IMPROVING OFFICE USERS' WORKPLACE PERCEPTIONS USING PLANTS

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ABSTRACT

This paper explores the importance of user perceptions within an organisational context, and more specifically, aims to identify and demonstrate the benefits of plants in offices in contributing to employee wellbeing by influencing their perceptions of a working office.

Via comprehensive literature reviews, the importance of user perceptions is determined as well as the importance of indoor plants in office environments in improving employee wellbeing through psychological benefits.

It is argued that user perceptions can be analysed through their input and functionalities in the workplace and their consequent application of workplace productivity. In this study, a perception survey was completed, which demonstrated that occupants of planted offices feel more comfortable, more productive, healthier and more creative and feel less pressure than occupants of non-planted offices.

The paper provides an insight into how plants can be incorporated within facilities management strategies to improve employee health and wellbeing and improve perceived productivity.

Keywords: perceptions, plants, satisfaction, workplace productivity.

INTRODUCTION

A significant amount of research exists relating to physical aspects of the workplace and their influence on employee psychology. However, this has tended to focus on individual aspects such as lighting or privacy for example, without bringing the various elements together to establish the optimum workplace design for various types of work.

There have also been few previous studies on the psychological effects of indoor plants in workplaces, although a great deal of literature relating to outdoor natural environments points to significant potential benefits. The majority of indoor studies that have been carried out also suggest that plants may bring benefits.

This paper presents the findings of a survey relating to the effect of indoor plants on various different aspects of perceived workplace quality.

USER PERCEPTIONS AND WORKPLACE PRODUCTIVITY

With suggestions that employee disengagement is increasing (Pech and Slade, 2006), it is important to provide workplaces that positively influence the workforce. Pech and Slade argue that the focus is on symptoms of disengagement such as distraction, lack of interest, poor decisions and high absence, rather than the root causes. The working environment is perhaps a key root cause in employee engagement or disengagement.

Research has indicated that improving the working environment reduces complaints and absenteeism and increases productivity (Roelofsen, 2002). Workplace satisfaction has been associated with job satisfaction (Wells, 2000) and perceptions of workplace quality have a significant effect on building users' psychology.

This paper focuses on several of the key issues around perceptions of the workplace. A range of literature exists relating to different elements of the workplace such as personal control, privacy, personalisation, colour, windows and lighting. However, these separate elements have rarely been considered as a whole.

Lee and Brand (2005) found a positive correlation between perceived personal control over the physical environment and self-reported job satisfaction. They also found that perceived personal control was positively related to workplace satisfaction. However, Veitch and Gifford (1996) found that although choice led to perceptions of increased control, it also led to a performance decrement among the participants in their trial.

As FM is often cost driven, cost reduction efforts may lead to perceptions of insecurity among staff. Pech and Slade (2006) identify changes in the work environment as a factor contributing to declining trust. FM cost cutting measures such as reducing the catering offering, reducing cleaning frequency or removing the office plants are likely to increase the perception of insecurity.

The perception of management support will positively impact upon trust. Research has found (Stokols *et al*, 2002) that greater perceived support for creativity at work is associated with lower stress and greater job satisfaction. Providing an appropriate workplace to support creativity is key to the perception of support for creativity. They also found that higher levels of distraction are associated with lower job satisfaction.

Privacy is a key requirement of workplaces and Sundstrom *et al* (1982*b*) reported an approximately linear increase in perceived privacy with each number of enclosed sides around the workspace. Maher and von Hippel (2005), however, found that the number of partitions were not correlated with perceived privacy but they did find a positive correlation between the height of partitions and perceived privacy. Sundstrom *et al* (1982*a*) reported that office workers moving from enclosed to open-plan offices perceived a reduction in privacy, the most important component being the ability to hold confidential conversations. They found a parallel between physical workspace enclosure and privacy satisfaction.

However, Goodrich (1982) points out that some design solutions might unintentionally reduce perceived privacy by creating more spatial privacy. Partitions make individuals blind to their surroundings. Noises and movements outside are

sudden and unanticipated, making them more distracting (Goodrich, 1982). Maher and von Hippel (2005) also found that, although higher partitions provide visual privacy, they may fail to block noise. Like Goodrich, they suggest that this noise may be more intrusive when employees do not have visual cues to determine the locus of the noise.

Duvall-Early and Benedict (1992) completed a survey of perceived privacy. They found that those working in private workspaces felt they could better use their abilities, had better perceptions of accomplishment and were able to keep busy all the time. A study of private offices with interior glass panels (Goodrich, 1982) found that these create a fishbowl effect. The glass invites passers by to look in making users feel exposed, and constantly distracted. Circulation routes are also a consideration in perceived privacy. Although Kupritz (1998) found support for partitions, these were considered less important than having minimal traffic routed through the worker's area and the workspace being located away from the main traffic flow. The engineers studied perceived that loss of production time and mistakes occur due to distractions (Kupritz, 1998).

There are, however, positive distractions, such as trees, plants and water (James, 2007) that may be incorporated into buildings to improve workplace quality and productivity. Goodrich (1982) also advocates using large plants to increase privacy perceptions. He states that workers agreed that plants made the office more pleasant and informal and this seemed to reduce their need for high privacy levels. Shibata and Suzuki (2002) found that peoples' mood may be affected by plants although they concluded that further research was necessary.

Kaplan (1993) asserted that those with a view of nature such as trees and greenery were more satisfied and that even a short exposure to a natural setting can serve a restorative function.

Kaplan (1993) suggests that having natural areas at the workplace can be useful for views or direct involvement such as lunch areas and areas to walk. Bringing nature into buildings is becoming increasingly popular with the use of landscaped atria and "streets" within buildings.

Larsen *et al* ((1998) add support for workplace plants, finding that office plants increased participants' perceptions of office attractiveness and comfort. Surprisingly, however, they found that productivity reduced with greater numbers of plants. They suggest this may be due to the repetitive nature of the task.

Schempp (1997) points out that most people react positively to the presence of indoor plants, perceiving the rooms to be more pleasant, and feeling more relaxed and active. He states also that the building users' understanding of nature is furthered by the experience of watching the plants develop into an ecosystem, outlining how surroundings change during annual seasons.

Lohr et al. (1996) state that people intuitively sense that contact with plants and nature is restorative and calming to the human spirit, evidenced, for example, by extensive landscaping in residential communities, interior plantscaping of offices and retail spaces as well as common use of interior plants in homes and workplaces. They argue

that, while the benefits of passively viewing plants in natural settings are well documented, many workers labour in windowless office spaces with few opportunities to view nature.

Individual perceptions will, of course, differ among different people. Goodrich (1982) highlighted individual perceptual differences following a survey of responses to a new environment:

> 'Two themes emerged from the data. Theme one characterized the new setting as pleasant, attractive, nice to work in, modern and functional. Theme two characterized it as cold, mechanical, hospital-like, sterile, hard and antiseptic. Each theme focused on different aspects of the same environment, suggested different meaning attributed to it, and indicated different emotional reactions as a result.' (Goodrich, 1982).

Goodrich (1982) highlights that some workers will territorialise their space by personalising their surroundings and they report feeling annoyed when others use their personal space. However, he also points out that some workers do not have these feelings and appear to be more flexible in how they use their space. Wells (2000) found positive associations between personalisation and workplace satisfaction. These were in the number of personal items displayed, the association between how much the employee would like to personalise and how much he or she is allowed to personalise and the extent to which the employee determined the arrangement of his or her workspace (Wells, 2000). Haynes (2007) points out that adopting flexible patterns such as 'hot-desking' and 'hotelling' has led to employees no longer having a fixed workspace. He argues that this could overlook a behavioural need to express their identity by modifying their workplace.

Colour is an important determinant of user perceptions but it appears often to be overlooked. Wright (2005) points out that workplace colour decisions will influence staff motivation and absenteeism as well as portraying a certain image to clients. Stone and English (1998) undertook a study of the effects of task type, colour and the presence of a poster on subjects' mood, satisfaction and performance. They studied the effect of red and blue partitions in the workspace and found that perceived privacy was higher in the blue partitions than in the red. A study of red, white and green offices (Kwallek and Lewis, 1990) found that subjects preferred working in the white environment but significantly more errors were made in the white office than in the red. However, subjects working in the white office rated it less distracting than those working in the red office.

Access to windows and artificial lighting will also affect the psychology of building users. There tends to be a strong preference for windows among occupants, however, Stone and Irvine (1994) found no evidence that windows effect higher performance levels. Their study found that a windowless room appeared to reduce stimulation from the environment, which was beneficial for tasks such as filing but potentially limiting for tasks benefiting from stimulation such as creative tasks (Stone and Irvine, 1994). Goodrich (1982) reported that having a window was psychologically important to workers as it provided more mental freedom, a chance to get away from the problem to gain new insight and a broader perspective as well as reducing fatigue and stress. However, negative effects were sunlight producing glare on computer screens and solar heat gain (Goodrich, 1982).

In summary, workplace design can have considerable impact on user perceptions, and a consequent knock-on effect to the overall strategic goals of the organisations core business. Becker (1990) emphasised the importance of user perceptions in an organisational sense by explaining the importance of staff involvement and participation in workplace design. Becker contended that involving 'end users' directly within the design and briefing stages will enhance their overall perceptions of the workplace as it will influence and determine:

- The amount and quality of information collected
- The nature and quality of solutions proposed and accepted
- Help determine employees' satisfaction with the process
- Colour their view of the final outcome

(Becker, 1990)

Hence, it can be argued that user perceptions should be viewed as a holistic process within FM planning and processes, as user input and their functionalities within the physical environment can inevitably enhance their later experience.

METHODOLOGY

The current study considers the effect of plants on employee perceptions of elements that contribute to wellbeing in an open plan office. Two offices were selected of the same size and orientation in the same building. The design and layout of the offices was similar and the occupants have similar roles. Plants were installed in one of the offices but not in the other.

A survey was administered and completed by occupants of the two offices. Two hundred and four responses were received, giving a response rate of 47%. Of these responses, 114 (55.9%) were received from office 1 (the office with plants) and 90 (44.1%) from office 2 (the office without plants).

Respondents were given a series of statements and asked to give their response to the statement – strongly disagree, disagree, neutral, agree or strongly agree.

RESULTS

Based on the literature review, it was expected that the results for the office with plants would be more positive than for the one without plants. The first statement regarding whether the work environment is comfortable did follow this pattern. Six (6.6%) respondents in office 2 strongly disagreed that the office was comfortable. Of the respondents in office 1, 72% agreed or strongly agreed with the statement, while in office 2 only 55% agreed or strongly agreed.

The results for the statement regarding whether respondents felt productive were closer. 84% of respondents in office 1 felt productive while 81% felt productive in office 2. This shows that those in the environment with plants felt slightly more productive than those in the environment without plants.

On the statements regarding feeling pressure at work, respondents were first asked whether they felt under pressure and secondly if the work environment contributed to the feeling of being under pressure. 48% of respondents from office 1 agreed or strongly agreed that they were under pressure, while 56% from office 2 agreed or strongly agreed. 13% of respondents in office 1 agreed or strongly agreed that the work environment contributed to feelings of pressure and 21% of those in office 2 agreed or strongly agreed. Again, this points to the fact that those in the environment without plants felt more pressure and were more inclined to think that the work environment was contributing to pressure.

Regarding concerns about health at work, 65% of respondents in office 1 disagreed or strongly disagreed that they were concerned about their health at work, while 51 % of those in office 2 disagreed or strongly disagreed. 17.8% of respondents in office 1 agreed or strongly agreed and 24% of office 2 respondents agreed or strongly agreed, indicating that those in the environment with plants felt healthier at work.

It was expected that plants in the workplace would increase perceptions of privacy. However, this was not proven to be the case in this study. This may be due to the fact that, although the plants were placed in locations that could enhance privacy, the varieties of plants used were relatively small. Of the office 1 respondents, 26.9% agreed or strongly agreed that they had sufficient personal privacy and 29% of office 2 respondents agreed or strongly agreed. 45% of office 1 respondents disagreed or strongly disagreed with the statement while 51% of office 2 respondents disagreed or strongly disagreed. This is a potential area for future research, perhaps using larger screen planting.

The results indicated that slightly more of those in the environment with plants felt more creative than those in the environment without plants. 13% of office 1 respondents agreed or strongly agreed while 43% disagreed or strongly disagreed. 10% of office 2 respondents agreed or strongly disagreed and 50% disagreed or strongly disagreed.

Regarding whether the office was aesthetically pleasing, 32.9% of office 1 respondents agreed or strongly agreed that it was and 27% of office 2 respondents agreed or strongly agreed, indicating that those in the planted environment find it more aesthetically appealing than those in the non-planted environment.

Interestingly, more respondents in office 1 agreed or strongly agreed that they would like to have more office plants than office 2 respondents. 60% of office 1 respondents agreed or strongly agreed compared to 56% of office 2 respondents. These results again identify a general preference for plants in the office.

The workplace is known to be an intrinsic job factor that can contribute to stress, for example, where physical working conditions are poor (Johnson et al., 2005). However, although the impact of the workplace on employee wellbeing is significant, it could be useful to consider its place among a range of possible influences. For example, instances of workplace bullying or sexual harassment may make the physical environment irrelevant to wellbeing. Further research is necessary to determine the full extent of workplace influence among other influences on wellbeing.

It is recognised that other variables could be affecting the overall conclusions of this study. However, the addition of plants to one of the offices studied was the only significant physical change to the workplace. This survey is currently running in several other offices throughout the UK in order to gain results from a wider sample and a range of different workplaces and further in-depth analysis will be undertaken to include statistical significance testing on the results. The full survey results are shown in table 1.

Table 1: Survey Results

Location	**Statement**				
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
	The work environment is comfortable				
Office 1	0	13	19	75	7
Office 2	6	4	30	48	2
	I feel productive in my role				
Office 1	0	1	17	80	16
Office 2	0	1	16	60	13
	I regularly feel under pressure at work				
Office 1	0	21	38	48	7
Office 2	2	16	22	44	6
	My work environment contributes to pressure I feel due to my work				
Office 1	10	55	34	15	0
Office 2	8	31	32	18	1
	I am concerned about my health at work				
Office 1	14	60	20	18	2
Office 2	9	37	22	19	3
	I have sufficient personal privacy in my work area				
Office 1	10	41	32	30	1
Office 2	9	37	18	24	2

	The work environment helps me feel creative				
Office 1	9	40	50	15	0
Office 2	6	39	36	9	0
	The office design is aesthetically pleasing				
Office 1	2	23	51	37	1
Office 2	7	25	34	24	0
	It would be nice to have more office plants				
Office 1	1	8	37	50	18
Office 2	0	6	33	29	22

CONCLUSIONS

This paper has also demonstrated the psychological benefits of plants relating to employee wellbeing. Plants can contribute to greater perceptions of workplace quality; affecting mood and making employees feel more productive.

The results demonstrate that those in the office with plants felt more comfortable, more productive, healthier and more creative than those in the office without plants. Perceptions of privacy, however, were not found to be greater in the planted office in this study.

Those in the planted office were found to be feeling less pressure than those in the non-planted office, with a greater number of respondents in the non-planted office also feeling that the workplace contributed to their feelings of pressure. This indicates that the presence of plants may reduce feelings of stress.

The respondents in the planted office also felt the environment was more aesthetically pleasing than those in the office with no plants.

A greater percentage of respondents in the planted office indicated they would like more plants than those in the non-planted office. The majority of respondents in both offices indicated they would like more plants, confirming the general preference for plants identified by Smith and Pitt (2008).

Although further research would add clarity to this subject, these findings indicate that plants in the workplace are a contributory factor to employee health and wellbeing. Plants should, therefore, be considered as an integral part of corporate real estate or facilities management strategies for workplace design in order to improve productivity and support the core business function.

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