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THE CONTRIBUTION TO AND AFFECT OF DESIGN AND ARCHITECTURE ON
HEALTH & ACTIVITY PROMOTION (H&AP) IN THE WORKPLACE

by

Krystal L. Schumacher

A THESIS

Presented to the Faculty of
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Under the Supervision of Professor Betsy Gabb

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THE CONTRIBUTION TO AND AFFECT OF DESIGN AND ARCHITECTURE ON HEALTH & ACTIVITY PROMOTION (H&AP) IN THE WORKPLACE

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University of Nebraska, 2013

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Expanding the research and awareness on the contribution to and affect of design and architecture on health and activity promotion in the workplace (h&ap) is essential in moving forward in the design of working environments. As humans, we spend the majority of our time indoors, for an average American adult he or she spends the majority of the day in a working environment. The impact that our spaces have is much deeper than the aesthetic. Our environments can depict how we act, feel and operate based on the design of our surroundings. Through this research, the goal was to study the connection between design and healthy lifestyles in sedentary ‘desk job’ workspaces. Through this, we have discovered how design can stimulate healthy and active habits in the workplace (termed as “health & activity promotion (h&ap)”) through design. Several staple companies were observed in terms of their recent practices of h&ap in the workplace. Four employees from four different companies participated in a detailed questionnaire about the objective of their company, the elements which promote h&ap, why this design method works and how the h&ap based design stimulates employees and employers to stay healthy and active through out the work day and beyond.

Determining the most effective types of projects and elements that are utilized when designing with h&ap in mind could impact worker’s perception of the importance

of health and activity especially during their working hours. This research has helped provide evidence that h&ap based design has been extremely and positively affecting toward it's users.

Acknowledgement

This thesis would not have gotten far if it weren't for the guidance of my design advisor, Dr Betsy Gabb. Thank you for taking the time to constantly help me excel in my education, I have considered you a mentor and an inspiration since I met you while visiting campus back in 2005. Thank you for providing me with constructive criticism and intriguing ideas along the way. You are truly an asset to the College of Architecture and have touched the lives of so many with your design knowledge and your ability to deliver that expertise to your students. Lucas, thank you for supporting me throughout the last six years of my education, your love, support [and humor] has kept me strong and light-hearted enough to achieve anything I put my mind to. To my family, thank you so much for helping me initiate my dreams of going to design school. You're interest, motivation, comfort and continuous guidance kept me heading toward the finish line during this milestone in my life! Please know how important the time spent with each of you was in between my studies, a constant reminder that there is a world full of wonderful and entertaining people outside of academia! Taking the time off and away, especially to spend with family and friends is key to any successful endeavor.

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Chapter 1: Launch Into the Topic

“The Battle of the Bulge was one of the most arduous and costly offensives of World War II. Today, its name is often evoked when discussing a more modern challenge: the ongoing fight against obesity. The latest battleground is the American workplace.”¹

“You might not want to take the following statistic sitting down: According to a poll of nearly 6,300 people by the Institute for Medicine and Public Health, it's likely that you spend a stunning 56 hours a week planted like a geranium staring at your computer screen, working the steering wheel, or collapsed in a heap in front of your high-def TV.”² The American Cancer Society has just published a new study conducted for 15 years showing that men and women who sit for more than six hours a day are up to 40 percent

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more likely to die earlier than people who sit less than 3 hours a day.

In addition, work-related musculoskeletal disorders have become one of the most common chronic diseases of modern society.⁴ With studies showing that sitting for six hours can lead to obesity, musculoskeletal disorders and even early death, designing a

¹ Lance S. Perry, “Standing Up: Redesigning the Workplace to Address Obesity,” *Professional Safety*, (June 2012) www.asse.org (accessed Sep 2012).

² Selene Yeager, “Your Body’s Biggest Enemy,” *Women’s Health*, (November 2009) <http://www.womenshealthmag.com> (accessed Sep 2012).

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Emilia Klapp R.D., B.S., “Sitting More than 6 Hours can be a Cause of Obesity,” *The Diabetes Club Athens-Banner Herald*, (May 2011) <http://thediabetesclub.com/sitting-more-than-6-hours-can-be-a-cause-of-obesity/> (accessed Sep. 10, 2012).

⁴ K. Probst, “Active Office: Towards an Activity-Promoting Office Workplace Design,” *CHI EA*, (2012) <http://mi-lab.org/projects/active-office/> (accessed Sep 2012).

healthier and more active working office environment can help decrease these statistics and potentially increase quality of life.

Human bodies were designed for physical movement and mobility such as walking, standing, labor and exercising. In current office environments, the design and practices are quite opposite, often trying to achieve the opposite to increase work efficiency. While most people think of exercise as only being done in a gym, it is more important to move more throughout one's daily routines to stay healthy and active. Paradoxically, the workplace has become an environment that both contributes to employee ill health while simultaneously offering the most potential for improving overall employee health and well-being⁵

This is important in that architects and designers can be proactive in designing the built environment to promote activity which in turn can improve the health and longevity among those in the workplace. In a recent study, researchers looked at physical activity in the work place using two large government sources: the National Health and Nutrition Examination Surveys, and the Current Employment Statistics. They found that in 1960, almost half of Americans worked in jobs that required at least moderate-intensity activity, such as agriculture, construction, and manufacturing. However, now that most work is in service industries such as education, financial services, and trade, only 20 percent of us

⁵ CCIH, "A Discussion Paper on Workplace Health," p. 18, (October 2002) http://www.ccih.ca/docs/CCIH_DiscussionPaper_on_WorkplaceHealth_LastVersion.pdf (accessed Sept 23 2012).

are that active at work.⁶ To supplement the preceding data, the prevalence of obesity in the United States has increased substantially since the 1960s. According to the Center for Disease Control and Prevention (CDC) data, from 1962 to 2010 the percentage of obese

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adults (age 20 and older) in the United States increased from 13.4% to 35.7%. That's a 22.3% increase in obesity rates over a 48 year span.

Obesity and obesity-related diseases on the rise is no surprise to America.

Therefore the purpose of this particular research is not to point out the obvious obesity epidemic, but rather dig deeper and consider how our built environments (specifically the workplace environment) can have an impact on our health and active lifestyles. Another highly important aspect on this topic is the demographic reality that America has a rapidly aging workforce who's ongoing healthy lifestyles must become a priority! The harmful effects of sedentary lifestyles in the work place that lead to obesity and other health related diseases will be examined and researched to help find alternative, healthier ways.

As stated previously, the average American employee who works in an office, spends an average of 56 hours or more sitting each week!⁸ Due to the inactivity throughout our daily lives, we are diminishing our opportunities at healthy and active

⁶ Ginger Skinner, "Gaining Weight? Blame your Desk Job," *Consumer Union of U.S.*, (May 2011) <http://news.consumerreports.org/health/2011/05/gaining-weight-blame-your-desk-job.html> (accessed September, 20 2012).

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Cheryl D. Fryar, "Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2009–2010," *Center for Disease Control and Prevention*, (Sept 2012) http://www.cdc.gov/nchs/data/hestat/obesity_adult_09_10/obesity_adult_09_10.htm (accessed September 29 2012).

⁸ Yeager, "Your Body's Biggest Enemy."

lifestyles and increasing the risk of diseases such as diabetes, heart problems and obesity. It is also important to note the aging population in the workforce, it is highly important to make h&ap a priority for that reason alone. One assumption is that the design of the physical office environment greatly contributes to the sedentary lifestyles that are all so common. The physical office environment includes meeting rooms, break rooms, the cafeteria, the elevators, the presentation of the stairways, views to outdoors, walking paths, corridors, the restrooms, and each employee's personal working space. With health and activity promotion (h&ap) in mind, all of these spaces can be re-considered as opportunities to increase h&ap in the workplace.

Well stated by the Canadian Council of Integrated Healthcare, "Health issues in the workplace not only cost the employer money but also cost an increased stress for remaining employees, creating a vicious cycle. Sick employees also impact families, communities, and the healthcare system. The boundaries of the workplace are permeable, and costs are easily transferred to other elements of society. It is for these reasons that workplace health must become a priority to all involved."⁹

Because workers spend almost one-third of their daily hours at work, it is essential that workplaces promote health and well being initiatives! An Australian study of 300,000 employees, carried out by WorkSafe Victoria's WorkHealth on program, identified the following issues in the workplace:

- generally inadequate fruit and vegetable consumption and physical activity
- high blood pressure in one quarter of workers

⁹ CCIH, "A Discussion Paper on Workplace Health," p. 18.

- increased risk of developing cardiovascular disease in almost half of workers
- high risk of developing type 2 diabetes in nearly a quarter of workers.

The benefits of healthy workplaces reach far beyond individual workers and can also influence the health of their families and communities, and yield social and economic benefits.¹⁰

The Statement

This thesis will focus on the impact of the built environment on sedentary ‘desk job’ lifestyles in the workplace in order to find out how one’s physical working environment has an impact on their health and wellbeing. Also, to understand how the typical ‘desk job’ office can be improved to promote physical activity through design and applications. Further, to examine ways to initiate healthy and active lifestyles in the office environment through design; which would potentially decrease the following; obesity, obesity-related diseases, sedentary lifestyles and unhealthy habits. This in turn could positively affect overall moral and psychological well-being of workers as well as diminish healthcare costs and sick days for employees and employers.¹¹

¹⁰ “Promoting a healthy workplace,” March 2012, *Department of Health*, (March 2012) http://www.health.vic.gov.au/prevention/healthy_workplace.htm (accessed Sep 20 2012).

¹¹ CCIH, “A Discussion Paper on Workplace Health,” p. 18.

Terms to Know

built environment: The built environment includes all aspects of the environment that are modified by humans, including homes, schools, workplaces, parks, industrial areas, and highways.

obesity: According to CDC, overweight and obesity are both labels for ranges of weight that are greater than what is generally considered healthy for a given height. The terms also identify ranges of weight that have been shown to increase the likelihood of certain diseases and other health problems. For adults, overweight and obesity ranges are determined by using weight and height to calculate a number called the "body mass index" (BMI). BMI is used because, for most people, it correlates with their amount of body fat. An adult who has a BMI between 25 and 29.9 is considered overweight.

health: A complete state of physical, mental and social well-being, and not merely the absence of disease. (World Health Organization, 1948)¹²

health promotion: The science and art of helping people change their lifestyle to move toward a balance of physical, emotional, social, spiritual and intellectual health.¹³

physical activity: Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure. Physical inactivity has been identified as the fourth leading risk factor for global mortality causing an estimated 3.2 million deaths globally. Regular moderate intensity physical activity – such as walking, cycling, or participating in sports – has significant benefits for health. For instance, it can reduce

¹² CCIH, "A Discussion Paper on Workplace Health," p. 18.

¹³ CCIH, "A Discussion Paper on Workplace Health," p. 18.

the risk of cardiovascular diseases, diabetes, colon and breast cancer, and depression.

Moreover adequate levels of physical activity will decrease the risk of a hip or vertebral fracture and help control weight.¹⁴

sedentary lifestyle: Sedentary behavior refers to activities that do not increase energy expenditure substantially above the resting level and includes activities such as sleeping, sitting, lying down, and watching television, looking at a computer, working at a desk and other forms of screen-based entertainment.¹⁵

work environment: According to the Business Dictionary, when pertaining to a place of employment, the work environment involves the physical geographical location as well as the immediate surroundings of the workplace, such as a construction site or office building. Typically involves other factors relating to the place of employment, such as the quality of the air, noise level, and additional perks and benefits of employment such as free child care or unlimited coffee, or adequate parking.

active life: Make no mistake: "Regularly exercising is not the same as being active," says Peter Katzmarzyk, Ph.D., Hamilton's colleague at Pennington, the nation's leading obesity research center. Katzmarzyk is referring to the difference between official exercise activity, such as running, biking, or lifting weights, and so-called non exercise activity, like walking to your car, mowing the lawn, or simply standing. "A person may

¹⁴ Physical Activity. *WHO World Health Organization*.
http://www.who.int/topics/physical_activity/en/ (accessed Sep 12 2012).

¹⁵ Pate R. Russell, Jennifer R. O'Neill, and Felipe Lobelo, "The Evolving Definition of "Sedentary," *Exercise Sport Science Review* vol. 36, no. 4 (2008): pp. 173--178

hit the gym every day, but if he's sitting most of the rest of the time, he's probably not leading an overall active life," says Katzmarzyk.¹⁶

ergonomics: Ergonomics is defined as an applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely. Also called biotechnology, human engineering, human factors.¹⁷

¹⁶ Marla Masters, "Why your desk job is slowly killing you," *Men's Health*, (Oct 2010), http://www.nbcnews.com/id/39523298/ns/health-mens_health/t/why-your-desk-job-slowly-killing-you/ (accessed Oct 19 2012).

¹⁷ Merriam Webster. Definition of Ergonomics, <http://www.merriam-webster.com/dictionary/ergonomics> (accessed Oct 19,2012).

Chapter 2: Review of Literature

In order to explore this topic, it is essential to review prior studies on the issue. The following precedent reviews have highlighted these issues: environmental factors influencing obesity in the work place, obesity and the negative impacts due to sedentary lifestyles, the influence of building design and site design on physical activity and an approach at promoting active lifestyles inside workspaces.

Theme 1. How do Environmental Factors Influence Obesity in the Workplace?

In a 2007 review titled *The Built Environment and Obesity*, the authors narrowed down and examined 20 different studies relating the impact of our environment to obesity. Of the 20 studies, in 17, they found a statistically significant relation between some aspect of the built environment and risk of obesity. Recent discussions regarding the obesity epidemic have focused on the role the environment plays in increasing energy consumption and decreasing energy expenditure. The built environment, in particular, has been thought to play an important role in influencing obesity by creating a climate that promotes increased energy consumption and a reduction in energy expenditure. As broadly defined in the health literature, the environment can be thought of as “all that is external to the individual” with the term “built environment” encompassing aspects of a person's surroundings which are human-made or modified, as compared with naturally occurring aspects of the environment.¹⁸

¹⁸ Mia A. Paps, Anthony J. Alberg, Reid Ewing, Kathy J. Helzlouer, Tiffany L. Gary, Ann C. Klassen, “The Built Environment and Obesity.” *Department of Pediatrics, University of Maryland School of Medicine*, (April 2007) <http://epirev.oxfordjournals.org/content/29/1/129.full> (accessed Oct 15 2012).

In this meta analysis, several factors were considered when selecting the journals including the definition and context of built environment. Depending on demographics, sex, age and social status; the built environment for individuals may vary. There are also different associations to the built environment whether it is urban, suburban, rural and all the variants that come with each of these categories. All of these elements were considered when the articles were narrowed down to best fit the research. To acquire the 17 articles, a Medline search was carried out using keywords including obesity, overweight, plus neighborhood or community. Another search was conducted using the terms obesity, overweight plus built environment or environment. This resulted in a total of 343 unique abstracts. For comprehensive measures, a search through PsychINFO and Web of Science was also conducted which produced 53 and 1,110 additional abstracts. Of these searches, the chosen 17 best fit the research criteria. Shown is a graph of the search “map” from the Medline Search.

Understanding the impact of the built environment on obesity may provide

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information necessary to develop successful community-based prevention efforts. Through this study, it is determined that the built environment has influence not only physically but also emotionally and pathologically on the users. The many ways in which the built environment influences health include not only direct pathological impacts of various chemical, physical, and biologic agents, but also factors in the broad physical and social environments, which include housing, urban development, land use, transportation,

industry, and agriculture. Understanding the impact of the built environment on obesity may provide information necessary to develop successful community-based prevention efforts.²⁰

All in all, the study reports that the built environment can impact unhealthy lifestyles which lead to obesity, however further research is suggested. The conclusion of this review states, “To date, there is a growing evidence base pointing to the importance of the physical and social contexts among which individual behaviors are enacted. This evidence, coupled with the limited success of individual-based interventions in long-term obesity prevention, points to an urgent need for additional research on the impact of the built environment on obesity. Understanding the mechanisms through which environmental factors may influence obesity will aid in developing future community-level intervention strategies to curb this epidemic.”²¹

²⁰ CCIH, “A Discussion Paper on Workplace Health,” p. 18.

²¹ CCIH, “A Discussion Paper on Workplace Health,” p. 18.

Theme 2. How does the built environment impact obesity?

“All this downtime is so unhealthy that it's given birth to a new area of medical study called inactivity physiology, which explores the effects of our increasingly butt-bound, tech-driven lives, as well as a deadly new epidemic researchers have dubbed sitting disease,” states Yeager from Women’s Health Magazine.²²

In 2004, a conference was coordinated by the NIEHS for professionals across several disciplines to come together and discuss and develop agendas for future research and policy implementation regarding obesity and the built environment. The topic of discussion was based around how the built environment can be changed to combat obesity, and how environmental health research and interventions can impact this growing public health problem.

Although obesity, like most other chronic health problems, is caused by complex interactions between genetics and environmental factors, the rapid increase in obesity over the past 30 years strongly suggests that environmental influences are responsible for this trend. This conference primarily focused on the environmental component. “Our built environment promotes a sedentary lifestyle today,” said Wilson, “and in addition to obesity there are many other attendant health challenges. If we better understand the linkages between obesity and the built environment, we can create communities and workplaces that promote health and also promote well-being, an important feature in

²² Yeager, “Your Body’s Biggest Enemy.”

overall health.” Researchers of this article are aware that more research remains to figure out the direct impact the built environment has on obese lifestyles. It is safe to say that the opportunities for physical activity in the built environment can be increased to encourage more activity, however the ideas needs to be pushed further in order to implement ways that will increase activity due to one’s day to day actions.

Obesity has become a growing concern for employers and companies, in terms of controlling health care costs and maintaining worker productivity. The numbers are daunting. According to CDC, in the United States the annual medical costs due to obesity-related diseases and conditions summed to nearly \$147 billion in 2010. Likewise, obese employees have cost employers a total of \$73.1 billion dollars in 2010 alone including sick days, doctor appointments and overall decreased productivity, according to a study at Duke University in 2010.²⁴

Julie Wakefield, “Fighting Obesity Through the Built Environment” *Environnews Health Perspective*, NIEHS News, (August 2004) <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1247493/> (accessed Sep 15 2012).

²⁴ Sam Laird, “Are Obese Employees Killing Your Company?” *Infographics*, Mashable Inc., (June 2012) <http://mashable.com/2012/06/01/obese-employees-infographic/> (accessed Oct 19 2012).

Theme 3. Influence of building design and site design on physical activity.

In this journal, the primary objective explores the influence of building design on physical activity focusing on larger multiple-unit residential, workplace and public buildings where the greatest physical activity gains can be achieved. There are several aspects being considered; including site selection and site design, building elements, research directions and interventions.

While this was published nearly seven years ago, it maintains some important factors on physical activity and building design. As this portion discusses:

“As the 40-year history of environment and behavior studies has shown, the causal relationships between building design and human behavior are very complex. Buildings and sites are deliberately designed to support a set of activities and to create or reinforce a set of cultural assumptions. So, at the outset of any design, it can be said that behavior causes environment. However, as individuals and groups use buildings on a daily basis, they are affected by the built-in physical aspects of the building and site, such as the availability of space for different functions, relationships among spaces, aesthetics, and symbolism. Each of these relationships are potentially mediated and moderated by individual and group knowledge and

attitudes. Nonetheless, in the short term, environment influences behavior.”²⁵

While site selection and site design play a large role in this article’s discussion, a focus on building programming and design is important in this context. One may ask why physical activity promotion hasn’t been an issue in past building designs? One answer to this question is mentioned in this article that the perceived or actual cost and benefit of physical activity promoting features played a large role in whether they became part of the program. While in some designs this would be a priority, in others it may get pushed aside due to higher priorities or important issues and requirements such as quick access, security and control within the building site. But seven years later now that companies are experiencing a bigger issue and impact due to obesity and sedentary lifestyles, WHP has come into the spotlight and a request for attention to this issue is increasing, and rightfully so.

Another portion of this article discusses building elements with stairs being a large topic of discussion. Several studies have examined the impact of stair usage toward more active lifestyles. This has been shown to be a low-cost resolution to prompt physical activity increases. According to the study,

At least three well-controlled studies have used both motivational signs and aesthetic interventions such as music and artwork, and have found that more people used

²⁵ Craig Zimring, PhD, Anjali Joseph MArch, Gayle L. Nicoll, MArch, Sharon Tsepas, MArch, MCP, “Influences of building design and site design on physical activity.” *American Journal of Preventative Medicine*. vol 28. issue 2. p 186-193, (Feb 2005) [http://www.ajpmonline.org/article/S0749-3797\(04\)00305-8/fulltext](http://www.ajpmonline.org/article/S0749-3797(04)00305-8/fulltext) (accessed Oct 2012).

the stairs. For example, in a 2-year study in one of their own buildings in Atlanta, the CDC progressively improved the lighting, and added art, music, and color; they found persistent modest increases in use, all at a cost of \$16,000.⁵⁵ The results of the CDC study led them to recommend improved stairs in all of their facilities worldwide.²⁶

While stairs can promote an increase in health decisions and activity while at work, it is an entirely optional amenity to the workers and unfortunately not a necessity in their working habits especially if elevators are present or more visible. With this being said, the next theme discusses innovative ways to push the idea of activity in the work space rather than just implementing access to activity in the work place.

²⁶ CCIH, "A Discussion Paper on Workplace Health," p. 18.

Theme 4. Promoting active lifestyles in the workplace.

In the research journal, *Active Office: Towards an Activity - Promoting Office Workplace Design*, the researchers presented the issue of physical inactivity in not just the work place but individual work spaces. They take it a step further to introduce a new concept of “working in motion” to help reduce the sedentary lifestyles often practiced in office spaces due to sitting at desks, sitting in meetings, sitting at lunch and even sitting while driving to and from.

In this context, the World Health Organization (WHO) recently identified the workplace as important area for the setting of health-promoting and preventive measures. Given the fact that an average adult person spends approximately half of his waking hours at work, there is high potential to utilize this time for the encouragement of increased physical activity. Moreover, work-related musculoskeletal disorders have become one of the most common chronic diseases, often resulting from years of poor posture and sedentariness at the workplace (e.g., office jobs).²⁷

Several companies are initiating health-promotions in their workplace, aka workplace health promotion (WHP). Workplace health promotion includes health benefit initiatives, healthy eating workshops, gym membership reimbursement, free fitness screenings, in- house workout classes and fitness areas and walking trails to name a few. In this journal article they mention that despite the growing evidence for the benefits of

²⁷ “The workplace: A priority setting for health promotion,” *WHO World Health Organization*, (2013) http://www.who.int/occupational_health/topics/workplace/en/ (accessed Oct 2012).

WHP, interventions have proven to be limited because most of them pose high demands on workforce commitment (e.g., gym classes) and require employees to leave their desks for exercising. These factors do help with health promotion, but WHP can be taken a step further in the design of workstations and office equipment. These are the innovative highlights of this article. With not only the WHP concept, but also adding an Active Office concept, physical activity can be integrated into an actual working space.

In *Figure 1.1* is a diagram which begins to explore what an Active Office may look like. This is an integrated environment which promotes more movement through changing between tasks, workstations and working postures via an active seat²⁸, height adjustable desks and a whiteboard. They take this idea a step further and look into media support as well. “The Active Office environment seeks to interconnect workplace furniture, communication media, applications, and traditional media in a way that makes

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it easy for the user to change between different work environments.” With access to not only a desktop computer but also tablets, laptops and smartphones, workers can move effortlessly to different working environments without leaving their work behind.

²⁸ <http://www.swopper.de>
²⁹



figure 2. Smooth interconnection of office furniture with hardware-related structural elements.

Figure 2.1. “Active Office”



Figure 2.2 “3Dee and Swopper” Active Chairs

While this research puts a new perspective on activity in the workplace or WHP some things need to be further explored. “Another relevant concern is the evaluation of physical activity promotion at the workplace to find out if a physically active work process is associated with health-related benefits, compared to a reference work-place within a traditional office environment. According to that, the focus is on the

investigation of which “improvements” can be achieved through a dynamic work process, and how they can be measured in terms of cognitive and bio mechanical parameters.”³⁰

While the concept of “working in motion” is shining a new perspective on work spaces, these researchers plan to do future investigations on how people work, identifying different work patterns and find out how these can be adapted to support a physically active work process. The researchers will continue to investigate the outcome of this new furniture and spatial system within the work place.

More research is needed: workplace health is an under-explored area, particularly workplace outcome-related research. Workplace health should be a high priority in order to keep employees healthy, happy and productive.

³⁰ Probst, “Active Office: Towards an Activity-Promoting Office Workplace Design.”

Conclusion

Contrary to popular belief, workouts and diet alone cannot combat obesity for good. Research is finding that people must increase activity without depending on themselves, but rather increase non-exercise activity thermogenesis by standing, walking and being more mobile throughout daily tasks. To no surprise, the modern office environment is a prime contributor to this problem due to sitting too much and not enough movement throughout the workday. This is due to the extensive amount of time we spend at our jobs each day. As a matter of fact, an employee with a full-time job in America works on average 241-261 of 365 days of the year and spends on average 2,088 to 1,928 hours at their job.³¹ For an employee with an average office or desk job, that can equate to a lot of sitting hours in a year.

Benden, Congleton and Fink (2011) studied 51 office workers and showed that the more overweight an individual is, the more likely s/he was to spend most of the day seated at a desk. The study also found that extremely obese employees (those with a BMI above 35) spent 20% more time seated per shift than those with a BMI below 35.³²

Considering all the research reviewed and the above statistics, the built environment in the workplace must be re-examined and altered in order to help address these life-threatening and extremely costly issues. There are emerging opportunities to conduct research on health and the built environment. Research to date can guide many health-promoting design choices now, although further research is needed to answer

³¹ “How many working hours make up a year?”

<http://wiki.answers.com/Q/How_many_working_hours_make_up_a_year>

³² Lance Perry, “Standing Up, Redesigning the Workplace,” Professional Safety, (June 2012) <http://www.ergostoreonline.com/pdfs/standing-up-to-obesity.pdf> (Oct 10 2012).

remaining questions. As design professionals, we have the opportunity to advance the evidence base for improving health.

Chapter 3: Research Methodology

“The way we design and build our communities can affect our physical and mental health. Healthy community design integrates evidence-based health strategies into community planning, transportation, and land-use decisions,” stated by the CDC

Designing and Building Healthy Places.

As there are limited examples of activity-friendly buildings for architects to assess or emulate, the development of activity-friendly design practices has received minimal attention in both research and practice. The idea that environments could be designed to promote physical activity, although accepted intuitively by architects and designers, is based on limited evidence and experience.³⁴ As a result of concerns expressed up to this point, the purpose of this thesis is to highlight the influence the built environment has on health promotion in the workplace. When it comes time to overall health-promotion in the workplace, there have recently been some revolutionary companies. The objective of this research is to investigate corporate office environments which have displayed innovative ways to keep people active in their work spaces throughout the work-day.

Upon the findings of the research, it will guide us closer toward health promotion through the built environment.

Significance of the Topic and the Research Problem

As the topic is health promotion in the workspace through design and the built environment, the question is how to implement effective design strategies to promote health, wellness and especially physical activity in the workplace. The practical significance of this research is that by finding out how the built environment can be influential to physical activity, designers can utilize the findings to program and design future work spaces in accordance with health promotion. There are a number of different types of workspaces which exist and when it comes time to the research question, the study findings will benefit all types of workplaces. It is important to discover ways to promote physical activity and healthy habits in the workplace, and explore methods of generating and increasing movement throughout a worker's average day.

This research will be applied to solve a practical problem. The problem is that as work spaces and desk-jobs continue to contribute to sedentary lifestyles, the obesity and health-risks in adults is constantly rising as a result.³⁵ Without proper investigations and

³⁵ "Sedentary Lifestyle is Dangerous to your Health," *NCPAD*, (November 2012)
<http://www.ncpad.org/403/2216/2006-09~Issue~~Sedentary~Lifestyle~is~Dangerous~to~Your~Health>
 (accessed Nov 2012).

modifications supported by sound research, obesity due to sedentary ‘desk jobs’ will continue to rise.

Description of Research Methods

Various research methods will be applied to answer the research problem. These methods will help answer the subservient questions (listed below) and eventually the overall research question. The methods will consist of: a) creating a list of the top “activity generating and health promoting” companies in the United States to potentially contact and explore; b) documenting the size, demographics, spaces attributes and types of these top companies; c) defining their innovations on health & activity promotion (h&a) in their workplace.

In order to answer the primary research question, several subservient questions must be answered. These questions will be answered through three different methods: 1) personal and/or phone contact of an employer, employee or wellness coordinator within the companies, 2) contact and feedback through an online survey which will be emailed to the respected companies; and 3) personal research on each company through online research and comparison. The subservient questions to be answered are listed on the following page.

Subservient Questions and Approach

1) What methods and applications toward “health promotion” have been utilized among these top ‘healthy’ companies?

In order to answer this question, information will be obtained (through online research and interviews) on the methods and applications within these companies. The information will be used to further understand how and why health promotion is so innovative throughout these companies.

2) Who are the people in the workplace which health promotion methods are geared toward?

In order to answer this question, information will be obtained (via online research) on the size, demographics and positions of the people within the company.

3) In what areas or spaces can physical activity be increased throughout the office-space?

To answer this question, information will be obtained (via online research and interviews) on the different areas within a workspace; these areas include desk-spaces,

offices, meeting rooms, conference rooms, break rooms, cafeterias, gardens, roof-tops, restrooms, locker-rooms, etc. The way that these spaces are used by the workers will also be considered.

4) How does health promotion alter a work space's current floor-plan?

This question can be answered by examining these top companies and how they are laid out, compared to how they were formerly laid out and also compared to companies who do not focus on health promotion currently. This question will also be answered by speaking to employers or employees within the given companies.

5) Are there concerns about increasing activity and health promotion in the workplace?

This question will also be answered by speaking to employers or employees within the given companies to receive their

perspective or concerns on the current activity generating environment.

6) What attributes make these spaces successful toward promoting health, wellness and physical activity?

This question will also be answered by speaking to employers or employees within the given companies to receive their opinion on the success of health promotion. An

examination of the company's overall design will also be helpful in answering this question.

7) Have the companies seen any return on investment by increasing health promotion and awareness?

This question will be answered by speaking to employers or employees within the given companies. It will also be helpful to conduct research on the company to find this information.

8) What are the employer's perceptions on the health and activity levels of the employees?

This question will be answered by speaking to employers within the given companies and receiving their outlook on health and activity promotion.

9) What is the role of design in encouraging physical activity and health in the workspace?

This question will be answered by speaking to employers and employees within the given companies and receiving their outlook on the physical design of the company. It will also

help to do this research as a design student, looking into the highlights of the design through websites, photos and videos.

10) Describe physical activity patterns in and around your worksites. Do employees stay active throughout the day? Before work? During? After? Where do they go? What do they do?

This question will be answered by speaking to employers and employees within the given companies and receiving their observations on physical activity patterns in their workspaces.

11) What are the goals of the company for health promotion in the workplace?

This question will also be answered by speaking to company advocates or wellness coordinators in the company.

12) What barriers does the company see while trying to promote physical activity? Building configuration, presence of views and local attractiveness, task support?

This question will also be answered by speaking to company advocates or wellness coordinators in the company.

13) What about the design of stairways in the workspace? How are they placed and promoted? Are their views to and from activity areas?

This question will also be answered by speaking to company employees and employers. It will also be beneficial to research the effects of stairway placement and usage.

14) *How can we construct interior paths that can be used by individuals to increase physical activity?*

This question will be answered after gathering information from the previous subservient questions and researching

16) *Focusing on the actual desk and working space of employees, how can (are) these areas designed to increase physical activity and health promotion?*

This question will also be answered by speaking to company employees and employers who regularly utilize the space.

17) *What role does nature play in generating movement? Does the company have roof gardens? Paths? Day-lighting?*

This question will also be answered by speaking to company employees and employers.

It will also be beneficial to research the positive effects of nature, biophilia in the workplace.

Chapter 4: Research Findings

Before discussing the details of the research findings, Table 2.1 is a depiction of information gathered from companies who are innovative in promoting h&a throughout the workplace. The companies shaded in “lime” are the primary research participants who gave me permission to explore their company and more important, I had the opportunity to speak with an employee who shared more insight through the research questionnaire.

Company & Location	# of Employees	Active Features Through Design	Research Participant-Interview	Benefits because of H&AP promotion @ work	Logo
Clif Bar & Co, Emeryville, CA	322	Bouldering wall, weight room, yoga room, dance studio, personal trainers on site, open and inviting stair cases, Cafe w/ organic ingredients, VIP bike parking and solar technology.	Yes, Emily Zisman	Activity breaks encouraged= employees being active, efficient and engaged in their daily tasks. Extremely low turnover rate, <1%.	
USANA, Salt Lake City, UT	1,313	Organic food in the Lean Cafe, Gym, Basketball courts, sand volleyball, onsite gym, open stair cases, open floor plan	Yes, Lauren Reichman		

Company & Location	# of Employees	Active Features Through Design	Research Participant-Interview	Benefits because of H&AP promotion @ work	Logo
InnovAge, Denver, CO	150	Indoor and outdoor gardens, standing and walking desks, activity incentives, sunlight patio	Yes, Abbie Olson	Increased efficiency, activity promotion and recent award has increased job seekers to seek out InnovAge	
Vail Resorts HQ, Broomfield, CO	1,000	Yoga room, open floor plan, Bosu balls for chairs, walking paths, sunlight and open views	Yes, Mike Trevey	Work efficiency, decrease in sick time off, higher collaboration between departments due to activity involvement, increase in knowledge about the company's mission, "Experience of a Lifetime"	
Aveda HQ, Blaine, MN		Organic community gardens, live plant wall in space, all natural bamboo furniture, solar deck, paper lighting, open space floor plans, herbal remedies, oils and lotions for access, massage therapy on-site	Permission to use company features in my research. No individual participants	Increased awareness of sustainability, volunteer projects, energy efficiency and practice of overall health and wellness. The employees are advocates for aveda's mission.	
Lululemon HQ, Vancouver, BC	5,000	Outdoor activities, open space floorplans, glass barriers for optimal daylighting, white finishes with pops of color for details, fitness clothing at work, plants on each desk, giant writing walls for active communication,	Permission to use company features in my research. No individual participants	Very high desire to work for the company. Increase in efficiency, physical and mental health, high collaboration among teams and departments	

Company & Location	# of Employees	Active Features Through Design	Research Participant-Interview	Benefits because of H&AP promotion @ work	Logo
MRY, New York	120	Organic snack cafe, in-house barista, yoga studio, lap pool, onsite fitness program, open floor plan, sunlight promoted, ping pong, dance-offs, art exhibits in the lobby.	Permission to use company features in my research. No individual participants	<p>“Get a Life” program provides everyone with a stipend for work-free activities.</p> <p>Very low turnover rate.</p>	

Table 4.1 “Table Data on Companies with Innovative Strategies and their Qualities”

The four companies which participated in research questionnaire provided essential information about each company’s working environments. h&ap is highly promoted in each of these companies through the space, layout and design. They have initiated a high respect for the health and well-being of their employees. They see the importance of h&ap during the work day. Below in Table 2.2 is graphical information based on their responses to the questionnaire they were provided with. The four employees from these four companies include: Clif Bar, USANA, Vail Resorts and InnovAge.

COMPANY	Clif Bar & Co HQ	USANA HQ	InnovAge	Vail Resorts HQ
H&AP Goals & Mission as a Company?	Yes	Yes: Mission Statement: “To encourage USANA employees to strengthen their health and well-being to contribute to the work and mission of USANA Health Sciences...”	The goals of the company are to a promote h&ap lifestyle within the workplace to improve wellness, health and efficiency at work. InnovAge wants to enable all employees to practice healthy habits while at work.	“Experience of a Lifetime” Mantra: Own it, Personalize it, Elevate it
Is h&ap preferred by employees during their workday?	Highly prefer	Highly prefer/Somewhat prefer. The response to h&ap during the work day is very positive among the employees.	Highly prefer. The employer often promotes this activity with daily walk reminders, treadmill desks and utilize the company gardens.	Prefer
What do you think encourages people to be physically active and make healthy decisions in the workspace?	Incentives, Places to walk/jog, healthy eating options, fitness facility on site, fitness classes offered during work hours, open layout, standing desks and alternative options to sitting at desks. (Also new gym classes offered, entry passes for races and group activities)	Incentives, Places to walk/jog, healthy eating options, fitness facility on site, fitness classes offered during work hours, open layout, standing desks and alternative options to sitting at desks.	Incentives, places to walk/jog, healthy eating options, standing desks and alternative options to sitting at desks. InnovAge also offers gift cards and incentives to stay active and healthy which highly encouraged activity during the workday	Incentives, Places to walk/jog, healthy eating options, athletic club discounts, open layouts, bosu balls for chairs, standing desks

COMPANY	Clif Bar & Co HQ	USANA HQ	InnovAge	Vail Resorts HQ
Can the layout/design encourage h&ap in the workplace?	Yes, Very Much	Yes, Very Much	YES	Yes, Very Much
How important is the design/layout of your workspace in h&ap?	Very Important	Very Important	Important	Very Important
% of employees who stay healthy and active due to the company's h&ap efforts	75%-100%	50-75%	50-75%	75-100%
What ways does the design of your building contribute to h&ap?	Views to outdoors, open floor plans, health food in cafe, fitness classes or yoga sessions offered	Views to outdoors, health promotion via employee engagement activities, health food in cafe, fitness classes or yoga sessions offered	Views to outdoors, natural lighting, open floor plans, health promotion via employee engagement activities. Also, live plants in the workspaces and gardens around the building.	Views to outdoors, natural lighting, open floor plans, health promotion via employee engagement activities, healthy food in cafe, active games in the cafe, live plants throughout the workspace
What barriers does the company perceive while trying to promote physical activity?	None currently	Building Configuration, lack of appropriate ergonomics	Presences of views to outdoors, Attractive Environmental Surroundings, Lack of healthy dining options	None currently

COMPANY	Clif Bar & Co HQ	USANA HQ	InnovAge	Vail Resorts HQ
What design qualities stand out as supporting h&ap in your workplace?	Fitness facilities, common areas, break rooms and cafe, roof gardens, outdoor recreation, walking paths inside and outside, easily accessible staircases, standing or walking options at workstations	Fitness facilities, In the break rooms and cafeteria, walking pathways inside and outside, easily accessible staircases	Roof gardens, outdoor recreation, walking pathways indoor and outdoor, standing or walking options at workstations	Common areas, outdoor recreation, break rooms and cafes, walking paths inside and outside, standing options at workstations
What are some physical activity patterns in and around your worksites that contribute to h&ap? How many flights of stairs are people willing to travel.	People climbing 2-3 flights of stairs, biking to work and parking bikes inside, walking to work, walking on breaks	The fitness facility generates a lot of action, especially between 10:30 - 2:30. Most employees are willing to walk 4 flights of stairs without feeling like they have to take the elevator.	Employees often take afternoon group walks, and occasionally use the walking treadmill desks. The treadmill desks would be used more often if placed in a more social/local place in the office.	Employees heavily utilize the games in the cafe, the walking paths around the pond and landscaping outside. Biking to work. Most employees are willing to climb 4-6 flights of stairs before choosing the elevator.
How many people use company recreational and exercise facilities?	50-75%	50-75%	There is not an on-site gym, however 25-50% of people do activity like walking during the workday.	There is not currently an onsite gym, however 75-100% of employees walk or run the paths during the workday and take advantage of the athletic club membership and afternoon sports pick-up games

COMPANY	Clif Bar & Co HQ	USANA HQ	InnovAge	Vail Resorts HQ
Focusing on the design of the stairways, are they emphasized? Are they clearly visible upon entrance? Do you feel safe using the stairways? Are they easier to access than the elevators?	Yes to all of those questions	Yes, To all of those questions	They are not emphasized or clearly visible upon entrance. Their usage would be increased if placed in the entrance area.	They are not emphasized and are in a stairwell. Oddly enough, employees are willing to climb several flights of stairs, even though the elevators are more accessible.
What design qualities in your building do you feel can help promote h&ap?	Views to outdoors, colors, space layouts, surface materials and patterns, artwork, lighting, air quality and air flow	Views to the outdoors, colors, lighting	Views to outdoors, colors, space layouts, surface materials and patterns, artwork, lighting, air quality and air flow	View to outdoors, colors, space layouts, surface materials and patterns, artwork, lighting
Do you feel that roof gardens, walking or running paths, day-lighting and other unique qualities are an important attribute to your workspace?	Yes, Definitely	No, but this would be an important feature to have when promoting h&ap.	Yes, these spaces are highly utilized by employees.	The walking/running paths are endless around the building. These are a very important attribute to the working environment. Many employers often hold 1:1 meetings by taking walks and getting outside to enjoy the landscaping.

COMPANY	Clif Bar & Co HQ	USANA HQ	InnovAge	Vail Resorts HQ
Focusing on the individual working space of employees, are these areas designed w/ h&ap in mind as employees sit and work at their desks for several hours per day?	Yes, Standing desks are available. Activity breaks are encouraged as much as possible throughout the workday.	This is an area which needs to be improved. Increase in ergonomics and standing desk options would be highly beneficial	There are standing desks and treadmill stations. I have not seen these to be used, as I feel that they are not centrally located with the other desks.	The individual work spaces are spacious and bosu balls are an alternative to sitting. Standing is also an option. The open floor plan also encourages movement among employees
Regarding the areas which promotes the highest level of activity (ie. walking paths, stairs, gym, office, cafe) what attributes make these spaces successful toward promoting health, wellness and physical activity?	They have been made clearly accessible and we are highly encouraged to use them.	I think the location of the facility is important. Our fitness facilities are in the middle of the office so it is a common meeting space. The space of the facility is large enough to accommodate our 650 employees. It never feels cramped or crowded where it is not inviting to participate.	The natural lighting is one of the best qualities of the building and the self-efficient HVAC system which helps contribute to the indoor air quality.	The visibility of the walking paths and activity going on in the cafe make the spaces successful toward promoting health, wellness and physical activity.
If h&ap is a new concept in your workspace, how did it alter your former work space's floor plan or design? What major changes did you experience?	Compared to our old warehouse location, this office is like Downton Abbey!	Wellness is embedded into the culture of our company. We have strong management support, which helps us generate excitement and buzz among the employees.	No, however they are always looking for ways to improve and promote h&ap in the workspace because of its success so far.	No, however they are always looking for ways to improve and promote h&ap in the workspace because of its success so far.

COMPANY	Clif Bar & Co HQ	USANA HQ	InnovAge	Vail Resorts HQ
Has the company experienced a return on investment because of h&ap?	YES: Less Absences, Improved overall moral, Decrease in turn-over rates, Increase in h&ap interest.	YES: Less Absences, Improved overall moral, Decrease in turn-over rates, Increase in h&ap interest.	Yes: Less absences, improved overall moral, increase in h&ap interest. The company recently received recognition because of an award they one for wellness in the workplace based on layout of the building design.	Yes, Less absences, improved overall moral, increase in h&ap interest, high desire to work for the company due to active benefits.

Table 4.2: “Research Data from Research Participants”

The responses from these employers and employees regarding the company’s h&ap was overwhelmingly positive toward promoting and practicing health and activity in the workplace. The design of the working spaces contributed to their positive responses. For example, Clif Bar & Co’s headquarters exemplified the highest amount of design-based h&ap qualities. The working environment was completely redesigned with h&ap initiatives in mind. Because of this, Clif Bar had the most positive response to h&ap in the workspace through design. The other three companies also displayed the importance of design when contributing to health in the workspace. It was a common response that the exposure to natural lighting, walking paths, onsite fitness, activity

encouraged breaks, health options in the cafe, and the placement of the stairways highly contributed to a positive working environment.

In regard to the responses from these four h&ap companies, this preceded information helps supplement the importance of architecture and environment. Physical structure has profound effects on human behavior. Designing humane and appropriate structures has become a critical component of not only inducing positive mental states, but also as a means of conserving and preserving our limited natural resources. According to Ouroussoff (1999), architecture can heal and function as a parameter "for an enlightened community, one that can even uplift the soul." In a profound example of interior design as it affects human health and wellbeing, Ulrich (1983) found "natural views are associated with positive emotional states which may play a role in the reduction of stressful thoughts and recovery from surgery." In his study, hospital patients who had windows with natural views fared better than patients who had window views of a brick wall. Compared to the patients with the wall-view, the patients with the natural view had fewer complications, took less pain medication, appeared more positive to nurses, and spent less time after surgery in the hospital. Other studies similar to Ulrich's (1983) suggest a positive overall effect of designing according to the fundamental services that will be provided by the building. In the example of hospital design, attractiveness, natural views, privacy, safety, and comfort provide an environment more conducive for healing.³⁶

³⁶ Deborah Stone, "Architecture and the Environment," Phycological Musings, (August 2011) <http://psychological-musings.blogspot.com/2011/08/architecture-and-environment.html> (Oct 23 2012).

The same implications have potential to be assumed in a workspace. Employees who have access to natural light, views to nature and high indoor air quality will be more productive, efficient, clear minded and even more active.³⁷

What was found by researching the 4 different companies was similarities in the research participants' responses to their working environments. In all four companies, the research outcome displays a positive reaction to h&ap in the workplace. It is proven through this research that companies who have invested time and attention to employee health and wellbeing, have received benefits beyond what can be seen. The design and layout in a workplace is where these h&ap initiatives begin. Architecture and environmental surroundings directly reflect human behavior. This can be used to a great advantage with h&ap in the workplace.

³⁷ Stone, "Architecture and Environment."

Design Intentions and Scale of h&ap Elements:

The outcome of this research and the studies before it, indicate a positive and beneficial response to promoting both wellness and physical activity in the workplace. h&ap can be evaluated on many scales: beginning with the environmental surroundings, to the architectural building scale, to the individual spaces, signage and can clear down to the detail scale. As with the four companies who were researched, h&ap is carried out through a multitude of different scales as well. Therefore, the purpose of this thesis is to investigate a multi-scale approach to health and activity promotion in the workplace. It is important to explore the several areas and characteristics of each to understand how to design and build with h&ap in mind in the future. Following are broken down categories of each area explored and future suggestions to incorporate h&ap into these areas.

Building Surroundings/Cultural aspects

“The way we design and build our communities can affect our physical and mental health. Healthy community design integrates evidence-based health strategies into community planning, transportation, and land-use decisions.”³⁸

H&ap promotion at work begins before one even steps foot in the building. The building surroundings and cultural aspects play a large role in contributing to a healthy work environment. In April 2002, the American Planning Association (APA) adopted a definition of smart growth, with one of the six critical elements being to promote public health and healthy communities. APA defines smart growth as using comprehensive

³⁸ “Designing and Building Healthy Spaces,” *CDC*, (August 2012)
<http://www.cdc.gov/healthyplaces/default.htm> (Apr 12 2013).

planning to guide, design, develop, revitalize and build communities for all including the following characteristics: 1) Have a unique sense of community and place; 2) Preserve and enhance valuable natural and cultural resources; 3) Equitably distribute the costs and benefits of development; 4) Expand the range of transportation, employment, and housing choices in a fiscally responsible manner; 5) Value long-range, region-wide sustainability rather than short- term, incremental, or geographically isolated actions; and 6) Promote public health and healthy communities.³⁹

Connection to outdoors is critical in integrating into h&ap in the workplace. Looking at Figure 2.1, 2.2, 2.3, and 2.4, this working environment is the location of a corporate “campus” type area where large corporate headquarters of varying companies are nestled between miles of walking paths, bike lanes, trees, retention ponds and spacious parking which allows for greater walking distances to the building entrance and the incorporation of trees, shrubs and greenery to be a part of the parking lots. This gives employees the freedom to take walking and jogging breaks during work, it creates a soothing environment and a break from the mental taxation of the long workday, and it provides a stronger connect with nature and the outdoors also known as “biophilia.” Biophilia, our innate need to affiliate with life and life-like processes, is a concept that has been recognized for several decades by the scientific and design communities, and intuited for hundreds of years by the population at large. Recent research in neuroscience and endocrinology clearly demonstrates that experiencing nature has significant benefits,

³⁹ Stone, Architecture and Environment.”

both psychological and physiological. Bringing nature and references to nature into the built environment is the purpose of biophilic design.⁴⁰



Figure 4.1 “Building Position and Structure; **Figure 4.2** “Surrounding Walking paths and Nature”; **Figure 4.3** “Campus Sign and Landscaping”; **Figure 4.4** “Walking Paths and Water View”

⁴⁰ William D Browning, “Bottom Line Benefits of Biophilia,” *Green Source Magazine*, (March 2012) <http://greensource.construction.com/opinion/2012/1203-bottom-line-benefits-of-biophilia.asp> (accessed Apr 13 2013).

The following questions and answers in the table provide evidence that most employees at these four companies stay healthy and active due to their company's h&ap efforts:

% of employees who stay healthy and active due to the company's h&ap efforts	75%-100%	50-75%	50-75%	75-100%
What ways does the design of your building contribute to h&ap?	Views to outdoors, open floor plans, health food in cafe, fitness classes or yoga sessions offered	Views to outdoors, health promotion via employee engagement activities, health food in cafe, fitness classes or yoga sessions offered	Views to outdoors, natural lighting, open floor plans, health promotion via employee engagement activities. Also, live plants in the workspaces and gardens around the building.	Views to outdoors, natural lighting, open floor plans, health promotion via employee engagement activities, healthy food in cafe, active games in the cafe, live plants throughout the workspace

Table 4.2.1 "Research Questions: Company h&ap Practices"

Mobility & Roof Gardens

Of course not all office environments have the outdoor surrounding capacity for ponds, parks, and miles of walking paths. In these instances, roof gardens have been implemented into some of the newest urban working environment designs. In downtown San Francisco, Twitter's new headquarters have created a remarkable roof garden for employees to get out and enjoy during working hours (as seen in Figure 2.5, 2.6 below).



Figure 4.5 "Twitter HQ Rooftop Social"



Figure 4.6 "Twitter HQ Rooftop Garden"

Another example was found with InnovAge, whose employee answered the research questions above. InnovAge is situated in a high-rise in downtown Denver. Despite its surroundings, the designers made every effort to create a connect with nature for the users of the building by: designing the building to naturally heat and cool itself, designing outdoor balconies and patios as break rooms, and creating spaces for fruits and vegetables to be planted in and around the building. They have community gardens and plants which people can utilize while at work and to take home.

In all four of the companies researched, bicycle accommodation was part of their h&a efforts. To promote bicycling to work, spaces and storage should be considered in the design phase as well.



Figure 4.7 “Bicycle Storage on a Campus: Portland State University”

At Vail Resorts, the company prides itself in being an advocate for the outdoors.

The headquarters are positioned within a campus-like setting surrounded by miles of walking paths, trees, gardens, water sources and break areas for employees to get out and enjoy the outdoors (as seen in Figure 2.1 through 2.4). The parking lot is also spaced out around the building to encourage walking further to the face of the building.

Do you feel that roof gardens, walking or running paths, day-lighting and other unique qualities are an important attribute to your workspace?	Yes, Definitely	No, but this would be an important feature to have when promoting h&ap.	Yes, these spaces are highly utilized by employees.	The walking/running paths are endless around the building. These are a very important attribute to the working environment. Many employers often hold 1:1 meetings by taking walks and getting outside to enjoy the landscaping.
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Table 4.2.2 “Research Questions: Outdoor Appearance, Connect to Nature”

Building Configuration

Nearly all areas in the working environment can be designed with h&a^p as a priority. The following portions are a breakdown of the different “zones” that have been found through research to provide healthy and active atmospheres for the users of the buildings. Much as been written about the built environment and health. in the past, emphasis was placed on urban sprawl and traffic and the siting of air pollution sources. More recently, a more holistic view of the built environment and health has been taken; this broader view gives consideration not only to traffic flow and pollution but also to access to open space; paths for walking, cycling and other physical activity; nearby commerce and the aesthetics of the environment. Built environments that encourage physical activity should reduce risks for obesity and the chronic diseases that are linked to physical inactivity.⁴¹

⁴¹ Andrew Dannenberg, “Making Healthy Places,” *Island Press*, Washington, (2011) p. 67.

Can the layout/design encourage h&ap in the workplace?	Yes, Very Much	Yes, Very Much	YES	Yes, Very Much	
How important is the design/layout of your workspace in h&ap?	Very Important	Very Important	Important	Very Important	
What design qualities stand out as supporting h&ap in your workplace?	Fitness facilities, common areas, break rooms and cafe, roof gardens, outdoor recreation, walking paths inside and outside, easily accessible staircases, standing or walking options at workstations	Fitness facilities, In the break rooms and cafeteria, walking pathways inside and outside, easily accessible staircases	Roof gardens, outdoor recreation, walking pathways indoor and outdoor, standing or walking options at workstations	Common areas, outdoor recreation, break rooms and cafes, walking paths inside and outside, standing options at workstations	

Table 4.2.3 “Research Questions: Design Layout and Qualities for h&ap”

Entrance & Common Areas

The entrance of a building may have one of the largest impacts on user experience. There is great opportunity to promote h&ap in this zone. Of the four employees interviewed, two mentioned that the stairs were clearly visible upon entrance and that this impacted the users to take stairs instead of the elevator. Another participant noted that if the stairs were more clearly visible, they would be utilized more.

The entrance creates the first impression, therefore it should be a vibrant, active environment. Elements such as the placement of stair-ways vs elevators, natural lighting, wide-open meeting spaces and also having any fitness facilities apparent upon arrival may impact the users that the environment is one which is promoting health and activity.

The common areas are generally highly utilized if designed properly and can create spaces for employers to express their investment in their employees. Commons can include 1) casual meeting spaces for employees, 2) cyber cafe's where users can "plug-in," get their daily news or just get out of their normal working environment, 3) gardens or atriums for relaxation, 4) lounge seating or tables and chairs for visiting, 5) treadmills, standing desks and walking desks, 7) game areas such as foosball, pool, etc 6) or just destination points to and from one space to another.

During the research of the main companies, all four noted that the common areas were highly effective due to their accessibility and central locations. These areas include walking paths, gardens, on-site gyms, outdoor break rooms and gaming areas.



Figure 4.8 “USANA HQ Entrance”

Break Rooms & Cafes

Where employees spend their time when away from their desks has just as much of an impact as the time they spend at their desks. The break rooms and cafe regions of an office can bring many healthy aspects to the overall environment. At Clif Bar & Co, the cafe is an open space full of community dining tables and an open kitchen where employees can see the chefs preparing healthy organic foods. The space is designed using a lot of natural light, white finishes, wood finishes and plants. An employee stated, “I just feel healthier for being in this space!” See Figures of this space below. Better yet, watch the video links to a tour of CLIF bar’s headquarters:

Media 4.1: Clif Bar HQ Office Tour: Part 1:

<http://www.bicycleretailer.com/videos/2011/04/tour-clif-bars-new-headquarters-part-1>

Media 4.2: Clif Bar HQ Office Tour: Part 2:

<http://www.bicycleretailer.com/videos/2011/04/tour-clif-bars-new-headquarters-part-2>



Figure 4.9 “Clif Bar Cafeteria with Open Kitchen”



Figure 4.10 “Clif Bar Open Work Space”

USANA's headquarters utilize similar characteristics with their break rooms and cafes utilizing the wide-open areas, the healthy cafe food options, and the wide open space for gathering. Break rooms can extend beyond the traditional "table chair" type scene, these areas can extend to activity areas. For example, at Vail Resorts HQ, the break room includes game tables such as foosball, board games and books encouraging employees to stimulate their minds and bodies while taking a mental rest from their work day.

When asked this question "Regarding the areas which promotes the highest level of activity (ie. walking paths, stairs, gym, office, cafe) what attributes make these spaces successful toward promoting health, wellness and physical activity?": One employee answered, "The visibility of the walking paths and activity going on in the cafe make the spaces successful toward promoting health, wellness and physical activity." The visibility and open layout of the cafe has quite an impact on h&a among the users of the space.

On-site Fitness

Having accessible recreation, exercise or sports facilities in neighborhoods tends to be associated with active recreation, but these associations were not found in all studies. Use of health clubs and recreation centers was significantly associated with regular physical activity. Living near coastal areas, lakes and beaches has been associated with more recreational physical activity according to a study mentioned by “Making Healthy Spaces.”⁴² This information can be utilized within an office environment. Ease of access is important to a fitness facility, therefore onsite access and ability to utilize the facility during working hours may help increase physical activity during the working day. Just as important is the surrounding areas such as the paths to the gym, work, cafe and break rooms and views to outdoors. All of these go hand-in-hand in creating an overall healthy environment for the workspace.

At USANA, they have an on-site gym which has been very successful in attracting employees to be physically active during the workday. The Usana employer expressed the importance of having the fitness facility centrally located and easy to access as a staple in people using the facility. The gym is located centrally in the building where it cannot be missed. It is part of the design, encouraging movement from all who walk by. When asked “in what ways does the design of your building contribute to h&ap?” the Usana employee answered, “Views to outdoors, health promotion via employee engagement activities, health food in cafe, fitness classes or yoga sessions offered.” Offering group fitness classes is also a positive in h&ap in the workplace.

⁴² Andrew Dannenberg, “Making Healthy Places.” p. 67.

Of the other companies interviewed, CLIF bar has an onsite fitness facility which has also been extremely successful in promoting h&ap. Vail Resorts and InnovAge both have deeply discounted and incentives to local athletic clubs however both mentioned that an on-site fitness facility would be ideal in increasing activity during the workday.



Figure 4.11 “Clif Bar HQ On-Site Yoga Studio”



Figure 4.12 “Clif Bar HQ On-Site Rock Wall”

What are some physical activity patterns in and around your worksites that contribute to h&ap? How many flights of stairs are people willing to travel.	People climbing 2-3 flights of stairs, biking to work and parking bikes inside, walking to work, walking on breaks	The fitness facility generates a lot of action, especially between 10:30 - 2:30. Most employees are willing to walk 4 flights of stairs without feeling like they have to take the elevator.	Employees often take afternoon group walks, and occasionally use the walking treadmill desks. The treadmill desks would be used more often if placed in a more social/local place in the office.	Employees heavily utilize the games in the cafe, the walking paths around the pond and landscaping outside. Biking to work. Most employees are willing to climb 4-6 flights of stairs before choosing the elevator.
How many people use company recreational and exercise facilities?	50-75%	50-75%	There is not an on-site gym, however 25-50% of people do activity like walking during the workday.	There is not currently an onsite gym, however 75-100% of employees walk or run the paths during the workday and take advantage of the athletic club membership and afternoon sports pick-up games

Table 4.2.4 “Research Questions: Mobility Patterns in the Office”

Alternative Seating and Workstation Products

Much energy has been focused on the spaces away from an employee's actual working station. However, where an employee spends most of his or her day working may have the highest impact on their h&a choices throughout the workday. Ergonomics at the workstation are crucial to maintaining an employee's health, wellbeing and job satisfaction. When asked this question, "What barriers does the company perceive while trying to promote physical activity?" one employer answered that lack of appropriate ergonomics was a huge barrier at the moment. This same company highly promotes the fitness facility use, the health cafe and walking paths, however ergonomics were of highest concern when asked about barriers.

As mentioned in the introduction, the World Health Organization recently identified the workplace as an important area for the setting of health-promoting and preventative measures. They mentioned that work-related musculoskeletal disorders have become one of the most common chronic diseases, often resulting from years of poor posture and sedentariness at the workplace (office jobs).⁴³ This is where the idea of an Active office comes into play, integrating physical activity in an actually working space. This can include promoting more movement through changing between tasks, workstations and working postures via an active seat (swopper.de), height adjustable desks and a whiteboard. "The Active Office environment seeks to interconnect workplace furniture, communication media, applications, and traditional media in a way that makes

⁴³ "The workplace: A priority setting for health promotion." WHO World Health Organization.

it easy for the user to change between different work environments.” With access to not only a desktop computer but also tablets, laptops and smartphones, workers can move effortlessly to different working environments without leaving their work behind. This is a wonderful concept and needs to be further explored to find the benefits of an active office. Integrating more movement into the working spaces can include small steps such as sitting on bosu balls or mobile chairs, having height adjustable desks allowing the user to stand instead of sit, integrating “walking desks” with treadmills so an employee can actually “walk and work.” At one company interviewed, they have walking desks available for all employees to use. The employees find this to be a successful idea, however everyone agreed that if the walking desks were actually in or near their working space, they would be much more highly utilized. Currently, they are isolated in a hallway away from the work office. A recent study was conducted regarding the response and effectiveness of the “Trek Desk” in a working environment titled “The Evaluations of Mobile work stations for active work,” conducted by Iowa State University. As seen in the image, the response of the integration of the desks was highly positive after being utilized for 30 days. Results indicate that 73.4% of participants had a favorable experience using the TrekDesk, 81% are likely to recommend the TrekDesk and 79% agree that the university should consider getting TrekDesks for their employees.⁴⁵

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Andrew Dannenberg, “Making Healthy Places.” p. 67.

⁴⁵ Gregory Welk, “Evaluation of Mobile Workstations for Active Work,” Iowa State University, <http://trekdesk.com/costfinancial/579-iowa-state-university-completes-evaluation-of-trekdesk-treadmill-desks-for-active-work-study> (accessed Apr 20 2013).

Evaluation of Mobile Workstations for Active Work

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¹Nutrition and Wellness Research Center (NWRC), ²Department(s) of Kinesiology, and ³Human Nutrition and Food Science

OBJECTIVE: The purpose of the study was to determine the feasibility of use of the TrekDesk mobile workstation by Iowa State University office workers who perform sedentary tasks. TrekDesk mobile workstations study has completed two waves and is currently in the third wave.

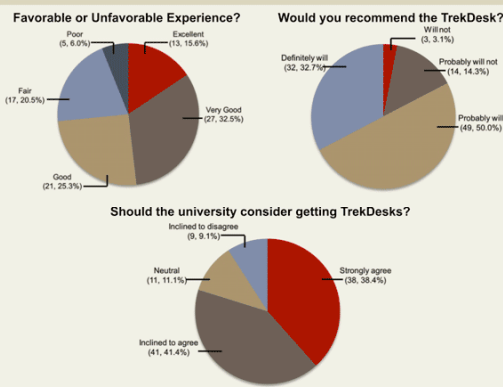
TrekDesk mobile workstations are placed in departments, centers and administrative offices across Iowa State University campus for a period of 30 days. The department chairs/heads provide approval to permit the placement of a TrekDesk mobile workstation in a common office suite that can be accessed by employees of the unit. The TrekDesk mobile workstations are placed in supervised areas and only accessible to employees that work within that department or unit. Interested participants provide informed consent and complete an online survey after 30 days regarding their experience with the TrekDesk mobile workstation.

Inclusion Criteria: ISU employee (faculty, P&S, Merit, Contract); Student workers who employed by an ISU office to carry out sedentary tasks for at least 10 hrs per week, such as working in reception, answering phones, etc.

Exclusion Criteria: Persons who are 350 lbs and larger (maximum user weight for the treadmill is 350 lbs) and/or with health conditions or medications that would exclude someone from walking on a treadmill.

One hundred and seventy one participants (130 females and 41 males) were recruited to the study and 99 participants responded to the survey about their experience regarding the Trekdesk

The study covered the following ISU administrative offices, centers and departments: Office of the Vice President for Research and Economic Development (VPRED), College of Human Sciences (CHS) Dean's Office, President's Office, College of Design, Bioeconomy Institute (BEI), Center for Excellence in Learning and Teaching (CELt), Center for Industrial Research and Service (CIRAS), ISU Dining, Liberal Arts and Sciences (LAS) Student Academic Services, Student Health, Virtual Reality Applications Center (VRAC), Library, Department of Residence (DOR), History, Sociology, Mathematics, Chemistry, Mechanical Engineering, Plant Sciences Institute (PSI), Natural Resource Ecology and Management (NREM) and Kinesiology.



Results indicate that 73.4% of participants had a favorable experience using the TrekDesk, 81% are likely to recommend the TrekDesk and 79% agree that the university should consider getting TrekDesks for their employees.

IOWA STATE UNIVERSITY
Nutrition and Wellness Research Center

weness
Works

Figure 2.13 “Study on effectiveness of Trek Desks”

The importance of ergonomics should not be overlooked in the workplace. The integration of properly designed ergonomic workstations is extremely important to the employee’s health. It has long been understood that ergonomics offers numerous benefits, but recently a stronger emphasis has been placed on the importance of ergonomics in the workplace.

The subject of ergonomics in the workplace has become so important, that it is now going to be addressed by the new OSHA standards to be released for 2010. According to the Occupational Health and Safety Administration musculoskeletal injuries are on the rise. These injuries are commonly caused by a workstation that is improperly set-up. Such

injuries can include carpal tunnel syndrome, tendonitis and low back pain. These injuries are now considered to be among the leading causes for disability within the modern workplace. OSHA estimates that as many as 1.8 million work-related musculoskeletal disorders occur every year. These injuries result in a loss of 650,000 work days per year; more than 1/3 of the total amount of workdays that are lost on an annual basis. Ergonomics seeks to prevent such injuries by studying the relationship between the workplace and people in order to improve comfort and overall efficiency while on the job. Due to the fact that almost 70% of all work performed in the country today is done while at a seated station, many ergonomic considerations apply to work that is performed at a computer. Adjusting your chair height so that your feet are able to rest flat on the floor and your knees are flexed at a ninety degree angle can help to provide proper lumbar support and prevent strain. The top of a desk should be situated so that it is about two inches lower than the forearms, with the computer monitor no more than an arm's length away. The monitor should also be adjusted so as to reduce glare. Ergonomics can also be applied to the keyboard so that the upper arms are able to rest in a relaxed position with the elbows at a ninety degree angle and the wrists pointed forward. This will help to avoid placing strain on the wrists and hands. Ergonomics has also shown that taking several short breaks is more beneficial than taking a couple of long breaks over the period of a workday. One ten minute break for

each hour of work should be taken in order to avoid problems such as repetitive strain injuries. Practicing good ergonomics can not only help to avoid injuries in the workplace, but can also help workers to be more efficient and productive.⁴⁶

Focusing on the individual working space of employees, are these areas designed w/ h&ap in mind as employees sit and work at their desks for several hours per day?	Yes, Standing desks are available. Activity breaks are encouraged as much as possible throughout the workday.	This is an area which needs to be improved. Increase in ergonomics and standing desk options would be highly beneficial	There are standing desks and treadmill stations. I have not seen these to be used, as I feel that they are not centrally located with the other desks.	The individual work spaces are spacious and bosu balls are an alternative to sitting. Standing is also an option. The open floor plan also encourages movement among employees
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Table 4.2.5 “Research Questions: Individual Workspaces”

Details: Artwork, Color, Materials, Lighting, Music

⁴⁶ “Importance of Ergonomics in the Workplace,
<http://wordsofyouwant.com/newportfolio/samples/health/Importance%20of%20Ergonomics%20in%20the%20Workplace.pdf> (accessed Apr 2012).

The details of the workplace should not be overlooked as an important aspect of h&ap. When asked this question, “Can the layout/design encourage h&ap in the workplace?” and “How important is the design/layout of our workspace in H&ap?” The answers across the board were strongly positive as in the design/layout has a huge impact on h&ap and is Very Important to promoting h&ap. When further asked “What ways does the design of your building contribute to h&ap?” the answers included: views to outdoors, open floor plan, health food in cafe, live plants in the workspace, light colors, large amount of daylight and visible activity promotion such as fitness facilities and games.

The largest factor when it comes to details was lighting and natural day lighting. Studies have found that absenteeism drops and productivity increases after providing more natural lighting in the workplace.⁴⁷ The link between light and mood, and mood and productivity is complex, and not easy to prove scientifically due to the number of other contributory factors. However, studies have made links between improvement in workplace daylighting and productivity, and even the success of retail outlets has been shown to dramatically increase with the introduction of skylights. In addition to delivering light, windows also provide a view. This has been more directly linked to improved workplace satisfaction, reduced stress and increased productivity. A view gives workers contact with the outside world, the weather, the time of day or year, and provides variety and stimulation. Naturally not all views are uplifting, and equally daylight does not always have a positive impact on productivity. Where sunlight enters an office

⁴⁷ “Design & Productivity,” *Intelligent Workspace* (June 11 2012) <http://blog.bcsdi.com/design-productivity/> (accessed Apr 2013).

directly, it can be distracting and create hot-spots, likely to decrease the productivity of the workers it effects. Overly large windows may also be problematic by causing loss of privacy. Of the company employees interviewed, there was less focus on schematic colors and more focus on the importance to daylight, the appreciation of natural finishes, and an emphasis on light-reflecting colors such as white.

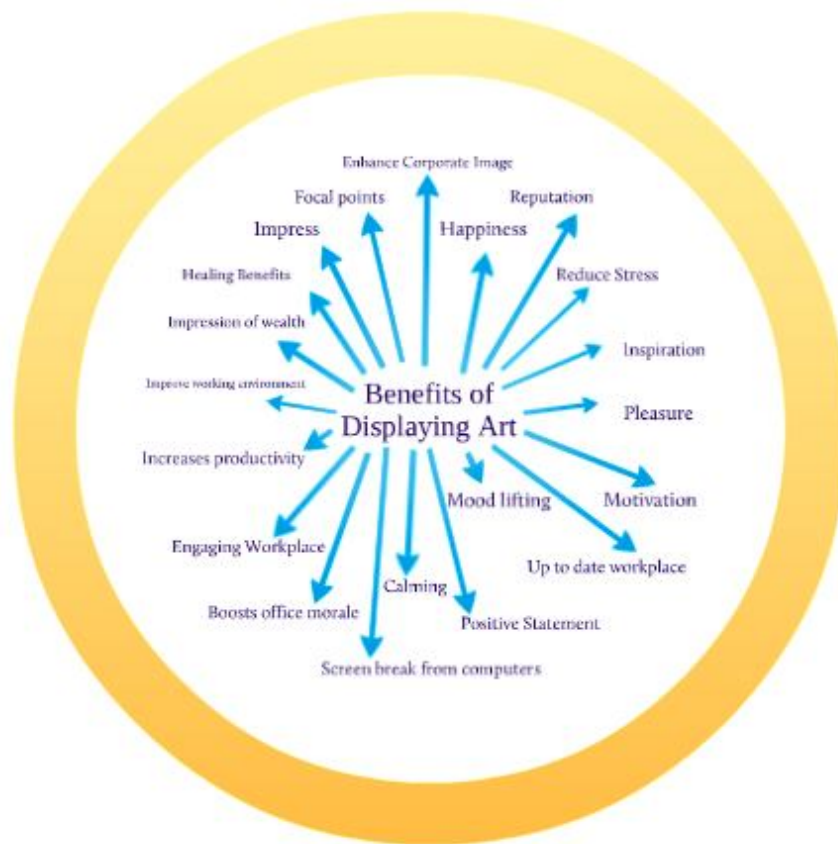


Figure 2.14 “Benefits of Displaying Artwork” From prezi.com

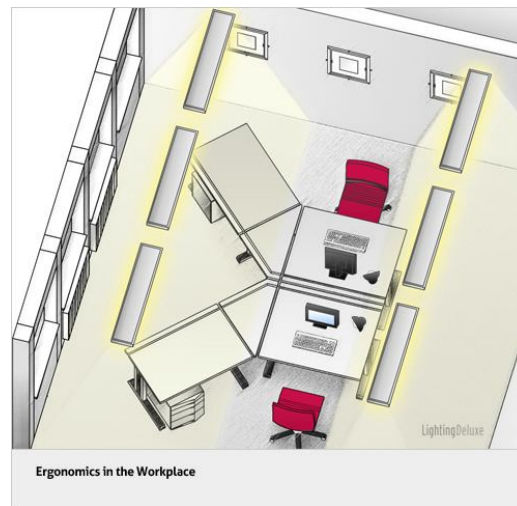


Figure 2.15 “Daylighting Patterns in the Office”



Figure 2.16 “Natural Finishes and Lighting”

Artwork continues to be a positive enhancement in the workplace. “Research shows that involvement with the arts increases motivation, builds teamwork and inspires people factors that business leaders identify as key profit drivers. The arts can improve

reputation, develop influence, raise profile, build brand recognition, encourage loyalty, increase sales and showcase commitment to corporate social responsibility.”⁴⁸

What design qualities in your building do you feel can help promote h&ap?	Views to outdoors, colors, space layouts, surface materials and patterns, artwork, lighting, air quality and air flow	Views to the outdoors, colors, lighting	Views to outdoors, colors, space layouts, surface materials and patterns, artwork, lighting, air quality and air flow	View to outdoors, colors, space layouts, surface materials and patterns, artwork, lighting
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Table 2.2.6 “Research Questions: Design Qualities”

⁴⁸ Lucy Byrne, “Rethinking the Office - Benefits of Art in the Workplace,” Prezi (Jan 2011) <http://prezi.com/c0vdiswhqjhy/rethinking-the-office-the-benefits-of-art-in-the-workplace/> (accessed Apr 13 2013).

Way finding and Signage

Way finding and signage also play a huge role in h&ap in the workplace. The placement of on-site fitness centers, roof gardens, walking paths and the stairways can promote activity. In the study when the 4 different employees were asked this question, “Regarding the areas which promotes the highest level of activity (ie. walking paths, stairs, gym, office, cafe) what attributes make these spaces successful toward promoting health, wellness and physical activity?” the answers included; 1) “They have been made clearly accessible and we are highly encouraged to use them.” 2) “I think the location of the facility is important. Our fitness facilities are in the middle of the office so it is a common meeting space. The space of the facility is large enough to accommodate our 650 employees. It never feels cramped or crowded where it is not inviting to participate.” 3) Another stated, “The visibility of the walking paths and activity going on in the cafe make the spaces successful toward promoting health, wellness and physical activity.” The positioning and visibility of activity promoting areas were highly effective in h&ap within these 4 companies.

The placement of stairs is also an important factor in how much they get utilized. The 4 employees at the 4 different companies, each one mentioned an importance in the placement of the stairs in the office environment. When asked the following question: “Focusing on the design of the stairways, are they emphasized? Are they clearly visible upon entrance? Do you feel safe using the stairways? Are they easier to access than the elevators?” the answers included: 1) yes to all of those questions, 2) They are not emphasized or clearly visible upon entrance. Their usage would be increased if placed in

the entrance area. 3) They are not emphasized and are in a stairwell. Oddly enough, employees are willing to climb several flights of stairs, even though the elevators are more accessible, this may be due to the overall persona of the company which in general is a highly active group of people.

Regarding the areas which promotes the highest level of activity (ie. walking paths, stairs, gym, office, cafe) what attributes make these spaces successful toward promoting health, wellness and physical activity?	They have been made clearly accessible and we are highly encouraged to use them.	I think the location of the facility is important. Our fitness facilities are in the middle of the office so it is a common meeting space. The space of the facility is large enough to accommodate our 650 employees. It never feels cramped or crowded where it is not inviting to participate.	The natural lighting is one of the best qualities of the building and the self-efficient HVAC system which helps contribute to the indoor air quality.	The visibility of the walking paths and activity going on in the cafe make the spaces successful toward promoting health, wellness and physical activity.
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Table 4.2.7 “Research Questions: Successful h&ap promotions”

Focusing on the design of the stairways, are they emphasized? Are they clearly visible upon entrance? Do you feel safe using the stairways? Are they easier to access than the elevators?	Yes to all of those questions	Yes, To all of those questions	They are not emphasized or clearly visible upon entrance. Their usage would be increased if placed in the entrance area.	They are not emphasized and are in a stairwell. Oddly enough, employees are willing to climb several flights of stairs, even though the elevators are more accessible.
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Table 4.2.8 “Research Questions: Stairways”

Conclusions & Further Research

Traditionally there are many studies on the impact which architecture has on human behavior, mood and health. There are not a lot of studies on architecture's impact on h&ap specifically. This area needs to be studied in greater depth. The purpose of this project was to study this impact specifically. Within a company who has integrated h&ap, there are several details and areas to be explored in order to understand what makes each space successful. Of these four companies and looking at several others, these details have been questioned and explored, revealing a positive success within companies promoting h&ap in the work environment and the employee responses.

The design and architectural qualities have a direct impact on the user. This impact can be advantageous when promoting health and activity in the work place. While historically physical activity hasn't been thought of in coordination of architecture, they actually have an inseparable impact on each other. The aim of this project was to explore the relationship between promoting health and activity in relation to building design and configuration. These responses have a positive impact on this research which should be considered when designing and redesigning the modern-day office space. Architecture and design is certainly not a passive. It is an integral and active part of the user's lives. The workplace is where users spend most of their days and successfully designing these environments to promote health and activity can increase activity in the average American who is currently not active enough, especially during the workday. Given a supportive environment and the opportunity to do so we can change this. Designers and

architects can partner with companies and change the reoccurring issue of sedentary lifestyles.

“Healthier communities planning is a challenging health promotion activity. The evidence is clear that [we] must invest more in promoting good health in whatever way possible...to find, as I was able to do, a niche in which professional skills can be used in a new and beneficial way for humanity.”⁴⁹

⁴⁹ Burt Ketcham, “Healthy People in Healthy Communities,” *Office of Public Health and Science, MD*, (2010) <http://atfiles.org/files/pdf/healthycom.pdf> (Oct 15 2012).

Appendix A

Letter of Informed Consent:



INFORMED CONSENT FORM

COLLEGE OF ARCHITECTURE
Architecture & Interior Design Programs

IRB Project ID#13750

Title: *The Contribution and Affect of Design and Architecture to Health & Activity Promotion (h&aap) in the Workplace*

Purpose:

This research project will aim to discover the benefits of integrating health and activity promotion in the workspace through architecture and design. You must be 19 years of age or older to participate. You are invited to participate in this study because you have displayed interest in the importance of health and activity promotion throughout the workday.

Procedures:

You will be asked to answer a set of questions on an interactive pdf form. The form will contain questions about the importance of health and activity promotion (h&aap) and your individual thoughts on the relationship of h&aap and design. The questionnaire will take about 20-30 minutes to complete. The questionnaire will be emailed to you, and upon completion you will send it back via email.

Benefits:

The benefits of this research is to use design and architecture to help increase health and activity promotion (h&aap) in one's environment during the workday. By providing your responses in regard to this topic, you can help contribute to healthy and active working environments in the future.

Risks and/or Discomforts:

There are no known risks or discomforts associated with this research.

Confidentiality:

Any information obtained during this study which could identify you will be kept strictly confidential. The data will be stored in a file on the investigator's computer and will only be seen by the investigator during the study and for a maximum of 2 years after the study is complete. The information obtained in this study may be published in scientific journals or presented at scientific meetings but the data will be reported as aggregated data.

Opportunity to Ask Questions:

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study. Or you may contact the investigator(s) at the phone numbers below. Please contact the University of Nebraska-Lincoln Institutional Review Board at (402) 472-6965 to voice concerns about the research or if you have any questions about your rights as a research participant.

Freedom to Withdraw:

Participation in this study is voluntary. You can refuse to participate or withdraw at any time without harming your relationship with the researchers or the University of Nebraska-Lincoln, or in any other way receive a penalty or loss of benefits to which you are otherwise entitled.

Continued on Next Page



INFORMED CONSENT FORM

COLLEGE OF ARCHITECTURE
Architecture & Interior Design Programs

IRB Project ID#13750

Consent, Right to Receive a Copy:

You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep.

Signature of Participant:_____
Signature of Research Participant_____
Date

Principal Investigator: Krystal L. Schumacher, UNL Graduate Student
Phone: 308-249-1881
Email: krystalschu@unl.edu

Secondary Investigator: Dr Betsy Gabb, Ed.D., IIDA, IDEC, Allied ASID
Phone: 402-472-9245
Email: hgabb1@unl.edu

Appendix B

Research Questionnaire

The design of health and activity promotion in the workplace.

a design thesis by krystal schumacher, University of Nebraska, Graduate Student.

Company:

Employer/Employee name:

Contact Info

Phone:

Email:

Address of Workplace:

Agreement to participate:

I, agree to participate in this thesis research project for Krystal Schumacher, a Graduate design student through the University of Nebraska at Lincoln.

Upon completion of your responses, this design research will be able to present a thesis with important information on helping designers improve the workspace to promote active and healthy lifestyles.

Questions

*Please note: **h&ap** is the abbreviation for "health & activity promotion," (for the purpose of this research paper).

I. Your Company and Employer Perceptions

1. Regarding the company's choice to be active in **h&ap** (health & activity promotion), can you briefly describe the goals of your company?

2. What are the employer and employee perceptions on promoting activity and health in the workspace and during working hours? Do most employees prefer h&ap activities during their workday? *(Select One)*

- ☐ Highly prefer
- ☐ Somewhat prefer
- ☐ Do not prefer
- ☐ Do not feel like they have time

Comments:

3. What do you think encourages people to be physically active and make healthy decisions in the workspace and during working hours? *(Select All that Apply)*

- ☐ Incentives
- ☐ Places to Walk/Jog
- ☐ Healthy Eating Options

- ☐ Fitness Facility on Site
- ☐ Fitness Classes offered during work hours
- ☐ Open layout
- ☐ Standing desks, alternative options to sitting at their desks

Other:

4. How important is the design and layout of your workspace in h&ap? *(Select One)*

- ☐ Very Important
- ☐ Important
- ☐ Doesn't make much of a difference
- ☐ Not Important at all

5. What percentage of the employers and employees stay healthy and active due to your company's h&ap efforts? *(Select One)*

- ☐ 0-25%
- ☐ 25-50%
- ☐ 50-75%
- ☐ 75-100%

6. What barriers does the company perceive while trying to promote physical activity?
(Select All that Apply)

- ☐ Building configuration
- ☐ Presence of views to outdoors
- ☐ Lack of natural lighting
- ☐ Attractive Environmental Surroundings
- ☐ Task support & Ergonomics (functional/comfortable design in office furniture)

- ☐ Stairs are hard to locate
- ☐ Lack of healthy dining options
- ☐ Lack of appropriate ergonomics

Any other barriers that come to mind? *If so, please list below:*

7. Has your company experienced a return on investment or other benefits by increasing h&ap and awareness?

- ☐ Yes
- ☐ No

(Select ANY that Apply)

- ☐ Less Absences
- ☐ Fewer work-related injuries
- ☐ Improved overall moral
- ☐ Decrease in turn-over rates
- ☐ Increase in h&ap interest

Other:

(Physical Space & WorkSpace Designs)

8. In what ways do you believe the design of your office/building contributes to a healthy and active lifestyle for employers and employees? *Select ALL that Apply*

- ☐ Views to outdoors, natural lighting
- ☐ Open floor plans
- ☐ Health promotion via employee engagement activities
- ☐ Healthy food in the cafe area
- ☐ Fitness classes or yoga sessions offered

Are there other healthy practices you can mention?

If so, please list below:

9. What design qualities stand out as supporting h&ap in various areas throughout your workplace? (ie: in the common areas, at individual workstations, meeting rooms, fitness facilities, the cafe) *Select ALL that Apply*

- ☐ Fitness facilities
- ☐ In the common areas
- ☐ In the break rooms and cafeteria
- ☐ Roof gardens, outdoor recreation
- ☐ Walking pathways indoor or outdoors
- ☐ Easily accessible staircases
- ☐ Standing or walking options at workstations

Are there other design qualities that stand out in the office?

If so, please list below:

10. Describe physical activity patterns in and around work sites. How much do people walk before, during and after work? How many flights of stairs are people willing to travel?

11. How many people use company recreational and exercise facilities (if there are any located in your workplace)?

- ☐ 0-25%
- ☐ 25-50%
- ☐ 50-75%
- ☐ 75-100%

12. Focusing on the design of stairways (or stairwells) in your workspace, answer "Yes" or "No" to the following questions:

- | | | |
|--|------------------------------|-----------------------------|
| Are they emphasized? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Are they clearly visible upon entry into the building? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Do you feel safe using the stairways? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Are they easier to find than the elevators? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

13. Do you feel that the following design qualities can help promote physical activity?

Select ALL that Apply

- ☐ Views to the outdoors
- ☐ Colors
- ☐ Space layouts
- ☐ Surface Materials and Patterns
- ☐ Artwork
- ☐ Lighting
- ☐ Air quality and air flow

14. If your company has roof gardens, walking or running paths, day-lighting, other unique qualities, do you feel these are an important attribute to your workspace?

☐

Yes

☐

No

Please briefly explain your thoughts:

15. Focusing on the individual working space of employees, are these areas designed with **h&ap** in mind as employees sit and work at them for multiple hours per day? Are standing desks or treadmills available?

16. Regarding the areas in the company's workplace which promotes the highest level of activity (ie: walking paths, stairs, gym, office, cafeteria) what attributes make these spaces successful toward promoting health, wellness, and physical activity?

13. If **h&ap** is a new concept in your workspace, how did it alter your former work space's floor plan or design? What major changes did you experience?

Final thoughts:

Do you have further thoughts and comments on how the design of your building has an impact on h&ap through your working space(s)?

Is there further data (ie: return on investment numbers, general observations) that you can provide to help with this research?



**Once complete, please save and attach this document with your responses to an email addressed to me: krystalschu@me.com*

"Thank you so much for contributing your responses to my research. I greatly appreciate it. Your response is extremely beneficial to the outcome of my thesis work."

Krystal L Schumacher

308.249.1881

krystalschu@me.com

Graduate Student, University of Nebraska - Lincoln

Research Participant's Letters of Agreement to Participate

Hello Lauren,

My name is Krystal Schumacher and I am graduate student at the University of Nebraska's College of Architecture. I am currently trying to complete a design thesis as a final step in my six years of college education in the field of interior design.

My thesis topic is "**Health & activity promotion (h&ap) in the workplace through design.**" While doing online research, I found that **USANA** displays the most creative, innovative and interesting qualities when it comes time to the design of health & activity promotion (h&ap) in your work space. **Initially discovered from greatist.com "The 44 Healthiest Companies to Work For."*

Thank you for your willingness to contribute to my research process by responding to questions about h&ap in your workplace. I am requesting your formal consent via signature (below) stating that you provided responses to my research questionnaire. Your responses will be used as an incredible example of h&ap design qualities as part of my thesis conclusion. My goal is to promote and emphasize the importance of h&ap design in future working spaces.

Again, I truly thank you for your time and efforts in contributing to my design thesis research.

Sincerely,

Krystal Schumacher
Current University of Nebraska - Graduate Student
308.249.1881
krystalschu@me.com

My thesis supervisor is Dr. Betsy Gabb, Ed.D., IIDA, IDEC, Allied ASID



Signature of Research Participant (Lauren Reichman, USANA)



Signature of Student Conducting the Research
(Krystal L. Schumacher)

Signature of Design Director in the College of Arch @ UNL
(Dr. Betsy Gabb, Ed.D., IIDA, IDEC, Allied ASID)

Hello Emily,

My name is Krystal Schumacher and I am graduate student at the University of Nebraska's College of Architecture. I am currently trying to complete a design thesis as a final step in my six years of college education in the field of interior design.

My thesis topic is "**Health & activity promotion (h&ap) in the workplace through design.**" While doing online research, I found that **Clif Bar & Company** displays the most creative, innovative and interesting qualities when it comes time to the design of health & activity promotion (h&ap) in your work space. *"Initially discovered from greatist.com "The 44 Healthiest Companies to Work For."*


Thank you for your willingness to contribute to my research process by responding to questions about h&ap in your workplace. I am requesting your formal consent via signature (below) stating that you provided responses to my research questionnaire. Your responses will be used as an incredible example of h&ap design qualities as part of my thesis conclusion. My goal is to promote and emphasize the importance of h&ap design in future working spaces.

Again, I truly thank you for your time and efforts in contributing to my design thesis research.

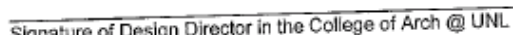
Sincerely,

Krystal Schumacher
Current University of Nebraska - Graduate Student
308.249.1881
krystalschu@me.com

My thesis supervisor is Dr. Betsy Gabb, Ed.D., IIDA, IDEC, Allied ASID


Signature of Research Participant (Emily Zisman, Clif Bar)


Signature of Student Conducting the Research
(Krystal L. Schumacher)


Signature of Design Director in the College of Arch @ UNL
(Dr. Betsy Gabb, Ed.D., IIDA, IDEC, Allied ASID)

Hello Abbie,

My name is Krystal Schumacher and I am graduate student at the University of Nebraska's College of Architecture. I am currently trying to complete a design thesis as a final step in my six years of college education in the field of interior design.

My thesis topic is "**Health & activity promotion (h&ap) in the workplace through design.**" While doing online research, I found that InnovAge displays the most creative, innovative and interesting qualities when it comes time to the design of health & activity promotion (h&ap) in your work space.

Thank you for your willingness to contribute to my research process by responding to questions about h&ap in your workplace. I am requesting your formal consent via signature (below) stating that you provided responses to my research questionnaire. Your responses will be used as an incredible example of h&ap design qualities as part of my thesis conclusion. My goal is to promote and emphasize the importance of h&ap design in future working spaces.

Again, I truly thank you for your time and efforts in contributing to my design thesis research.

Sincerely,

Krystal Schumacher
Current University of Nebraska - Graduate Student
308.249.1881
krystalschu@me.com

My thesis supervisor is Dr. Betsy Gabb, Ed.D., IIDA, IDEC, Allied ASID



Signature of Research Participant (Abbie Olson, InnovAge)

Signature of Student Conducting the Research
(Krystal L. Schumacher)

Signature of Design Director in the College of Arch @ UNL
(Dr. Betsy Gabb, Ed.D., IIDA, IDEC, Allied ASID)

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