasant environment created by natural light decreases stress levels of office workers. Similar studies are needed in Indian setting to see the effect of lighting on productivity of office employees.

Methodology

Sample

A total of 660 employees from various offices of Chandigarh were recruited as sample. The age range of the sample was between 25 to 60 years. The employees who were working for the last three years in a particular organization were considered for inclusion in this study. The research took place approximately three year post-occupancy to eliminate effects related to occupants being satisfied with the building because it was new and different (Franke & Kaul, 1978). The minimum educational qualification of the selected subjects was graduation.

Questionnaire

The data collection instrument for this study was a structured questionnaire developed by the researcher with the help of experts. The questionnaire is adapted and modified version of already existing scales of occupants' satisfaction with indoor environment quality (IEQ) components of other buildings by different researchers. The questionnaire items were developed to reflect the satisfaction/comfort/productivity components of the office environment. The questionnaire for the study contained 44 total items pertaining to employees' general demographics and satisfaction with thermal, acoustic, and lighting conditions. Thirty-two items of the questionnaire were related to the occupants' satisfaction of the IEQ components of thermal, acoustic, and lighting conditions. They were rated by the occupants based on a five-point Likert-type scale (1= "very dissatisfied" to 5 = "very satisfied").

Data Analysis

For result findings and in-depth analysis of the different components of office environment on the productivity of the office employees, statistical techniques of correlation has been used. SPSS 16 software as research tool for data analysis was used for this research.

Results and Discussions

Table 1: Descriptive Statistics

Variables	Mean	Std.Deviation	Respondents (N)
Productivity	3.6114	.73930	660
Lighting	2.9398	.75791	660

Table 2: Coefficients of Correlations between Productivity and Element of Office Design

Sr. No.	Variable	(r)
	Lighting	.055

In the present study employees productivity is not correlated with satisfaction with lighting. Results of present study are contradictory to previous research (Brill et al., 1984; Verderber and Reuman, 1987; Marans and Yan, 1989; Boubekri et al., 1991; Hedge et al, 1995; Nagy et al., 1995; Cakirand Cakir,1998; Leather et al., 1998; Manav and Yener, 1999; Knez and Kers, 2000; Reinhart, 2002, Odemis et al., 2004;Kibert, 2005; Galasiu and Veitch, 2006; Nishihara et al., 2006; Manav, 2007). It was expected that both day light and artificial indoor light is very necessary in any office environment. Having good lighting or utilization of natural light in the office can help and prevent fatigue and can also increase creativity, energize, motivate, and increase productivity. The results of present study were surprising and contrary. One of the possible reasons for it can be that for a large majority of the people working in buildings in Chandigarh, lighting for vision during the day is quite adequate, in part because people have very flexible visual systems and adjust their posture in response to the available lighting conditions. For example, the dimmer the light, the closer one holds the reading materials to maintain a constant ability to read. Laboratory experiments show that young people with normal eyesight will systematically adjust the eye-to-task spacing to maintain good task visibility, either by moving closer to the visual task or shifting posture to avoid reflected glare (Rea et al., 1985). One plausible reason could be that Chandigarh being well planned city most of the offices are getting sufficient day light in which the employees can work without much strain so employees doesn't consider lighting important enough to increase their productivity further.

Conclusion

It can be concluded that satisfaction with office lighting may not be perceived important by office employees in Chandigarh because in Chandigarh the office buildings are well designed with respect to daylight.

References

1. Abdou, O.A., (1997), "Effects of Luminous Environment on Worker Productivity in Building Spaces," J. Architectural Eng., 3 (3), pp. 124-132.
2. Brill, M., Margulis, S., and Konar, E., (1984), "Using Office Design to Increase Productivity. Buffalo," The Buffalo Organization for Social and Technological Innovation (BOSTI), Workplace Design and Productivity, Inc, New York.
3. Boubekri, M., Hull, R.B., and Boyer, L.L., (1991), "Impact of Window Size and Sunlight Penetration on Office Workers' Mood and Satisfaction: A Novel Way of Assessing Sunlight," Environment and Behavior, 23, pp. 474-493.
4. Çakir, A., and Çakir, G., (1998), "Light and Health. Berlin: ERGONOMIC Institute," From website http://www.healthylight.de/Light_and_Health/Documents_files/1LightandHealth.pdf. assessed on 6/05/2011.
5. Finnegan, M.C., and Solomon, L.Z., (1981), "Work Attitudes in Windowed vs. Windowless Environments," J. Soc. Psychol., 115, pp. 291-292.
6. Franke, R.H., & Kaul, J.D., (1978), "The Hawthorne Experiments: First Statistical Interpretation," American Sociological Review, 43, pp. 623-643.

7. Galasiu, A.D., and Veitch, J.A., (2006), "Occupant Preferences and Satisfaction with the Luminous Environment and Control Systems in Day lit Offices: A Literature Review," *Energy and Buildings*, 38, pp.728-742.
8. Hedge, A., Sims, W.R., and Becker, F.D., (1995), "Effects of Lensed-indirect and Parabolic Lighting on the Satisfaction, Visual Health, and Productivity of Office Workers," *Ergonomics*, 38, pp.260-280.
9. Knez, I., and Kers, C., (2000), " Effects of Indoor Lighting, Gender, and Age on Mood and Cognitive Performance," *Environ. Behav.*, 32 (6), pp. 817-831.
10. Kibert, C.J., (2005), *Sustainable Construction: Green Building Design and Delivery*, John Wiley and Sons, Inc, Hoboken, N.J.
11. Leather, P., Pyrgas, M., and Beale, D., (1998), "Windows in the Workplace: Sunlight, View and Occupational Stress," *Environment and Behaviour*, 30(6), pp. 739-762.
12. Manav, B., (2007), "An Experimental Study on the Appraisal of the Visual Environment at Offices in Relation to Color Temperature and Illuminance," *Build. Environ.*, 42 (2), pp. 979-983.
13. Manav, B., and Yener, C., (1999), "Effects of Different Lighting Arrangements on Space Perception." *Arch. Sci. Rev.*, 42 (1), pp. 43-48.
14. Marans, R.W., and Yan, X., (1989), "Lighting Quality and Environmental Satisfaction in Open and Enclosed Offices," *J. Arch. Plan. Res.*, 6(2), pp.118-131
15. Nishihara, N., Nishikawa, M., Haneda, M., and Tanabe, S., (2006), "Productivity with Task and Ambient Lighting System Evaluated by Fatigue and Task Performance," *Proceedings of Healthy Buildings*, Lisbon, Portugal, pp. 249-252.
16. Nagy, E., Yasunaga, S., and Kose, S., (1995), "Japanese Office Employees' Psychological Reactions to their Underground and Above-Ground Offices," *J. Environ. Psychol.*, 15 (2), pp. 123-134.
17. Odemis, K., Yener, C., and Camgoz, N., (2004), "Effects of Different Lighting Types on Visual Performance," *Arch. Sci. Rev.*, 47 (3), pp. 295-302.
18. Rea, M.S., Ouellette, M.J., and Kennedy, M.E., (1985), "Lighting and Task Parameters Affecting Posture, Performance, and Subjective Ratings," *J. Illum. Eng. Soc.*, 15(1), pp. 231-238.
19. Reinhart, C.F., (2002), "Effects of Interior Design on the Daylight Availability in Open Plan Offices," *Proceedings of the ACEEE Summer Study on Energy Efficient Buildings*, Pacific Grove, CA, pp. 1-12.
20. Verderber, S., and Reuman, D., (1987), "Windows, Views, and Health Status in Hospital Therapeutic Environments," *J. Arch. Plan. Res.*, 4 (2), pp. 120-133.