

Design Guidelines for Workplace Well-Being

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ABSTRACT

Updated 5/11/2014. This paper suggests low-cost spatial organization strategies as well as physical amenities that can promote well-being in the workplace. Areas of interest include furniture selection, desk arrangement, and lighting environments that an office can utilize to promote well-being. To highlight how these guidelines can be implemented, the paper analyzes a technology company's office which was built in 2013.

AUTHOR KEYWORDS

Well-being; health; office; workplace; architecture; furniture; low-cost

INTRODUCTION

Creating a healthy workplace is an area with an increasing amount of attention but very few "best practices". In certain sectors there has been significant attention placed on creating playful and imaginative spaces to help attract top talent and promote the company's brand. Going as far back as the 1940's there is also a wealth of resources for creating efficient and productive office spaces. What this project hopes to address is the void in the dialogue of office design focusing on tangible well-being benefits for workplace inhabitants.

The focus of the proposed spatial strategies is encouraging movement, socialization, and healthy sleep patterns among office workers. Non-spatial strategies such as conflict resolution, managerial techniques, working hours, and food offerings all have merit for well-being but are not discussed in this paper.

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GUIDELINES FOR OFFICE-WELLBEING

1: Promote Movement, Discourage Sedentary Positions

The first and most heavily emphasized guideline should be to promote regular and continuous movement throughout the day and discourage sedentary positions. Research in the last 10 years has begun to show not only the mental health benefits of movement, but also the marked deleterious effects of sitting for long periods of time.ⁱ

Many large office work environments and office-parks have gyms somewhere in the facilities to promote employee exercise. This is a great health asset to those employees and should be continued. However more effort can be made on discouraging sitting for more than 30 minutes at a time. Sitting jobs are associated with twice the rate of heart attacks and three times the rate of diabetes as standing or walking jobs.ⁱⁱ Research has shown that the mere act of sitting down changes the metabolic function of the body. Enzymes that break down fat drop by 90%, "good" cholesterol drops by 20%, and insulin effectiveness drops by 24%.^{iii iv}

The first major office-based study was completed in February 2014. The study monitored blood activity in two groups –standing versus sitting desks—as well as giving them an accelerometer to track walking movements. The data revealed an increase in blood glucose excursion by 43% for standing desks, and energy expenditure was 174 kcals greater than sitting desks. Interestingly, the accelerometer showed only a minor increase in walking movement for standing desks, indicating the difference was primarily due to the standing posture.^{lv}

The inclusion of adjustable-height desks as an option is therefore quickly becoming a logical improvement from traditional sitting desks. Further strategies that can be implemented are 42" high communal desks or surfaces for when meetings or projects need to be worked on. Open horizontal surfaces tend to accumulate activity, especially when a project needs to be organized, discussed, or designed in a group. While traditional 32" high conference

tables and spaces are still acceptable and encouraged, the majority of open tables should be at 42" or 44" high to promote the standing position.

A desk layout of end-to-end desks, rather than 90 degree corner offices, is preferred due to its more open plan and increased visibility between co-workers. Arranging desks end-to-end allow socialization and movement to happen in the void spaces of the office. By increasing the open-ness of the office plan, movement is encouraged and a feeling of connectedness can be better achieved. When implementing an open plan it is important to also include ample areas of private study and work. Walled off spaces where sound exclusion and moments of respite are an important counterpoint to the open desk environment.

LIGHTING

Project recommendation: Limited overhead lighting, adjustable lamps for everyone in two frequencies, and custom lighting in smaller booths.

The use of natural light in an office should always be considered to be a priority. Companies are not always capable of modifying the existing façade of a building, but re-arranging the office to store people in front of the windows is preferable. Natural light is considered to be a tangible asset to employees, and depression levels rise when kept from daylight.

For artificial lighting, it is recommended that the office contain both high-frequency "blue" light and lower-level "warm" light, in the form of lamps, to positively affect employee's circadian rhythm. Blue, or light-bulbs marketed as day-light, have been shown in a 2009 study to suppress Melatonin, a hormone associated with circadian rhythm. The study found that Lamps with daylight color (6500 K) can significantly suppress melatonin, warm white lamps (2700 K or 3000 K) have a much inferior effect on melatonin suppression. Cool white colors (Color Temperature of 4000 K) have a moderate effect on melatonin suppression.^{vi} Therefore warm white lamps are recommended for use in afternoon and night in order to prevent melatonin suppression, while blue-light is accepted and even promoted in the morning. Setting a clear circadian

rhythm as a collective office will help the employees maintain healthy and regular sleep habits. These two sets of frequencies can be purchased for less than \$10 USD at most hardware stores.

It is also recommended that a series of private spaces implement custom lighting conditions. Extremely bright Light Therapy lamps can be used privately, as well as dimmer lighting to help an employee in the case of a headache or eye strain. The bright light therapy lamp should be a 10,000 lux light-box (Which is about 10x brighter than a typical light bulb) giving a range of UV wavelengths to mimic actual sunlight. One study at Columbia University noted that Light-therapy treatment works with a .84 average effect size, and works best when it is centered looking down on the forehead with a 20-45 degree angle. The positioning is partially why private spaces are encouraged for these uses. Currently these lights are used to treat SAD (Seasonal Affective Disorder) but there has been evidence of them having a medium effect on non-seasonal depression as well - an average effect size of .53 --which is similar to results seen in antidepressant medication trials. It is important to note that studies behind light-therapy treatments are sparse (currently only 3 significant studies), but at around \$150 each, it is still well-within many company's budget to have two or three.

An overall lighting strategy that maximizes exposure to natural daylight is preferred. When artificial lighting is necessary, having two sets of lamps for the morning and afternoon could help regulate employee's sleep patterns. The addition of private booths for light-therapy lamps also shows preliminary evidence to reduce depression levels.

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Case Study



Figure 1: Plan of a new technology company's office, built in 2012.

Here we say a new technology company's office. The plan does not follow the health guidelines in several areas.

- 1) Conference room and ping pong table are situated near the only windows, eating up half of the naturally lit space (the wall at the bottom of the image).
- 2) The table is using up a lot of the free space in the center, encouraging people to sit at their desks rather than move around.
- 3) The use of overhead fluorescent lighting as the primary light source is not ideal for circadian rhythms. Desk lamps are present, however it is reported that the overhead lights are on most of the time.
- 4) The lack of privacy areas could lead to a detrimental effect on well-being.

Case Study



Figure 2: Sample adjustments to help promote well-being.

Small adjustments in the layout during the design phase that could help workers maintain well-being.

- 1) The desks have been simplified and re-arranged to promote sideways glances and free up space for movement around the office. These are adjustable height desks which work best in a straight line.
- 2) Privacy areas with custom lighting environments have been added. The back lounge has been converted to more private working desks.
- 3) More of the communal space has been relocated to the front by the windows.
- 4) The introduction of surfaces at 42" and 46" heights to promote standing.

COST

These changes, if done at the initial design phase, would have cost no more than \$500 per employee. This includes standing desks (100-200\$), higher communal tables (\$600 total), 3 treadmill desks (\$1000 total), and 4 privacy booths (~\$5,000 -8,000 total). With 28 employees, that is roughly \$457 per employee. While this might be slightly cost prohibitive for some companies, these changes are also well within the budget of many companies and should be considered when designing or altering existing spaces to maximize the health and well-being of employees.

CONCLUSION AND LESSONS

More research needs to be done on the effectiveness of these changes. It would take a control office environment, tracking employees with accelerometers and monitoring their sleep habits and moods, alongside a group where standing surfaces and custom lighting environments are implemented. I have tested the lighting environment personally (Strong Light-Therapy lights in the morning, only one dim light on in the evening, and it has definitely encouraged earlier bed times.

While analyzing the design for the example office space, like all design plans it is a difficult game of moving one program to another location, its implications, and ultimately some spaces have to be sacrificed. What is clear after research on the healthy office is that it's a burgeoning subject without much historic precedent. I wasn't able to find a single book or resource on the subject in the way I'm beginning to analyze design decisions. The above observations are a first pass at office space suggestions, but I think it could be a fertile area for a more comprehensive matrix of approaches.

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