CORPORATE OFFICE EMPLOYEE ANALYSIS: TRANSFORMATION FROM CLOSED OFFICE LAYOUT TO OPEN FLOOR PLAN ENVIRONMENT

Stephanie J. Fanger
University of Nebraska-Lincoln, stephaniejfanger@gmail.com

Follow this and additional works at: https://digitalcommons.unl.edu/archthesis

Part of the Interior Architecture Commons, and the Other Architecture Commons

Fanger, Stephanie J., "CORPORATE OFFICE EMPLOYEE ANALYSIS: TRANSFORMATION FROM CLOSED OFFICE LAYOUT TO OPEN FLOOR PLAN ENVIRONMENT" (2011). Theses from the Architecture Program. 123.
https://digitalcommons.unl.edu/archthesis/123

This Article is brought to you for free and open access by the Architecture Program at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Theses from the Architecture Program by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.
CORPORATE OFFICE EMPLOYEE ANALYSIS: TRANSFORMATION FROM CLOSED OFFICE LAYOUT TO OPEN FLOOR PLAN ENVIRONMENT

by

Stephanie Julia Fanger

A THESIS

Presented to the Faculty of
The Graduate College at the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Master of Science

Major: Architecture

Under the Supervision of Professor Betsy S. Gabb

Lincoln, Nebraska

December, 2011
The office workplace within the United States has undergone monumental changes in the past century. The Environmental Protection Agency (EPA) has cited that Americans spend an average of 90 percent of their time indoors. As human beings can often spend a majority of the hours in the day at their workplace, more so than their home, it is important to understand the effects of the built environment on the American office employee. In order to stay current with modern times, General Dynamics, a corporation located in Scottsdale, Arizona implemented a renovation of interior space. This thesis examines the transformation from a close office layout to an open style floor plan environment. As the closed style workplace has been in existence since the 1980's, the change will be a major transformation which will take the employees a while to adjust to. The closed style workplace was characterized by high panel cubicles, displacing employees based upon their rank within the company’s hierarchy. The open style layout places employees into the same low panel work station, despite their position within General Dynamics. Questionnaires were distributed before and after the move into the open style workplace, leveraging the satisfaction amongst the buildings occupants. The following components were the focus of the study, assessing which work environment was more beneficial for the corporate employee: assigned workstation and other associated office furniture; access to the outdoors; workplace amenities; organizational hierarchy of rank; ambient temperature and lighting control; privacy; personalization; communication and collaboration spaces; and technology. The findings
from both workplace styles were reported to General Dynamics AIS management, as well as creation of a future design prototype which blends favored attributes together.
Author’s Acknowledgements

I would like to acknowledge my employer, General Dynamics C4 Systems, located in Scottsdale, Arizona for monetarily supporting my master’s education. I am especially thankful, as this is a benefit in which I would be unable to pursue on my own. Thank you to my company for assisting the tuition expenses as well as my textbooks, since the supplementary material tends to be extremely expensive. Additionally, I would like to say a special thank you to my managers within the Facilities Operations department, Mike Cooley, Thor Tellefsen and Patrick Okamura, who allowed me to pursue a higher education degree at University of Nebraska- Lincoln and have supported my research within our corporation.

Furthermore, I would also to acknowledge the employees and management of General Dynamics AIS for allowing me to study their employees in their new working environment, and taking time out of their busy schedules to aid my collection of data. Dana Moss, Kim Burch and Tom Butler have taken the time out of their demanding work schedules to support my research. Dana, I am appreciative of you for providing me with the Pittsfield survey analysis, and answering all my emails in a timely manner. Kim, I am appreciative of the supplemental data you supplied me regarding real estate, offering a unique outlook which I had not previously considered. Tom, I am grateful for you allowing me to personally interview your employees and taking the time to organize the interviews. I would like to also thank Jay Adams and Glen Plyler for answering direct questions about AIS Facilities and placing me in contact with helpful connections within the corporation.

Thank you to Beatrice Landon from BDHP Architecture in Cincinnati, Ohio for sharing all her detailed space planning information with me and taking time out of her busy schedule to promptly answer my lengthy emails and questions. I am thankful to
speak in architecture and design terms with her about the research, as some terms and concepts may be difficult for engineers to understand fully.

On a personal level I would like to thank my parents, Julie and David Fanger for supporting my aspiration to pursue a Master's degree. I am eternally grateful to have been raised by such established and accomplished parents, who I love dearly. I would also like to thank my boyfriend, Jeff Aspland, for making my life less stressful as I balanced work and school full time the past year and a half. Thank you for maintaining the house and walking the dogs when I had little energy to do so. Jeff, you are my everything.

Last but most certainly not least, I would like to commend my amazing thesis chair, Betsy Gabb, for being very attentive to my emails, questions and concerns. I could have not worked with a more talented and passionate chairperson; I am thankful for all the advice she has lent me throughout this process. Completing this distance based master’s program in Arizona, has been a breeze with an advisor like Betsy. She is an asset to the University of Nebraska- Lincoln design program.
# Table of Contents

Table of Contents i  
Figures ii  
Tables iv  
Chapter One 1  
Design Problem  
Chapter Two 4  
Literature Review  
Chapter Three 18  
Analysis of Building Components  
Chapter Four 27  
Analysis of Old Closed Office Environment  
Chapter Five 34  
Analysis of New Open Office Environment  
Chapter Six 52  
Pittsfield Research Studies and Results Analysis  
Chapter Seven 65  
Scottsdale Research Studies and Results Analysis  
Chapter Eight 84  
Conclusion & Recommended Prototype  
References 89  
Appendices 92
List of Figures

Figure 1: Employee Title Deciphering Work Station Square Footage

Figure 2: Link between Employee Positive Emotion and Favorable Outcomes at the Workplace

Figure 3: Know Thy Customer

Figure 4: Silent Observation

Figure 5: GSK Space Renovation

Figure 6: Spectrum of the Workspace

Figure 7: Organizational Culture Survey Results

Figure 8: Building Components Which Affect Employees Directly

Figure 9: OSHA’s definition for Correct Upright and Standing Posture

Figure 10: General Dynamics Office Cubicle Standards

Figure 11: Old General Dynamics AIS Floor Plan- Closed Office Style

Figure 12: New General Dynamics AIS Floor Plan- Open Office Style

Figure 13: Mock Up Herman Miller Cubicle Workstations for Open Office Style

Figure 14: Location of Herman Miller Workstations

Figure 15: Personal Space: Workstation Explanation from the User’s Manual Design Handbook by Landon

Figure 16: Location of Windows in the Floor Plan
Figure 17: Window View outside to Natural Landscaping

Figure 18: Demolition of Old 8’x8’x66” Cubicles with Views from Windows

Figure 19: Break Room Location

Figure 20: Community Space: Café Description from the User’s Manual Design Handbook by Beatrice Landon

Figure 21: Location of the Phone Rooms, Huddle Rooms and Conference Rooms

Figure 22: Large Conference Room Definition from User’s Manual Design Handbook by Landon

Figure 23: Large Conference Room Definition from User’s Manual Design Handbook by Beatrice Landon

Figure 24: Small Conference Room Definition from User’s Manual Design Handbook by Beatrice Landon

Figure 25: Location of Collaborative Areas

Figure 26: Definition and Function of the Work Tables from User’s Manual Design Handbook by Beatrice Landon

Figure 27: Open Collaboration Concept from User’s Manual Design Handbook by Beatrice Landon

Figure 28: Scottsdale Post Occupancy Results

Figure 29: West, South and North Walls

Figure 30: South Wall Perspective

Figure 31: North Wall Perspective

Figure 32: View of West and North Walls
Figure 33: 
View of Break Room

Figure 34: 
View of Break Room

Figure 35: 
Large Conference Room

Figure 36: 
Personalization of Workstations
List of Tables

Table 1: Satisfaction Scores for May 2010 Questionnaire

Table 2: Satisfaction Scores for August 2010 Questionnaire

Table 3: Comparison Graph of May 2010 and August 2010 Results

Table 4: Significance amongst Surveys

Table 5: Scottsdale Closed Workplace General Questions

Table 6: Current Work Environment Aspects on Performance

Table 7: Ranking of Important Workplace Aspects

Table 8: Rank on Agreement with Current Work Environment

Table 9: General Dynamics AIS EPS Results

Table 10: Comparison of Pittsfield and Scottsdale Closed Office Survey Results

Table 11: Scottsdale Open Style Office Interview Results
Chapter One: Design Problem

The aesthetic of the interior built environment can affect the morale and productivity of the occupant both positively and negatively. The United States Environmental Protection Agency (EPA) has cited that Americans spend an average of 90 percent of their time indoors. As human beings can often spend a majority of the hours in the day at their workplace, often more hours than their home, it is important to understand the effects of the built environment on the American office employee. Interior architecture can directly affect the occupant’s experience, which has become a public health issue known as sick building syndrome (SBS). This syndrome is one of the largest stressors on the office employee, as interior environments can directly affect the wellbeing of the occupant (Indoor Air Facts No. 4 Sick Building Syndrome).

One of the earliest documented cases of sick building syndrome occurred in 1863 in the Ohio State Capital building located in Columbus, Ohio. Occupants and employees of the building became ill with a mysterious disease, in which the culprit was found to be clogged basement air passages, which were filled with debris and raw sewage. Despite human health problems existing for centuries in the United States, it was not until in 1982 that the term “sick building syndrome” was conceived. Sick Building Syndrome was internationally recognized as a medical condition by the World Health Organization (WHO). Truly however, the 1970’s displayed a plethora of health related issues in buildings as public health agencies were requested to investigate complaints by office workers related to the indoor environment, and for the past four decades, sick building syndrome has become an eminent attribute to employee wellness (Abdul-Wahab, 2011). Another element of the building which was found to directly impact the occupant’s health and constituting to sick building syndrome is asbestos. Asbestos was heavily used in the late 19th century in ceiling and flooring systems for its sound absorption, strength and resistance to fire. Conversely, asbestos can become cancerous
to humans when the fibers are inhaled over a long period of time, leading to mesothelioma. The EPA cites the following as contributing factors to sick building syndrome: inadequate ventilation, chemical contaminants from indoor sources, chemical contaminants from outdoor sources and biological contaminants (Indoor Air Facts No. 4 Sick Building Syndrome).

According to the Commercial Buildings Energy Consumption Survey (CBECS) as of 2003, there are over 4.9 million office buildings existent in the United States alone. As there is a plethora of office classified buildings, it is beneficial to understand ways in which workplace design can be improved, as a vast amount of time can be spent at one’s place of employment. Additionally, employee salaries and office real estate are the two largest expenditures in regard to a company’s expenses. “It is about understanding how space, the second most expensive resource an organization has (its people being the first), can be leveraged to help those people who work more effectively, and to attract and retain the right people in the first place” (Becker and Steele, 1995). It is advantageous to investigate the ways employees function within their office environment to ensure occupants are able to be productive and morale is high.

This thesis investigated the effects of interior architecture and open style cubicle configurations on employees in a corporate workplace environment. Specifically, the researcher analyzed an engineering department renovation from General Dynamics in Scottsdale, Arizona. General Dynamics is a defense contractor, creating products for aerospace, combat systems, marine systems and information systems and technology. The specific division of General Dynamics that underwent the studied renovation is known as General Dynamics Advanced Information Systems (AIS). This specific building is considered secure by the Department of Defense, which regulates employees to wear badges at all times, making the general public unable to enter the premises without an appointment. The researcher assessed the benefits and hindrances in changing the
workplace setting from a closed cubicle arrangement to an open style environment. Prior to the renovation, the General Dynamics AIS employees were located throughout the building, with no specific real estate allotted to that specific division. The goal of the renovation was to modernize the workplace, as well as centrally locate the AIS employees to be within the same location. Research focused on the comparison of the old workplace configuration to the new workplace renovation, and leveraging any distinct changes. A prototype for future company reconstruction was developed from the found data to coincide with the occupant’s data analysis. The goal of the prototype design is to elevate excess expenditures spent on planning and design development, as well as maintaining a standard method of construction.
Chapter Two: Literature Review

An examination of literature concerning the history of the office environment in the United States, as well as supporting cognitive research on the psychology of office employees, is necessary to understand the basis of the project. The office style workplace in the United States is a relatively young entity, which has undergone dramatic changes in the past century worth noting. Additionally, since American office employees can oftentimes spend more time at their workplace than at their home with their family, there is a great desire to understand the factors which hinder and compliment their work processes. The main points from the literature review will be reiterated at the end of the chapter.

History of the American Office

Office building floor plan configurations in the United States have undergone several major transformations throughout the past century. From 1900 to 1950, national economic growths lead to the introduction of reinforced concrete and the modular ceiling grid system, which provided greater amounts of leasable business space as well as the creation of several business opportunities (Henderson and Mays, 2003). People were able to meet in a central location which moved the emphasis on agriculture to business. This also allowed for cities to become more densely populated, in turn creating a need for downtown business facilities with ample transportation.

The time period from 1950 to 1970 promoted the expansion of corporate culture in which organizational space was allocated based upon an employee’s hierarchy. Job titles and ranking equated a standard amount of square footage per employee, which is displayed in Figure 1. Additionally within this time frame, office environments were designed on the concept of open planning which positioned the entry level employees together based upon their function and department classification. Employees who
possessed the ranking of a manager or supervisor were given the prime real estate of the office, which would reside around the building’s interior perimeter with window views. Employees believed in loyalty to one’s company during the time period, often believing that the longer one works for their employer, the more opportunities they are presented with. This hierarchy based floor plan also allowed management to observe their employees from their desk, as the open seating arrangement displayed no physical boundaries in eye’s way.

Figure 1: Employee Title Deciphering Work Station Square Footage (Rayfield, 1994)

Following thereafter, the years of 1970 to 1990 took advantage of information technology and the stress on electronic communications (Henderson and Mays, 2003). The defined location of an office changed from being one distinct building to having multiple identities which ranged from the home, car, airplane, and hotel. This shift in where the work related tasks took place resided on the dependence of technology,
placing a higher concern on independent efficiency. The furniture industry responded to this change in workplace with the creation of modular furniture systems which were flexible, easy to assemble, electrified and customizable.

From 1990 to present time, office environments are still stressing importance on catering to wireless technology, as well as new emphasis on adjustable settings to the user’s preference, environmental sustainability, and individual control over lighting and thermal comfort. Working hours have become integrated to accommodate any person anywhere on Earth, some businesses implementing 24/7 operations. Work related tasks are typically completed on desktops, laptops and tablets; throughout the past decades the speed and size of these electronics has immensely improved. Universal planning, telecommuting, hoteling, webinars, smart phones, remote workstations and downsizing are all buzzwords which became popular from the integration of technology into the workplace.

*Psychological Findings of Office Employees*

Psychologically, if office employees are content with their working relationships and feel safe within the workplace, their work will yield favorable outcomes. Staw, Sutton and Pelled propose that employees who feel and display positive emotions and actions are more likely to experience positive outcomes within their careers. They state that positive emotion has desirable effects on a person’s relationship with their coworkers who promote greater task activity, persistence within challenging situations as well as enhanced cognitive functioning. Additionally, office employees who often express pleasant attitudes are considered more likable and will be rated favorably as well as possessing the ability to cooperate well with others. The diagram presented as Figure 2 highlights the process in which employees achieve favorable outcomes within their workplace, which will directly affect their communicational ability with colleagues.
Sutton and Pelled, 1995). The arrangement of the office can affect an employee’s opportunity to build a solid rapport with their coworkers and management team, as well as thwarting it. Configuration of employees should be a well-executed process that is researched thoroughly. Positive communication and collaboration were monitored when analyzing the closed versus open office environments for the study of this thesis.

![Diagram](Figure 2: Link Between Employee Positive Emotion and Favorable Outcomes at the Workplace (Staw, Sutton and Pelled, 1995)](attachment)

Additionally, employees who feel safe within their workplace will be more productive than office workers who feel their life is at risk. The physicality of the workplace lends itself for employees to feel safe at their assigned workstation. Discrimination based on age, sex and race can all create employee stress which leads to emotional and behavioral side effects (Hinduja, 2006). If employees are situated in a configuration which does not discriminate upon these factors, the occupant will be more
apt to produce higher quality work. In an ideal office environment, managers and supervisors would be seated near their employees to observe any odd behavior which can negatively affect the morale of the team. Workplace violence is claimed to be the greatest threat to a company, followed by the theft of proprietary information (Carcione, 2000). Workplace violence needs to be taken into effect when renovating a space to ensure that all employees feel safe, regardless what time of day they are working.

Organizational Ecology of Office Environments

“Organizational Ecology” is a term coined by Workplace by Design authors, Becker and Steele, to reflect how organizations successfully operate in regard to space and time. This phrase describes the way in which employees are successful in their careers through the decisions of information technology, physical settings, furniture, work processes, human resource policies, and hierarchy of management (Becker and Steele, 1995). In today’s society the two most popular types of office workstation configurations which are based off of organizational ecology are known as open office environment and closed office environment. Both classifications have advantages and disadvantages, and truly depend upon the specific company and group of individuals who reside in the space to quantify which is more necessary.

Closed office environments are characteristic of embracing privacy in that office employees are situated in a cubicle with tall panels or an individualized office. The concept behind this atmosphere is to provide a place where employees are able to concentrate without being distracted. In closed office configurations, the priority is placed on the individual’s contribution to the company, rather than a group effort. The saying “out of sight, out of mind” applies to this setting, which hopes that employees will be on task if kept alone. Employees are separated into desk settings based upon their rank in a closed office configuration, which can be displayed horizontal through prime real
estate and vertically through different stories denoting status. Entry level employees are typically seated at a desk system which contains the bare essentials to complete their job tasks. The entry level employee will have the least amount of square footage; as well sharing restrooms, break rooms, parking space, and conference rooms with their colleagues. The superiors or management in a closed work atmosphere will possess the complete opposite of the entry level employees, in that they will have a desirable office location with window views, their own restroom, personal parking space, conference room and personal administrator. Those who possess higher elitist status within the company may even be located on the highest level of the building, with the entry level employees residing on the lowest floor. The workplace perceived as an organizational hierarchy which rewards leaders in personal space, location and furnishings creates a constraining relationship on internal communication of employees (Becker and Steele, 1995). Conference rooms are the preferred method of communication in closed offices, allowing for employees to budget their time around a scheduled meeting and allowing ample time for preparation. Closed office environments are not the preferred option in today’s industry as collaboration is not fostered amongst employees.

**Closed Office Environment Benefits**

- Ability to isolate oneself from visual distractions and audio interruptions
- Individual employee pulls their own weight within the company
- Privacy
- Ability to personalize space
- Easier to control thermal comfort and lighting through personal fans, heaters and lights
Closed Office Environment Hindrances

- Hierarchy through work station may hurt communication
- More difficult to see if employee is staying on task
- Collaboration is more formally presented
- Work related tasks may take longer to finish, as employees are separated based on rank rather than position
- Employee may feel isolated which can cause issues with security
- Higher cost to maintain and renovate

Open office plans are considered to have minimum interior walls, which allow for easy accessibility to modular furniture systems easing conversion of any organizational changes. There are two approaches to an open office environment which are a social relations approach and a sociotechnical approach (Oldham and Brass, 1979). Social relations approach argues that in the absence of walls and barriers, employees are able to build social relationships with one another which influence motivation and satisfaction. Employees are able to develop close friendships with one another, while also receiving clear information about work performance from management and peers. The sociotechnical approach states that in the absence of physical boundaries, the work place creates healthy challenges for employees which in a close office setting would be nonexistent. By not possessing a bounded work area, employees are unable to clarify the work process which forces employees to think differently than they previously did (Rice, 1958; Cummings, 1978).

In regard to an open office environment, entry level employees and managers sit in the same style work station, without any true sign of rank being visible to a visitor. The
The concept behind this work environment is for employees to be all viewed as equal, despite official titles. Mentoring can take place more efficiently in an open office environment since no walls are visible, and employees can aid their colleagues in judgment calls. Since employees are typically within earshot of one another, they may be more apt to collaborating with their colleagues, thus producing the best possible product for the company. The better the relationships the employee pursues with his or her coworkers, the more fulfilled the said employee will feel towards their management and workplace. The open system does not allow for much individual privacy, but also holds all employees accountable to be on task, since management and their colleagues are able to easily view them. Open offices cater towards employee collaboration, creating furniture groups specific for break out conversations. Open offices operate on a more organic philosophy of completing work tasks, allowing for informal conversations to occur. The following is a brief synopsis of the benefits and hindrances of an open office environment (Becker, 2004). These attributes are important to consider as the research will be analyzing the success in renovation to an open style office.

**Open Office Environment Benefits**

- Status amongst employees is not recognized
- Equal opportunity for communication between all employees
- Space is more accessible for expansions
- Ability to have more informal collaboration
- Less time spent traveling across the plant
- Less expensive to maintain than closed office environment
- Higher sense of safety
- Discourages inappropriate activities
Open Office Environment Hindrances

- Higher density of employees
- Some employees may have less square footage and storage than previous workplace
- Visual distractions
- Audio distractions
- Harder to add employee’s personality to their space
- Privacy

*Case Study: GlaxoSmithKline (GSK)*

GlaxoSmithKline, abbreviated as GSK, is a pharmaceutical manufacturer that specializes in manufacturing and marketing products in the areas of: anti-infectives, central nervous system, respiratory and gastro-intestinal. After the company merged in 2003, there were challenges on workplace strategies, which GSK studied on the operating techniques of their customers. Richard Evans, Director of Real Estate stated the following: “As we undertake any workplace change project, we look at how the department functions, primary modes of communication, needed adjacencies, and the cultural position of the organization. You need to get customers thinking in those terms because in the working environment, form follows function”. The following themes were considered the Space Program Guiding Principles:

1. Space use and allocation must be in line with the GSK Spirit
2. Space is a GSK business asset owned neither by individuals nor the local site
3. Capital requests must demonstrate how the totality of the business has been considered in conceiving the new space.

4. Capital will not be invested in space without reference to long-term utility and marketability.

From the principles, GSK decided to interview samples of their employees in order to understand their work patterns, which placed their results into a repository of five core work styles, which is denoted in Figure 3. These five work styles were labeled as: global senior manager (HR Vice President), project manager (Clinical Director), virtual (Clinical Research Manager, Sales), team resident (IT Development) and research resident (Statistician). Each one of these work styles have different responsibilities which range in confidentiality, mobility and coordination. Understanding the different position styles allows for facilities and real estate teams to coordinate a workplace design more successfully.

![Figure 3: Know Thy Customer (Real Estate Executive Board)](image)

Employees were also silently observed, understanding what proxemics distances are important to their daily business. It was found that their workspace was occupied on an
average of 41 percent of their work day, which came as a surprise to management. How this silent assessment was studied specifically is shown in Figure 4.

Understanding the ways in which employees utilize their day is important for comprehending the highly occupied spaces. Judging from this case study, workstations were not the most occupied space throughout the day, and could possibly be reconsidered spatially, to functionally tie with the hours equated with their use. Through studying the patterns of the employees, the company headquarters was renovated to better suit the needs, which is portrayed in Figure 5. The number of meeting rooms was increased to hold large groups, at least six conference rooms are able to fit 64 employees. The total seats within the space were increased by 35 percent, allowing for different areas for employees to accomplish their work tasks, no longer allocating individualized work stations to each employee. The space per person was reduced by 26 percent, as personal workstation was previously not being occupied for the totality of the work day (Real Estate Executive Board).
Case Study: Procter & Gamble

Procter & Gamble (P&G) is the most popular maker of products which are divided into three sectors: health and wellbeing, beauty, and household care. Similarly, to the previous case study, P&G were looking to renovate their workplace to benefit the employees and further productivity. Space was rebranded, to introduce the importance of the workplace to employees. Five themes which were the main focus of the renovated space included: space’s function, proper scope, timing for change, scheduling, and the bottom line. The values which P&G wanted to communicate to their customers and their employees is that the workspace drives competition as it aids employees to be more creative and efficient. Space, technology and culture are all key elements to the success of how staff interacts. Figure 6 displays the spectrum of workspace in which collaboration and teaming range. The renovation in which Procter & Gamble pursued ranges on the more collaborative side, with the prototypes of neighborhood.
Furthermore, P&G found it beneficial to survey different business units as the needs for each location differed. The Manila, Philippines location needed to accommodate growth, improve wellbeing while using high collaboration within teams. The Prague, Czech Republic office wanted to focus on accommodating growth, boosting work effectiveness and allowing for movement across team configurations. As both of these locations projected different values, the space needed to reflect these concerns with the arrangement of space. Surveys were then sent out to understand how the different types of employees cherished their workplace. An example of the survey appears in Figure 7. Through separating employees based on their location style, the importance of the workplace is able to be studied more in depth (Real Estate Executive Board).
Summary of the Literature

In summary, the exceptional points discussed in the literature review are as follows:

- Office plan configurations possess a vibrant history in the past century
- The time period of 1950 to 1970 promoted corporations, in which employees were organized based upon hierarchy within the company
- The time period of 1990 to present time places importance on technology and the ability to work remotely
- Closed office environments embrace privacy in that office employees are situated in a cubicle with tall panels or an individualized office.
- Open office plans are considered to have minimum interior walls, allowing for accessibility to modular furniture systems, easing conversion of any organizational changes.
Chapter Three: Analysis of Building Components

As one can note from the previously presented information, office design has been evolving rapidly for the past century to adhere to productivity, efficiency and communication. Closed office environments communicate company values of hierarchy, order and formality. Open office environments compare adversely to closed style standards, instead projecting characteristics of openness, equality and informality. The values and motives in which a company operates are portrayed with the interiors of the building. It is essential for companies to analyze the messages suggested by the built environment, to ensure that these values are communicated properly to their employees and customers.

Employee morale is essential in regard to the productivity and success of a company and can be altered through the built environment in which the employee resides. Office workers can leverage their happiness within their organization based upon the following building and design components: assigned workstation and other associated office furniture; access to the outdoors; workplace amenities; organizational hierarchy of rank; ambient temperature and lighting control; privacy; personalization; communication and collaboration spaces; and technology. Figure 8 depicts these attributes as each individually equal to one another; all entities being utmost important to the success in the relationship between the built environment and the occupant. The following elements will be critically discussed and analyzed in this research to understand what is considered paramount in a workplace renovation, specifically at the corporate level.
Figure 8: Building Components Which Affect Employees Directly

**Assigned Workstations and Furniture:** Employees should be assigned a workstation which is relative to their position or department, allowing for proper collaboration and mentorship amongst colleagues. Those who fall within the architectural or engineering industry may need extra surface space to view construction drawing sets. Administrators may need more filing space to store employee and vendor files. Specific components which contribute to the work desk system should be highly investigated, to ensure that employees are using their space adequately. Furniture systems should not be used to express status within the organization, but should instead be viewed as a tool to aid employees in their productivity. Customization in workstation components will allow for a more unique desk system, as each employee is not the same. Desk heights, monitor heights, chair heights, keyboard placement and other entities should be flexible to allow for the employee to make adjustments as need be. Furthermore, it is imperative that employees are cognizant of ergonomics while spending time at their desk. The United States’ Occupational Safety & Health Administration (OSHA) has specific
guidelines on ergonomics which will affect the safety of employees while at their workstation. According to OSHA, ideal working position consists of the following:

- Hands, wrists and forearms are parallel to the floor
- Head is in line with the torso
- Shoulders and relaxed and upper arms hang normally at the sides
- Elbows are close to the body and are bent between 90 and 120 degrees
- Feet are supported on the floor or by a foot rest
- Back is fully supported with appropriate lumbar support
- Knees are the same height as the hips, while seated

The following figure should be noted when analyzing an office environment concerning the ergonomic safety of the employees (Besser).

Figure 9: OSHA’s definition for Correct Upright and Standing Posture
Access to the Outdoors: Window views allow office employees who spend long hours at their workplace to understand the weather conditions outside. Accessibility to outdoor seating areas and patios should also be painless for every employee to access, for those who wish to eat lunch outdoors or to take a brief break. A survey conducted in the Mediterranean, sampled 100 white and blue collared workers concerning the direct and indirect effects of windows in the workplace. The results showed direct significance between job satisfaction and sun lighting penetration, as well as a view of natural outdoor elements was found to buffer the negative impact of job stress (Leather, Pyrgas, Beale and Laqurence, 1998). Accessibility to the natural environment additionally allows for employees to intake fresh air, as well as control the ambient temperature inside of their office space. Views and access to the outdoors should be granted to every employee to enjoy, strategically placing break rooms and collaborative areas next to windows and clerestories. Window views should not be used as a reward given to an established employee based on rank, as employee well being is paramount from all levels in the chain of command. Furthermore, it is paramount that screens or shading systems are available for employees, if the sun glare on the computers becomes too unbearable. Adjustments should be made easily for employees (Chiras, 2011).

Workplace Amenities: The office break room should be a place for employees to rejuvenate for a short period of time and to not think about work (Binggeli, 2010). Different amenities can be made available to employees to make them more appreciative of their environment, such as espresso machines, smoothie blenders, catered breakfast and lunch, flat panel televisions, comfortable dining seating, game tables, and video game consoles. It is important that this space is located away from employee workstations as the noises and smells may annoy others who are trying to concentrate. Different company headquarters which are located in San Francisco and Silicon Valley have continued to be some of the most riveting workplaces in the nation;
creatively blending work and play under the same roof. As there is a mass amount of corporations in that real estate area, competition is high and companies have implemented some radical concepts. For instance Google’s headquarters has implemented a slide for employees to optionally slide down instead of taking the stairs. If employees do not want to walk around the campus, they are able to zip by on Razor scooters. Examples such as this allow for employees to enjoy their time spent at work through a nontraditional experience. Also, corporate employers are considering outlandish environments for employees to work in, allowing for employees to reside in a “one stop shop” where mundane errands can be taken care of right at the workplace: dry cleaning, child care, haircuts, nail services, athletic gym, car wash and detailing, as well as banking services (Zeithaml and Gremler, 2008).

**Technology:** As technology has vastly improved over the past centuries, it is essential employees are able to access the proper tools and equipment which will improve their productivity. Sometimes it may be more beneficial for employees to have two monitors instead of one, or to have a laptop instead of a desktop as they travel frequently. Smart phones should be given to employees who work irregular hours in different locations and need to be reached repeatedly. To promote virtual or remote offices, companies are starting to offer laptops, tablets and smart phones as part of their employment package, thinking it is needed to increase productivity (Weckesser, 2011). Management should understand the benefits of new technology to help the office employees as a group, rather than looked upon on as given on individual basis as a social symbol. Additionally, it should be taken into consideration bandwidth on wireless devices continues to increase which allows employees to have access to all information instantaneously, regardless of whether than phone belongs to work or is personal (Nickson and Siddons, 2004).
**Organizational Hierarchy:** Office environments should be designed for cohesive collaboration among all employees, seating managers near their direct employees, if possible to allow for continuous mentorship. Organizational hierarchy in formal organizations can reflect themes of power and status, it is significant that the company is cognizant of the values it displays within its workplace. The business environment is filled with a unique mix of individuals who vary in age, gender, sexuality and race; which means that equal opportunity must be pertinent in the hierarchy of the workplace floor plan. Over the past thirty years, more women have entered the workplace, offsetting male dominated corporations. “This social revolution has given rise to a feminist critique of existing workplace structures geared to an “ideal worker” who is able and willing to devote himself single mindedly to paid employment” (Wax, 2004). With women entering the business world more rapidly than seen previously, many are obtaining positions of responsibility. Restroom should be properly renovated to allow for both genders to utilize them, adhering to the city codes. Also, in today’s business world there is a unique blend of employees which presents itself as four different generations sharing the same payroll: Traditionalists (born before 1945), Baby Boomers (born 1946-1964), Generation X (born 1965-1977) and Millennials (born 1978-1999) (Weckesser, 2011). Differing generations within the same company, render multiple challenges as each generation has a diverse perspective on technology, privacy, communication, and appropriate work etiquette (Sujanksy and Ferri-Reed, 2009).

**Temperature and Lighting Control:** Office occupants will have their own druthers on what temperature and lighting is preferable to their tastes. In this circumstance, it may be near impossible to make every office employee satisfied, unless they were all to obtain individual hard wall offices with their own controls. A Canadian experiment was conducted to test the notion that providing choices to employees in the physical environment improved mood and performance. One hundred ninety-two subjects were
used as a sample and examined upon their experience with three different types of lighting in an office setting. One workstation was lit with ambient lighting, another was lit with fluorescent luminaries and the third was lit with ambient lighting as well as incandescent task lighting. Brain teaser puzzles were given to the subjects to test their productivity within the different work stations. Subjects in the choice and preferred conditions perceived more control than those who were unable to choose their conditions (Veitch and Gifford, 1996). Even if there are a very limited amount of options to provide employees within their environment, they will be appreciative of a few choices.

Temperature can be controlled through personal fans, space heaters and window accessibility. Building occupants can control lighting through personal task lighting, pendent lighting on dimmers, and shading treatments to windows. Providing small noninvasive ways for the employee to control their environment will allow for the user to feel more attached to their work setting, and comfortable in regards to temperature and lighting sources.

**Privacy:** Office employees in both open and closed environments will still need a place for solitude. This can be accomplished through phone rooms which enable the occupant to make personal calls which he or she does not want others to hear, while also not disrupting employees at their desk. Phone rooms should be well insulated to acoustically absorb someone speaking within the space, allowing the employee to ensure that their conversation is confidential. Conference rooms should be made available for employees to use when they need a large area to accomplish a project without the interjection of their peers. Privacy at cubicles can be accomplished through screens, rolling panels and headphones. A case study conducted at a large corporation analyzed a 70 employee office renovation, from a closed office plan to an open plan style. Employees who originally had a door in their previous workstation were moved into a door less enclosure, which was constructed through modular workstation systems. It
was found that satisfaction with privacy immensely declined with those who previously occupied a walled office, which reflected a decrease in confidentiality of conversation and dissatisfaction with acoustics (Sundstrom, Herbert and Brown, 1982). Flooring surface in an open style office configuration should be high acoustic grade carpet, which will eliminate noises from employees traveling around the space, as well as their dialogues. It may be difficult to completely eliminate all hard walled offices, as managers will need to speak confidentiality to their employees, but it is imperative employees feel comfortable carrying out private matters from time to time (Chevalier, 2007).

**Ability for Personalization:** Employees yearn for workstations in which they can personalize, to their own preferences. As office workers can often spend more time at their workplace, than with their family, it is imperative to provide a space for employees to call their own. A California survey of 338 office workers at 20 different companies revealed that there is an indirect relationship between personalization and employee satisfaction with their physical work environment. Furthermore, it was also found gender differences existed between personalization preferences, in that women favored to personalize their work stations more than men did. Men and women also differed by using different items to personalize their workstation with. It was suggested personalization may be more integral to the well being of women in the workplace as opposed to the men (Wells, 2000). Personalization can be accomplished through tack boards for employees to post up pictures; digital picture frames with flash drive accessibility; white boards for personal note taking; surface area for plants and picture frames; and ability to change paint colors or cubicle panels to their preferred choice. Since employees have little control on the design of the rest of the building, providing a small space in which they can call their own will promote happiness (Bechtel and Ts'erts'man, 2002).
Communication & Collaboration Spaces: Collaboration is a key element which enables employees to be challenged and learn from one another. Ample space should be provided in an office for collaboration to occur on the informal (break out seating areas, lounges, restroom, or break room) and formal levels (meeting or conference rooms). Personal employee workstations are shrinking in size, moving from the traditional 8’ x 8’ configuration to a 6’ x 8’ style as it has been found that employees do not spend a majority of their day at their workstation. Although they are smaller, companies are leveraging the decrease in size to aid collaboration and communication in the appropriate assigned spaces. Organizations put faith in collaboration as they hope their employees will leverage the differences amongst themselves in specific terms of knowledge, skills and resources to develop innovative solutions that individually they would be unable to solve (Hardy, Lawrence and Grant, 2005). If employees have meaningful relationships with those they work with, they will feel more attached to their work environment, preferring to come to the office rather than working remotely. “Workplace friendship is said to reduce workplace stress, increase communication, help employees and managers accomplish their tasks, and assist in the process of accepting organizational change” (Berman, West, and Richter, 2002). Friendships can be built through collaboration within the informal discussion spaces, as employees are able to meet peers whom they would not have previously. “Free-standing furniture that can be easily reconfigured by those using it is, from this perspective, a loose-fit approach, and it is likely to better accommodate unpredictable change- like that which occurs in a team-oriented environment- than furniture that is part of a fixed interlocking system” (Becker and Steele, 1995). Furniture on casters allows for employees to retract and connect pieces to identify to their collaborative needs.
Chapter Four: Analysis of Old Closed Office Environment

This study was conducted at General Dynamics Corporation, in Scottsdale, AZ. This particular campus of General Dynamics encompassed over one million square feet of building space, with two central buildings: Hayden and Roosevelt. The research studied the effect of employee morale and productivity in an open office style workplace versus a closed style environment. The previous work environment style was characteristic to a closed style, possessing workstations based upon hierarchy and position rank. The group surveyed was the employees of the General Dynamics AIS (Advanced Information Systems) division, consisting of 36 full time employees. Of the sample studied, the employees’ job descriptions relate to the engineering industry, creating different projects through computer software. The intention of this project was to move AIS employees which are scattered throughout the General Dynamics property, to one distinct area in which more efficient collaboration and communication can occur. The AIS division was interested in pursuing a new collaborative floor plan based on the success they had at their Pittsfield and Bloomington offices.

As the closed workplace variation provides more privacy to employees, a major concern of the employees was the distractions which can occur in an open style office. The closed style environment had been in place since the conception of the building in the 1950’s, and therefore this shift in workplace orientation was viewed as a radical notion. Understanding the history in which the American workplace has undergone in the past century is influential to researchers, as the concept of working will continue to change. Modular cubicle furniture dating back to the early 1980’s filled the closed style workplace. This furniture style stopped being produced several years ago, forcing management to purchase a mass amount for their warehouse, in case of a future expansion. As large corporations like Google and Yahoo are viewed as modern workplaces with ideals which are more conducive to employees, management at
General Dynamics AIS considered a complete office overhaul. In order to understand if the new renovation was perceived as successful, investigation of the past working conditions was underwent.

The old floor plan of the AIS division encompassed several different areas, exuding the definition for what is known as a closed office environment. As the AIS division rented space from General Dynamics C4S division, the AIS group was clustered throughout the facilities, without a particular reason other than availability. Hierarchy was prevalent in the old floor plan, as space was considered an entitlement to an employee. There were various types of desk configurations to display rank ranging in size dependent upon the employees’ job classification. Entry level employees sat at a cubicle desk station comprised of modular Haworth panels and surfaces, occupying 64 square feet per employee with 8’x8’ footprint and 66” panels. Employees were unable to control the ambient temperature other than possession of a small fan within their cubicle. Ceiling grid lighting was also unable to be controlled by the employee, although employees had task lighting in their cubicle that they were able to control for extra lighting on their work surfaces. Very few employees were seated near windows, although much of the sunlight was blocked from the 66” panels, making it difficult to bring light evenly throughout any of the office areas. The ceiling height varied throughout the two buildings, but consisted anywhere from eight feet high to fifteen feet high.

Administrator positions and supervisors occupied modular desk configurations made with Haworth panels and surfaces, occupied 96 square feet per employee. These work stations were 8’x12’ in area, with supervisor cubicles being assembled with 80” panels to provide a higher sense of privacy. Dependent upon the supervisor’s position, doors may also be part of the cubicle system, allowing for complete isolation from the rest of the department. The 80” panels were not ideal for an open space as they stood obviously higher than the 66” panels, creating an eye sore in the room. The 80” panels
symbolized a higher advancement in the company hierarchy; people who occupied that space were entitled to more privacy with this type of setting. Administrator cubicles had a walk up counter area in which the panels were situated at 40” to support employees. Administrators and supervisors were also unable to control the lighting and ambient temperature, with the exception of personal task lighting or fans.

Managers possessed hard wall offices which ranged in size, but were typically found to be 10’x12’, constituting 120 square feet of space devoted for one employee. These offices had their own thermostat, door, and lighting system to appease the occupant of the space. Managers with hard wall offices were allowed to paint the interior walls of their office from any of the Facilities approved paint standard colors. Choosing the color of the walls was also seen as an entitlement, because employees who resided in the cubicle systems had no choice on the surrounding wall paint. The hard wall personal office is the most customizable for the employee, unlike the cubicle environments which cannot be altered to adjust to one’s personality preferences. Some of the managerial offices were situated against glazing, allowing for managers to have views to the outdoors, which was also seen as an entitlement. These windows were inoperable, and could not functionally open but boasted beautiful views of the surrounding desert landscape. The different type of cubicles which were previously discussed is displayed in Figure 10, comparing the size differentiations next to one another.
A majority of the hard wall personal offices and conference rooms were located along the prime real estate which possessed windows and external views. Daylighting, which can directly affect the building occupant’s well being, was only available to those who were lucky enough to be positioned in an office lining the building’s glazing. This old layout was extremely linear and stagnant, prioritizing the need for expansion of employees more so than the aesthetics of the space. This traditional hierarchy layout is presented in Figure 11, displaying conference rooms and managerial offices along the ribbon of exterior windows. The layout signified corporate indicators of strict regimen. The perimeter lined offices and conference rooms did not break up the monotony of cubicles, but only further added to the solemn appearance. The 80” panels blocked a great deal of natural sunlight penetration as well, making the employees situated in the back of the room unable to enjoy the natural lighting.
Assigned Workstations and Furniture: Employees were assigned to one of the following types of workstations: 8’x8’x66” cubicle, 8’x12’x66” administrator cubicle, 8’x12’x80” cubicle with door or 10’x12’ hard wall office. The cubicles were constructed with Haworth panels and surfaces, which were very unfashionable and dated back to the 1980’s. As previously stated, that specific modular type was discontinued years ago. The standard furnishings which came in the cubicle configuration included: panel marker board, panel tack board, pedestal file, lateral file, pencil tray, keyboard attachment option, box file, personal shelf with bracket, phone shelf with bracket, visitor task chair, employee ergonomic desk chair, and two flipper doors. The writing surface was mounted anywhere from 28” to 32” inches dependent upon the employees height, and ergonomic comfort. The ergonomic comfort was accessed by the safety team, which resided as a department on the General Dynamics campus.

Access to the Outdoors: Windows were not available to all employees, as most windows were situated in manager’s offices or conference rooms. No employee had control over operability of windows, although shading treatments were provided. Patios were available for employees to utilize, but located near the cafeteria and dining room.
Natural light was not a normal commodity in the old configuration. As the building was built in the 1950’s, daylighting was not a priority for the workspace design.

**Workplace Amenities:** There were no true amenities in the old workplace, other than different areas available for employees other than break rooms, patios and restrooms. Break rooms were fairly dull in that they had a few table and chair sets, microwave, refrigerator, vending machines, trash receptacles and water dispensers. Most of the furniture within the break room belonged to a conference room at one point, and may have been donated as a cost savings. Employees were able to go to seating areas available near the cafeteria, which featured outdoor dining sets on the patio.

**Technology:** Technology was not a large priority in the old floor plan, as it was stressed that employees would work regular office hours, 7:30am to 4:00pm Monday through Friday. Dependent upon the amount of traveling an employee did between General Dynamics sites, he or she possibly possessed a laptop versus a desktop. Desktops computers were contracted through Dell, and were rebuilt every two years to ensure they were running with the most up to date technology. Blackberry phones were issued to managers and supervisors who met the criteria for position rank.

**Organizational Hierarchy:** Rank was a nonverbal communicator which existed in the old office floor plan, as the higher positioned employees were situated with a larger square foot office. Additionally, the higher on the chain of command the employee, the more control they had upon their assigned work station. The most prestigious positions in the company were situated on the third floor, which also boasted the best views of the surrounding areas. Some of said offices possessed their own personal restroom.

**Temperature and Lighting Control:** Employees had little control over the temperature and lighting of the office in the old floor plan. Temperature could only be controlled by those who had a hard wall office, or resided in a space alone. Employees
in cubicles were unable to adjust the room settings, but were able to plug in personal fans or heaters to make them more comfortable, although more electricity was used.

**Privacy:** Employees had a great amount of privacy, as no employee shared a cubicle with another colleague, and each cubicle had very tall panels. Engineers typically had more introverted personalities compared to other departments within the corporation, so privacy was the largest priority to their workplace necessities. Employees felt more comfortable in their assigned work station than any other location in the building, and would rarely allocate time to work on a project in a conference room or break area.

**Ability for Personalization:** Employees did not have many opportunities for personalization, other than within their cubicle. Conference and break rooms were considered neutral territories in which all employees must share with their peers. Essentially, the more square footage an employee had for an office, the larger the space that employee had for personalization. Many employees would hang up artwork and photography in their personal offices, which reflected their personality.

**Communication & Collaboration Spaces:** Collaboration was widely condoned in the old office layout, as traditional styling of business was preferred in which formal meetings were held. Communication was heavily stressed through email, documenting conversations for legal reasons, was the most preferred method, rather than in person physical conversations. Conversations which occurred in person were often followed up through an email afterwards, to ensure that the message was portrayed accurately.
Chapter Five: Analysis of New Open Office Environment

The analysis of the new open office environment was based upon the comparison to the older closed office environment, which displayed characteristics of a closed style office. The main research goal was to understand which workplace style was the most preferred by corporate employees, in order to create a prototype for future company renovation and expansion. As the industry standard of corporate interiors has transcended more towards a liberal style with characteristics of teleconferencing, flexible working hours and new technology, General Dynamics AIS management became concerned about staying competitive to other major corporations. As this was a major adjustment for employees, the true results in what attribute deemed itself as more beneficial for the company, may take many years to completely understand. The open style office design had not been implemented in General Dynamics. However, in order to understand future renovations and what environment type was more beneficial for specific departments, analysis of the open environment versus the closed environment occurred.

The concept of updating the AIS group in Scottsdale, Arizona came from the success of renovation of AIS offices out of Bloomington, Minnesota and Pittsfield, Massachusetts. These floor plans were designed by Project Architect, Beatrice Landon from BHDP Architecture, an architectural firm located in Cincinnati, Ohio. The Bloomington and Pittsfield sites were also previously fell under the description of closed office layouts, and had been radically changed into open office layouts. The renovation of the two sites was very beneficial in that the employees overall much appreciated the open style office to work in. Therefore, Scottsdale, Arizona was chosen as the next location for change. Landon, also created the conceptual ideas for the Scottsdale floor plan, aligned with the core elements of communication and collaboration. Through using
the same architect for renovations, the sites were able to also be compared and assessed on functionality as they had similar themes.

The new floor plan of the AIS renovation was laid out in an open office style plan, consisting of honeycomb shaped Herman Miller workstation systems with 46” panels. There was no visible division of rank in the new floor plan; managers are seated at cubicles instead of having their own individualized hard wall office. This concept behind diminishing the visible hierarchy was to encourage that all employees are viewed and treated equally, all voices should be heard. Conference rooms and break out areas were designed to be located farthest away from the windows, allowing for employees to enjoy the beautiful mountain views Arizona has to offer. Phone rooms, conference rooms and huddle rooms were provided in the center of the floor plan, to allow for uncomplicated accessibility of the employees for their private business needs. Phone rooms allowed for employees to make confidential calls, respecting their privacy. Huddle rooms resemble small conference spaces, which allowed for employees to break out into informal groups to discuss their projects, without disturbing their workstation neighbors. Conference rooms were still influential in the success of the AIS organization, as formal business meetings was carried out with visitors and customers regularly.

The project architect, Beatrice Landon from BDHP Architecture in Cincinnati, Ohio designed the preliminary floor plan of the AIS renovation. After expansion of other surrounding office space, the final floor plan is depicted below, which seats roughly 150 employees. Landon also facilitated in furniture selection, paint specifications, space planning and construction materiality. Additionally, she created a handbook for employees to read on the background concepts behind the new layout, images from her handbook are presented in this chapter. Landon entitled this document as the “User’s Manual Design Guidebook”.
Additionally, sustainability is an important value to General Dynamics AIS division, and it was a key determinant in furniture and furnishing selections in the renovation of the interior environment. The values in which AIS holds as important is displayed in Appendix E, which fall under the realms of construction practices, demolition waste, lighting, HVAC, material selection, procurement, energy conservation and post construction commissioning. As the building in which the AIS department resides is LEED certified Operations and Maintenance, it is advantageous that the department renovations which take place reflect the same guidelines and continue the value of green building maintenance practices.

The nine building components which directly affect an employee’s well being and productivity are analyzed in more detail, with reference to Landon’s creation. Figure 6 displays the four main components which contribute to the new floor plan: employee workstations; open collaborative areas; a multipurpose break room and private conferencing, huddle and phone rooms. The floor plan featured in Figure 12 displays the office renovation as it correctly appears with north facing upward.

![Figure 12: New General Dynamics AIS Floor Plan- Open Office Style](image)

A mock up of the cubicle workstations was set up mid July 2011 for AIS employees to come visualize what their new space may appear like. This is presented in Figure 13. Two different color paneled options were presented, one with warmer neutral
tones and the other with a blue accenting color. Employees were able to sit in the mock up, visualizing how their daily tasks would be carried out in the workstation. The concept behind the mock up was to smooth over any questions the employees may have had about the space, allowing for interaction prior to renovation. Monitor docking stations connected to the system furniture allow for uncomplicated mobility, correcting the height to the user’s ergonomic preferences. Flexible task lighting allowed for AIS employees to visualize the fixture’s operability, through the action of shining light on whatever they needed to be illuminated. Six different task lighting fixtures were presented at the mock up, which allowed for employees to make their own choices about their workstation. This configuration was completely different than the past cubicle configuration in which the lighting was integrated below the flipper doors and was not able to be moved. Below writing surface storage files allowed for employees to safely lock up personal items, as well as store confidential files.

Figure 13: Mock Up Herman Miller Cubicle Workstations for Open Office Style

Assigned Workstations and Furniture: Employees were seated in the new hexagonal workstations, which were a product manufactured by Herman Miller. The chosen seating for the workstations was the highly regarded Aeron chairs, which are also manufactured by Herman Miller. Break out spaces were highly stressed in the
renovation, as casual collaborations and conversations were considered a priority from a management perspective. These furniture pieces were in the form of plush club chairs on casters with removable writing surface, which allowed for the user to move the chair quickly. Furniture which was flexible and light to move was applied throughout the new department layout. Furniture systems were constructed on an angle, to break up the monotony of the old floor plan, adding in a bit of character to the interior.

As depicted in Figure 14, workstations were the same size and arranged in different patterns, with no more than eight cubicles grouped together in a line. Employees were consulted on their opinions about who they would like to sit by, prior to move in of the new office. The final floor plan was developed based upon project and department, placing employees who had similar projects or clients, next to one another. The workstations were organized in short lines which enables easy accessibility from multiple pathways. Each grouping of workstations was intimately situated nearest conferencing spaces and informal break out areas.

![Figure 14: Location of Herman Miller Workstations](image)

Landon described the decision in Figure 15, describing why cubicle furniture was chosen to be placed on an angle as opposed to the prior linear configuration, which corresponds to the cockpit design of airplanes. The concept behind this idea that, less stress is associated with employees whom are oriented in a way in which everything was
housed easily within their cubicle. The 120 degree angles of the work station allowed for
the employee to swivel around in their chair, enabling items to be within their reach as
well as embracing ergonomic guidelines. Smaller cubicle square footage was used in the
new workstation than the previous 8’x8’ standard, as management wished employees to
spend time at their cubicles when they needed to have complete concentration. It was a
priority for employees to be encouraged to occupy the collaborative zones, as working in
groups was a department priority.

Figure 15: Personal Space: Workstation Explanation from the User’s Manual Design

Handbook by Beatrice Landon

Access to the Outdoors: Windows in the newly configured space were opened
up, to showcase as much daylighting as possible. This helped eliminate electrical costs
in this area of the building, as employees were be able to work with natural sunlight, as
opposed to artificial light. The north wall which is depicted by the neon green block in
Figure 16, displays where the current glazing exists in the space. The other half of the
department unfortunately did not have the installation of windows, but sunlight was quite
noticeable regardless, as it penetrated throughout the space. The north wall was
additionally painted white, which reflected light throughout the office, more so than a dark color would. Cubicles had low height partitions and panels, enabling sunlight to infiltrate the entire space. Conference rooms and offices were placed in areas in which windows do not exist, to not occupy prime real estate.

Figure 16: Location of Windows in the Floor Plan

Figure 17: Window View outside to Natural Landscaping
**Workplace Amenities:** Amenities were well sought out in the office renovation, as employees were able to spend their time amongst several different spaces. The break room was designed to be more representative of a café, rather than a sterile room with equipment and outdated furniture. Starbucks espresso and coffee machines were strategically made available for all employees to utilize in the break room, which provided a nice sanity break for employees to get their caffeine fix. As there were not a lot of off campus lunch options within the vicinity of the corporation, AIS management has implemented the idea of catering lunch three times a week to improve employee happiness. Another benefit of catered lunches was that it brought every employee within the departments together for a meal, which created a casual environment which enabled people to really get to understand one another without feelings of obligation, feeling enabled to discuss business matters. Through providing a Wii gaming system in the break room, employees were able to find a successful outlet for relaxation and a break from work.

The break room was designed to be centrally located in the office renovation, as depicted with Figure 19. A central location was convenient for employees who were
thirsty and refill their water bottles regularly throughout the work day. It was created large enough to hold a large amount of employees, for birthday celebrations and impromptu meetings. The curvilinear shape of the break room was chosen, as it appears to be more pleasing on the eye than a straight wall, and broke up the monotony of the previous work environment. The break room was considered a multifunctional space, encouraging as employees to spend time collaborating with their colleagues within its bounds.

Beatrice Landon described the concept behind the curvilinear break room as a fun area to facilitate work and social activities, creating a multipurpose space that can be used throughout the day. Diverse seating options were created for the employees to choose which they prefer: high counter seating, soft club chair seating, and traditional height dining table seating. These different types of seating arrangements allowed for a variety of actions to take place which included: eating lunch or breakfast, casual meetings, playing on the Wii, and personal business affairs. Employees felt more at ease in this space, as the walls serve as a barrier from the workstations.
Technology: All employees received laptops upon move in to the new office space, which was a departure from the previous desktop computers, which dictated where an employee must take care of their business matters. AIS management’s goal behind this was to allow for employees to work wherever they prefer within the office, without the limitations that desktop computers hinders. Additionally, surface tables were purchased to run PowerPoint presentations, image slideshows, videos as well as internet capability. These surface tables were useful for conducting informal business meetings as it possesses a larger display surface than laptop computers, and it allowed people to easily view the information from multiple angles. These surface tables did not exist anywhere else within the Scottsdale General Dynamics site, until the renovation. Flat panel televisions which connected to computers were placed in each huddle and conference room, allowing for employees to brainstorm through creation of presentations, research and brainstorming. Their previous conference rooms did not have flat panel televisions, and were considered a major improvement. An upgrade in
technology throughout the renovated space silently spoke to employees that modernization was an important company goal.

**Organizational Hierarchy:** Office hierarchy was chosen to be communicated as nonexistent in the new floor plan, as managers and supervisors were seated in the same hexagonal cubicles as their direct employees. All employees shared the same amount of square footage in the work station, as well as sharing the same accessibility to other spaces within the office. There were no private spaces which employees were unable to enter, every space was considered shared. Conceptually, every employee possessed the same workstation square footage, which led to a feeling of equality, possibly improving the communication amongst coworkers. This was a huge disintegration from the past floor plan, as ranking was omnipresent throughout the interior. This attribute may take the longest amount of time adjusting to the new configuration, as hierarchy can oftentimes be a silent indicator.

**Temperature and Lighting Control:** Employees moved from an individualized office are no longer able to control the temperature of the space, as they were integrated into the open floor plan. The thermostat for the entire space is controlled by a BCAST system, allowing only mechanical technicians to change the temperature, not allowing anyone within the space to do so. Personal heaters were not allowed within the new space, which formed challenges for employees who were more sensitive to the temperature. Personal fans were allowed into the space as they did not require a higher electrical load, or possess the opportunity to ignite surrounding objects. Lighting controls were improved immensely in the renovation, as the entire space will be placed on motion sensors, which conserved energy. The ceiling grid lighting near the windows was also on sensors which coincided with the lighting source from the outdoors. Employees were able to control the visibility outside with the use of shading devices. On a personal level,
employees were also able to control the lighting within their cubicle with task lighting, which was more flexible than the previous office environment's lighting fixtures.

**Privacy:** As the renovation was converted to an open style design, privacy was an extreme concern to employees. Different spaces were created to allow employees environments for which private issues, group sessions and office meetings can take place. The following spaces were designed to enable a more discrete and quiet atmosphere include. Displayed in Figure 21, these spaces were formally known coined as the following: phone rooms, huddle rooms, and conference rooms.

![Figure 21: Location of the Phone Rooms, Huddle Rooms and Conference Rooms](image)

Six phone rooms exist in the new configuration, which function individually by employees and not in groups. Phone rooms were designed for employees who need to discuss private matters regarding their personal life on their cell phones. To not disturb other employees who are diligently working at their desks, phone rooms were placed respectfully near the workstations. There was a large amount of phone rooms designated to the floor plan, as it was perceived that employees would be usually them excessively. There exist six rooms shared amongst over 175 people. Employees were instructed to be cognizant of the time spent the phone rooms and huddle rooms, as their colleagues may want to use them. Rules and limitations will need to be enforced by management to ensure that employees are not abusing their time. Additionally, phone
rooms were implemented to function as a private space for employees to view personal information on their laptops, which they did not wish their peers to observe.

Eight huddle rooms were placed into the floor plan, enabling groups of employees to communicate their ideas within a private setting. The huddle rooms were designed for informal use by employees whose work chats turned into extensive conversations which needed a space entity to not disturb others. The ideal number of people within a huddle room was described as four to six employees. The rooms were also described to employees prior to move in, to not be scheduled out in advance. The instilled philosophy of this space was: “first come, first served”. If employees needed a space to brainstorm in a team and spread out their possessions across the table, this space was designed for that exact action. Landon described the behaviors which exist within the huddle rooms in Figure 22. Another action which the huddle rooms were designed for, was conference calls, as employees were advised to not use the speaker function on their cubicle phones while at their desk.

Figure 22: Huddle Rooms from User's Manual Design Handbook by Beatrice Landon
Eight conference rooms which vary in size were also designed in the space. The conference rooms were depicted as a more formal space, in which traditional business takes place. These rooms were communicated to be reserved in advance, and should not be used as break out space. Client meetings, project presentations, benchmarking conference calls and monthly reviews are all actions which participate in this area. A very large conference room was placed in the central vicinity of the department, across from the break area for equal walking distance amongst employees. This conference room was designed to accommodate up to 25 people, providing a space for many employees to be gathered at once. Additionally, seven smaller sized conference rooms which house u to 12 employees each possess more square footage than the huddle rooms. The design concepts and behaviors are described in depth by Landon on Figures 23 and 24, below.

Figure 23: Large Conference Room Definition from User’s Manual Design

Handbook by Beatrice Landon
Ability for Personalization: Employees were told by management that they were able to personalize their cubicles in the same ways as their previous workplace environment. During the mock up of the workstations, employees were able to choose what task lighting they preferred, out of a selection of six different lights. Employees were able to additionally choose what side of the desk they wanted their storage compartments to go, and how they should be arranged. Giving employees choices about their workstation made them feel included in the design process, which overtime created a heightened sense of loyalty to one’s workplace. Moreover, employees were able to choose where they preferred to be seated in the space, which was taken into consideration by upper management. Meetings prior to move in were held to inform employees of the different types of choices available, which in turn made the employee, feel their decision was considered prior to the new construction of the department. Personalization of the cubicle was a decision left up to the employee, as some prefer to
display pictures of their family, while others liked it clean and bare. Shelving components within the workstation allowed for ample space for employees to exhibit personal items, plants and awards. One of the storage units was formatted like a closet, which allowed for a coat to be hung up when the weather outside was unbearable.

**Communication & Collaboration Spaces:** Collaboration was the largest priority in this renovation, as the entire space was redesigned and retro commissioned around this sole concept. Collaboration was meant to be fostered with the layout, allowing employees ample opportunities to work together and be productive in their job tasks. Figure 25 demonstrates areas in which employees were able to collaborate which are not specific to other actions; such as the break room, huddle room or phone room. Offering a multitude of versatile spaces allowed for employees to have options on where is the most beneficial for their work to be conducted.

![Figure 25: Location of Collaborative Areas](image)

A library was featured nearest the western wall, which was constructed of counter height work tables and storage systems. The concept behind this area was to permit employees a zone in which discussion of engineered drawing sets could take place. It was meant to be treated as a library zone, allowing for other casual business conversation. Stools were provided for occupants to perch at, enforcing the concept of a temporary discussion zone. Work tables were displayed in other areas of the floor plan,
which broke up the monotony of same height furniture. Landon described this theme in Figure 26, as the work tables were presented to employees as an integral station for paperwork and filing to occur. The mass amount of flat surface area, which is a large square footage than the workstation desk, was available for employees to spread out their materials.

![Figure 26: Definition and Function of the Work Tables from User’s Manual Design Handbook by Beatrice Landon](image)

Collaborative zones were scattered throughout the department, creating equal use by all employees. Comfortable chairs which were easy to move enable multiple uses for employees as well as availability for rearranging. Power outlets and data drops were physically located near all the collaborative areas, allowing for guests to use their laptops as well. Figure 27 portrays an open collaboration concept near a window. For employees whom had several guests at once, the open collaboration area allowed for work to be completed without the formalization associated with a conference room.
Figure 27: Open Collaboration Concept from User's Manual Design Handbook by Beatrice Landon
Chapter Six: Pittsfield Research Studies and Results Analysis

Significance of the Pittsfield Study

The study should be considered significant as it investigated a workplace style in which the employee, management and company benefit. The study falls under the realm of qualitative research, as the goal was to understand the effect of the built environment on human behaviors, further researching the reasons such behaviors exist. In relation to this Pittsfield study, the intention was to understand what type of workplace style was more beneficial to the occupant, through understanding their behavior and attitudes. Both workplace styles were analyzed with aims to understand which office type was more successful overall. This information generates an understanding for future company expansion, and which style would be more impactful and cost effective.

Hypotheses

1. If employees are content with their workplace design, then the employees will be more productive in the space.

2. If the employees build stronger relationships with one another and their managers, then the employee will be more pleased with their employer.

3. If the workplace design is more collaborative, the teamwork will be more successful in the company.

Approach Method of Closed Workplace Analysis

General Dynamics AIS completed an office renovation from closed style workplace to an open collaborative environment, which took place in Pittsfield, Massachusetts. An anonymous survey questionnaire was determined to be the most beneficial method for gathering information about the occupant’s preference in workplace settings. The goal of this study was to understand what type of work
atmosphere was more advantageous to the employees, which would leverage a prototype when future expansion occurred. Before the renovation took place, a survey was distributed in May 2010 to 65 employees, forty one responded, creating a 63% rate of participant return. The survey was formatted as all multiple choice questions, with blank spaces for additional comments to be added. Employees who were included as survey participants were chosen because they would be affected by the renovation. All employees who moved workplaces because of the renovation were sent the digital questionnaire. The goal from the first questionnaire was to analyze the success of the workplace prior to renovation, and understand the success of the closed style workplace. The employees were asked the following questions (located in the Appendix as the first document, A) based upon their satisfaction with the older environment which had closed style attributes. The questions related to the physical entities and abstract emotions which affect the employee’s attitude and productivity while completed daily work tasks. The questionnaire and data were created by AIS management, and the researcher had no affect on the questions which were generated.

**Pittsfield May Results Analysis**

Permission to include the Pittsfield data was obtained by General Dynamics AIS management, as the survey was complete prior to the research of this thesis. The data was initially organized based upon responses received within the two different completion dates of May and August. Different tables were created to visually showcase the data based upon the survey, which was created by General Dynamics AIS Facilities and Real Estate Department. The May questionnaire was placed into a chart to graphically distinguish the responses, Table 1. The horizontal axis constitutes the number of responses, which is a range from the middle 30’s to the low 40’s in terms of participants. Employees were able to choose what questions they wanted to answer,
some skipped over questions and left them blank, which explains the inconsistent number of results between questions. The vast amount of responses resides in the “very satisfied” and “satisfied” bars which are displayed in a middle green and a light green. Points of interest are shown in red and orange, as they signify extremely dissatisfied and very dissatisfied. Twenty four questions were graphically presented in Table 1.

Satisfied to Extremely Satisfied Attributes

As analyzing each criteria of the May scores is unnecessary, it is important to understand what factors the employees liked about the closed style environment. The criterion which the employees were the most satisfied with includes:

- Comfort of work station
- Privacy
- Ability to focus
- White boards
- Individual workspace
- Work on my own

All of these six attributes relate to working in an environment which is individualized and includes solitude. The benefit of working in a closed style office is the separation of employees through workstations, which is perceived positively from this data. One can assume that the scenario of working alone is rather positive in this closed office environment, especially since the work station is considered comfortable. Employees are content with their individual workstation, which may allow for a greater sense of productivity and concentration on work load. Of these attributes, employees showed the most satisfaction overall to privacy.
Dissatisfied to Extremely Dissatisfied Attributes

Also, as analyzing every attribute individually is not necessary, understanding the areas which need improvement is critical. The criterion which employees were the most dissatisfied with includes:

- Natural light
- Meeting Spaces
- Technology in Meeting Spaces
- Voice Communications
- Collaboration across geographies
- Team Workspaces

All of the criteria which was displayed dissatisfaction amongst employees relates to the physical workspace of the entire office, and not the individual workstation. Technology may have been outdated, which displays the lack of happiness with technology in meeting spaces, voice communications and across the geographies. Collaboration may be suffering due to the dissatisfaction in meeting spaces and with teams. The attribute was the displayed the most dissatisfaction is the lack of natural light.
Table 1: Satisfaction Scores for May 2010 Questionnaire

Approach Method of Open Workplace Analysis

A follow up survey was distributed to the same 65 employees in August of 2010, which was taken three months after the initial survey was sent out. It is questionable whether this was a sufficient amount of time, or if the data would have proven more factual if there was a greater range of time between the surveys. Thirty eight of the 65 people responded to this second survey, which lowered the response rate from 63% to 58%, thus a 5% change in respondents. The number of employees who were moved into the renovated space and answered the questionnaire was more than half of the sample. The same questions (as the previous survey) were used and graphically presented, displayed in Table 2. This allows for data to be studied from a before and after standpoint, displaying areas which could be affecting productivity and the company’s profitability.
Satisfied to Extremely Satisfied Attributes

From a quick glance at Table 2, when can notice a drastic change in satisfaction with the workspace. The six most satisfied attributes of the renovation include:

- Natural Light
- Computer Resources
- Co-worker availability
- Collaboration with co workers
- Collaboration across geographies
- Team workspaces

Collaboration in groups had greatly improved from the May surveys, creating a measurable satisfaction. The most significant improvement across the two surveys was the availability of natural light, as over twenty people ranked the change as extremely satisfied. Compared to the May survey, the attributes of team workspaces, natural light, and collaboration with geographies were poorly ranked and were considered as dissatisfying by employees. This data is portrayed as statistically significant.

Dissatisfied to Extremely Dissatisfied Attributes

Areas of dissatisfaction still exist across the survey, but are not as extreme when compared to Table 1. The six most dissatisfied areas the employees ranked fall under:

- Privacy
- Ability to focus
- Storage
- White boards
- Voice communications
- Work on my own
These attributes relate to the disadvantages of having an open style environment, as employees may get distracted by what is happening around them. Since the work stations were reduced in panel height, storage and white boards were also reduced in size, which was not received well by the survey participants. The two most poorly received areas were privacy and ability to focus. Contrastingly in the May surveys, the aspects of privacy, ability to focus, and work on my own were highly praised as satisfying to employees. This change is considered statistically significant.

<table>
<thead>
<tr>
<th>Table 2: Satisfaction Scores for August 2010 Questionnaire</th>
</tr>
</thead>
</table>

**Analysis of Closed versus Open Workplace in Pittsfield Facility**

To better differentiate the answers to the questions on a side by side analysis, Table 3 was developed. Figure 3 compares the scores of May and August, May being represented with a red line and August with a green line. It is plausible to note that the
satisfaction with General Dynamics AIS was the practically the same, regardless of the workplace design. The most significant data attribute is the quality of natural light.

Table 3: Comparison Graph of May 2010 and August 2010 Results

The management of Scottsdale General Dynamics AIS felt the Pittsfield survey was an excellent starting point, but the questions needed to be analyzed differently to leverage the success of the built environment. The components of organizational hierarchy and personalization were not discussed in the Pittsfield model, which make it difficult to understand if employees psychologically felt equal to their supervisors since they both occupy the exact same workstation. It may have been too soon to analyze the success of the renovated space, as the employees had only occupied the open style area for three months and may have not become comfortable with the change just quite yet. Therefore, one can note the significant changes in questionnaire wording will
develop a deeper understanding in what the occupants cherish. Through asking questions in a different way, the managers are hoping to understand the areas which are important to the Scottsdale employees, and if they are similar or different to the ones examined in Pittsfield.

Table 4 highlights critical areas of interest which should be understood as important factors which attribute to the success of the workplace. The range of approval in responses is graphically displayed through differing in color, with red signifying a substantially lower rate and green displaying a significantly higher rate. As the critical areas of dissatisfaction are brought to one’s attention, can these criteria be easily fixed? Acknowledging the employees dissatisfaction of white board availability and storage may not be a difficult requirement to fix, however the aspect of privacy may be nearly impossible to create a solution. Employees may never feel their workstation is private, with the new workplace layout, as their computer screen and writing surface is exposed.

<table>
<thead>
<tr>
<th>Question Text</th>
<th>MAY 2010</th>
<th>AUGUST 2010</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Satisfaction Questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall how satisfied are you with GDAS?</td>
<td>4.55</td>
<td>4.55</td>
<td>0.01</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>Overall how satisfied are you with your current working environment at GDAS?</td>
<td>4.55</td>
<td>4.86</td>
<td>0.32</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>Overall how satisfied are you that your current work environment...facilitates your productivity?</td>
<td>4.48</td>
<td>4.76</td>
<td>0.28</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>In particular, how satisfied are you with the following aspects of your current working environment?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to computer resources</td>
<td>4.62</td>
<td>5.11</td>
<td>0.49</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Access to co-workers</td>
<td>4.62</td>
<td>5.06</td>
<td>0.43</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Comfort of workstation</td>
<td>4.78</td>
<td>4.63</td>
<td>-0.16</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>Privacy</td>
<td>4.68</td>
<td>3.69</td>
<td>-0.99</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>Ability to focus appropriately on my work without distraction</td>
<td>4.59</td>
<td>3.79</td>
<td>-0.83</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>Ability to easily know whether my co-workers are available for interaction</td>
<td>4.54</td>
<td>5.08</td>
<td>0.54</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Ability to find/use meeting spaces</td>
<td>3.76</td>
<td>4.86</td>
<td>1.10</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Usefulness of Technology in meeting spaces</td>
<td>3.83</td>
<td>4.69</td>
<td>0.86</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Storage</td>
<td>4.70</td>
<td>3.97</td>
<td>-0.73</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Availability of White Board</td>
<td>4.65</td>
<td>4.03</td>
<td>-0.62</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Quality of natural light</td>
<td>3.22</td>
<td>5.36</td>
<td>2.14</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Quality of light provided to perform my work</td>
<td>4.32</td>
<td>5.06</td>
<td>0.73</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Voice communication technologies</td>
<td>3.91</td>
<td>4.50</td>
<td>0.59</td>
<td>SIG OK</td>
</tr>
<tr>
<td>Ability to exchange/share information</td>
<td>4.58</td>
<td>4.94</td>
<td>0.36</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>Ability to collaborate with co-workers</td>
<td>4.65</td>
<td>5.06</td>
<td>0.41</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>Ability to collaborate across geographies</td>
<td>4.18</td>
<td>4.40</td>
<td>0.22</td>
<td>NOT SIG OK</td>
</tr>
<tr>
<td>Team workspace</td>
<td>4.03</td>
<td>4.78</td>
<td>0.75</td>
<td>SIG OK</td>
</tr>
</tbody>
</table>
Table 4: Significance amongst Surveys

**Employee Satisfaction Represented as Significant Data**

The fourth column states the significant data which was determined by General Dynamics AIS Facilities and Real Estate department. Based on the data which was displayed in Tables 1-3, the following attributes are described below with the differences transcending from smallest to largest:

- Access to computers, 0.49 difference
- Ability to tell whether coworkers are available for interaction, 0.54 difference
- Voice communication technologies, 0.59 differences
- Quality of light to perform my work, 0.73 difference
- Team workspaces, 0.75 differences
- Usefulness of technology in meeting spaces, 0.86 difference
- Ability to find/use meeting space, 1.10 difference
- Quality of natural light, 2.14 difference
Seven attributes were significantly improved within the renovation, with the quality of light being the most superior change.

*Employee Dissatisfaction Presented as Significant Data*

Conversely, data which was not improved with the renovation of the workplace is worth nothing. The criteria which is considered significant, but negatively are:

- White boards, -0.62 difference
- Storage, -0.73 difference
- Ability to focus, -0.82 difference
- Privacy, -0.98 difference

Privacy is the most significant attribute which was hindered in the renovation. Privacy is not as large of significance as the quality of light is 2.14 and privacy falls to -0.98. As there are less attributes which fall under the ‘unsatisfied’ data than the ‘satisfied data’, than it can be determined from the data that the renovation was beneficial and produced substantial data to support this statement.

*Hypotheses Analyzed*

1. If employees are content with their workplace design, then the employees will be more productive in the space.

FALSE: Table 4 presents the third question under “Overall Satisfaction Questions” in which the employee is questioned about the work environment facilitating productivity. From May to August, there was only a 0.28 difference, which was described as not significant. The productivity may be the same, despite the renovation in office.
2. If the employees build stronger relationships with one another and their managers, and then the employee will be more pleased with their employer. FALSE: As Table 4 presents in the first question under “Overall Satisfaction Questions”, there is a 0.01 difference from May to August concerning the satisfaction with GDAIS. Through the renovation, the employees did not become more satisfied with their employer, proving the change to not be significant.

3. If the workplace design is more collaborative, then the individuals will be more content with their peers and teams. FALSE: Likewise, under Table 4’s grouping of “GDAIS EPS Questions”, the twelfth question questions the employee about their enjoyment with working with their team. The difference between May and August decreased by -0.09 which is not statistically significant.

Analysis of the Nine Building Components in Pittsfield

Based upon the analysis of building components which contribute to the employee’s morale and productivity, it seems from the presented data that the open office layout was the preferred method of working. Assigned workstation and other associated office furniture was preferred in the old layout as that furniture was more comfortable, possessed better storage, and had a better source for white boards. Accessibility to the outdoors was preferred in the new workplace environment, as windows were put in place, allowing for natural light to penetrate through the space. Workplace amenities were also preferred in the renovated space, as there was a better source of conference rooms and break out spaces. Employees were proud of the renovation, and were excited to bring guests into the new space. Organizational hierarchy of rank was difficult to tell which layout was preferred, as there were no questions asked about this issue. Ambient temperature and lighting control was
preferred in the new space, as stated with the aspect of “my workplace is adjustable to suit my needs”.

Privacy was much preferred in the old space, as the panels shrank in size which may have been too drastic of a change for employees. Personalization was not defined within this survey, so it is difficult to understand what work environment was preferred. The communication and collaboration aspect was vastly preferred in the new layout, as the floor plan was created to promote accessibility of employees to technology and one another. Technology was more preferred in the new space, as new voice communication technologies and usefulness of technologies in the meeting room ranked highly. Overall, the renovation improved several areas in which the old configuration was struggling to foster the growth of the employees.
Chapter Seven: Scottsdale Research Study and Results Analysis

Significance of the Study

As the modern workplace can be defined in various ways, the companies which still occupy a physical building in which employees work at least five days a week, should consider the configuration of the interior. The study falls under the realm of qualitative research, as the goal is to understand human behaviors and the reasons such behaviors exist. The specific participants who were analyzed in this research were corporate office employees who worked in the defense industry. In relation to the study, the intention was to understand what type of workplace style were more beneficial to the occupant, through understanding their behavior and attitudes. Prior to renovation, a digital questionnaire was sent conducted in order to understand the closed style office environment ability to foster the employees’ productivity. After the renovation was completed, singular in person interviews took place to study the effects of the open style office environment on the occupant.

Hypotheses

To coincide with the Pittsfield model, the same hypotheses are being questioned to understand if the Scottsdale renovation enables the following:

1. If employees are content with their workplace design, then the employees will be more productive in the space.
2. If the employees build stronger relationships with one another and their managers, and then the employee will be more pleased with their employer.
3. If the workplace design is more collaborative, the teamwork will be more successful in the company.
**Approach Method of Closed Workplace Analysis**

Research questions were formulated by General Dynamics AIS Facilities and Real Estate team, in which a questionnaire was sent out to employees electronically. The questions were created similarly to the Pittsfield model, in which physical and abstract workplace entities were queried. These questions were formally introduced as the “Scottsdale: Modernization of Workforce Survey”. This survey was conducted in early August 2011, to measure the satisfaction of the employee’s current environment, analyzing the older style office space which was distinguished by high panel cubicles and placement based upon hierarchy. To determine the success of the closed versus open workplace, both environments were surveyed with the same questionnaire.

Similarly, the Pittsfield model and the Scottsdale model both possess six different answers which the employee was able to respond with: extremely satisfied, very satisfied, satisfied, dissatisfied, very dissatisfied and extremely dissatisfied. Leaving the employee to choose from an even number of questions eliminated the middle answer which was unhelpful in understanding the success of the workplace. Additionally, a column of N/A or Not Applicable was added to the Scottsdale survey so employees who work remotely or different schedules than the majority of the group are able to select an answer which signifies they were not included. The questionnaire presented open ended questions to the employees, who had the choice of writing in or not. The statements from the open ended questions were also analyzed in this research, to support the opinions of the occupants.

The survey was sent out electronically to 68 people within the General Dynamics AIS division. 36 employees responded to the survey, which resulted in a response rate of 53%. Comparatively to the Pittsfield survey, the Scottsdale closed workplace environment questionnaire was less successful in the response rate, displaying a 6% change amongst returns. The questionnaire which was digitally sent out to employees
can be viewed in its entirety, as Appendix B. The results were analyzed in early October of 2011 by the researcher.

Scottsdale August Results Analysis

Permission to include the Scottsdale data was obtained by General Dynamics AIS management, as the survey was completed during the research of this thesis. The results of the digital questionnaire were broken down into five segments, which are represented as Tables 5 through 9. The successes and failures of the closed style workplace are discussed in the following sections of this chapter.

Table 5: Scottsdale Closed Workplace General Questions

Table 5 displays the general questions which the employees were questioned, similar to questions appeared in the Pittsfield surveys. The high ranking attributes in this section relate to workplace personalization (95% satisfaction across the sample) and workplace performance (89% satisfaction across the sample). A statement was expressed by an employee about the ability to personalize his desk: “During times of stress- and things have been very stressful lately- it’s very helpful to look at pictures of my family. That keeps me going. Also to some degree I can shut out distractions that way. Finally, I can alter my workspace to maximize it’s effectiveness. It’s a little ‘home
away from home’ and I’m here 10-12 hours a day- often more than I am actually home”. As presented in the literature review, the workplace may be occupied more than one’s home, which stresses the importance of comfort.

The lowest ranking attribute of this section falls under the overall satisfaction of General Dynamics AIS, which is represented at 68% satisfaction across the sample of employees. One employee left a response to the satisfaction question stating: “That’s a very, very broad question and is not very useful without being more specific. Dissatisfaction mostly stems from management doesn’t seem to listen to rank and file; seems to talk down to us and treat us unprofessionally”. From this statement, one can gather that there was dissatisfaction in management, which affects the employees’ happiness with their employer. Another employee left the comment of: “Management is out of control”. Through statements such as this, it seems that the management presents a concern to the employees, which can affect the morale of the workplace. This concept may have to do with layoffs which took place earlier in the year (June 2011) within the division. Underlying factors such as this are difficult to measure, but can still affect the morale of the employees.

The changes within the workplace have even frustrated employees to leave the company permanently. One anonymous employee wrote: “I think a lot of us feel like this was mandated and we had no voice in the matter. Even when ideas for cutting costs were solicited it was after the fact that we were already going down the road of spending a lot of money on this new furniture- so what was the point of asking? We don’t feel like part of the process at all. And we see old friends leaving because they don’t like the direction GD seems to be heading. Experienced old friends. This can be very stressful”. As it is difficult to appease every employee in the company, it is suggested that in the next company renovation, employees will be addressed on the reasons the workplace style will be changed.
More specific questions of the workplace are represented in Table 6, which analyze the ability for the employees to successfully perform his or her job with the current working environment (this was the closed style office). Most of the attributes questioned were well received, with a percent satisfaction above 75. A few aspects such as access to coworkers, comfort of work station, storage and availability of white boards received 100% satisfaction amongst the employee sample. These attributes should be studied in the post occupancy interview to insure employees are still satisfied despite the change in workplace style, as these four attributes ensure success for the employee to perform his or her job.

The lowest ranking factor in this set of questions is the quality of natural light, which only achieved a 63% satisfaction. An employee left a comment stating their happiness dependent upon the location of their desk: “DEPENDS ON WHERE I SIT. BY THE WINDOW, EXTREMELY SATISFIED”. It is unclear why the employee typed his or her comment in all capital letters, although it may be to express their concern for getting
a window seat in the new configuration. The use of daylighting is an important attribute to the workplace, especially since employees came from areas prior to the renovation which was without a window. The placement of employees next to windows was a decision completed by AIS management, as employees were grouped in the open style configuration based upon project.

Table 7: Ranking of Important Workplace Aspects

Table 7 presents the segment which asked the employee to rate the importance of each of the listed aspects within the office environment. The attributes which employees held important to success in the workplace included: access to computer resources, comfort of work stations, privacy, ability to focus without distractions, individual workspace, ability for one to work on their own when necessary, individual productivity and the productivity of my team. All of these attributes received perfect 100% in importance, describing what attributes are essential for a workplace’s success. An employee responded to the stress of privacy stating: “Current work environment provides me the privacy to perform engineering analyses, but meeting rooms are often difficult to find open when needed”. This problem could be easily adjusted during future
expansion, with a change in meeting room scheduling. Judging from this data, it seems that the employees were fairly content with the past workplace environment.

Similarly to Table 6, availability of natural light was received the worse, only 50% of the sample was satisfied with the level. This may be communicated as daylighting is not an important factor in a workplace, and will not be regarded during future moves. Some employees have never worked within a space that has windows, so it is difficult to understand if they know the impact of the natural environment. An employee stated the importance of seeing the outdoors from his or her perspective: “In general I think more natural light would be easier on the eyes, and wouldn’t make us feel like we are ‘trapped’ indoors. We should be able to see the storm passing by or see the sun shining”. As the ranking of importance on quality of natural light was very low, the addition of daylighting in the renovation may not be received as well as thought.

<table>
<thead>
<tr>
<th>Please indicate your level of agreement with the following statements.</th>
<th>Answer based upon your current work environment.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Working at DCAISS</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>2</td>
</tr>
<tr>
<td>Disagree</td>
<td>5</td>
</tr>
<tr>
<td>Somewhat disagree</td>
<td>6</td>
</tr>
<tr>
<td>Neither agree nor disagree</td>
<td>7</td>
</tr>
<tr>
<td>Somewhat agree</td>
<td>11</td>
</tr>
<tr>
<td>Agree</td>
<td>11</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>1</td>
</tr>
<tr>
<td>Average Score</td>
<td>5.58</td>
</tr>
<tr>
<td>Percent Agree</td>
<td>64%</td>
</tr>
</tbody>
</table>

Table 8: Ranking of Agreement with Current Work Environment

The fourth section which was analyzed in the digital questionnaire asked employees to indicate their level of agreement based upon the statements relating to their work environment. These attributes are displayed in Table 8 on the horizontal axis. This section was received the worst by the surveyed sample of General Dynamics AIS
employees, with all of the highest percentage of this section being 72%, and the worst ranging to 28%. The factors which employees held important were the following:

- Our workspace has a strong positive impact on our ability to get the job done
- There is the right balance between team and individual work
- Working at GDAIS is fun and exciting

Although these three attributes scored above 60% in agreement with employees, the lack of higher scores reveals that the happiness with the workplace may be low.

The statement which was regarded with the lowest amount of agreement was: “There are optional work spaces to match particular work efforts”. During the time in which this survey was conducted, the closed workplace style had minimal areas to foster communication and group involvement. Employees had the option of booking out a conference room and using it as a break out space, working in a break room, or working at their cubicle. The lack of flexible areas for casual discussions in the previous work environment may describe the 28% which was allotted to this attribute.

Furthermore, communication and areas for teamwork to occur has been brought up through this survey as an employee priority. One employee stated: “It’s difficult at times to communicate with team members because you’d like to provide more information than what can be entered into an email- but the person sits in another room, so you either have to call them and hope that they are there. Or get up and go down the hallway to try and find them”. Employees in the older layout may have not been seated next to their coworkers whom they work with often, and as a large corporation it is difficult to assume when that employee will be available at their desk. Hopefully this statement will be improved immensely with the post occupancy results, as several different exist in the renovated plan for different actions to take place in the workplace.
Table 9: General Dynamics AIS EPS Results

The final section of the questionnaire related to overall happiness with General Dynamics as an employer, alluding very little to the built environment. This section ranged drastically, from the lowest percent of agreement residing at 42%, to the highest being 97%. From Table 9, it is concluded that employees enjoyed working in their teams more so than working for General Dynamics. Employees may enjoy working with one another and the friendships that were formed from work, rather than admiration for their employer. It is shown that employees feel they are unable to socialize with one another, as only 42% of the sample show satisfaction. Again, no questions were directly asked about the employee’s relationship with their management, so it is difficult to leverage the sense of hierarchy within the workplace.

**Questionnaire Open Ended Responses**

Another attribute which was discussed throughout the open ended section of this survey was concern for noise. Employees wrote down various statements complaining about noise disturbances in the closed workplace environment. One employee said: “To be effective I need my line of sight block so people moving around don’t distract me. This is met with the current cube. I also need quiet. The current cube does not effectively
block conversations as well as I would like”. If this is a problem with higher panel employee cubes, the noise issues need to most definitely be addressed in the space renovation. Another employee addressed his or her problem with sitting next to an administrator: “I sit next to administrative folks that have noisy visitors much of the day. If I’m doing easy tasks like budgets or schedules, this is not a problem. If I’m trying to invent something or study a complex technical issue, the noise has a large negative impact”. As administrative positions have job tasks related more towards communication with employees, their phone calls can pose as a disturbance to the rest of the department.

Satisfied Attributes of the Closed Office Environment

To summarize the previous information, the following attributes are successful in the closed off environment. The following attributes achieved an 85% or better satisfaction amongst employees surveyed:

- Personalization of workspace
- Access to computer resources
- Access to coworkers
- Comfort of work station
- Ability to know whether my coworkers are available for interaction
- Usefulness of technologies in meeting spaces
- Storage
- Availability of white boards
- Quality of light to perform tasks
- Voice communication technologies
- Ability to exchange share information
• Ability to collaborate with coworkers
• Ability to collaborate across geographies
• Individual workspace
• Ability to work on my own when necessary
• My individual productivity
• Productivity of my team

_Dissatisfied Attributes of the Closed Office Environment_

To summarize the previous information concerning the dissatisfaction of the closed style configuration, the following attributes earned less than 50% in agreement:

• Environment is a catalyst that enables rich and varied employee interactions
• The workspace is interconnected with the work process
• I am proud to bring customers into our workspace
• There is sufficient room to accommodate an expanding employee population
• There are optional work spaces to match particular work efforts
• GDAIS provides employees with frequent opportunities to socialize with other employees

_Closed Workplace Survey Questionnaire Results- Comparing Pittsfield to Scottsdale_

In order to understand how General Dynamics AIS exists throughout the country, it is beneficial to compare the data of Pittsfield and Scottsdale. The data was compared side by side, as shown in Table 10, which denotes Pittsfield in red and Scottsdale in dark blue. The results were compared on a range from 0 to 6, signifying 6 as extreme satisfaction and 0 with extreme dissatisfaction. From this graph, it is communicated that the Scottsdale site was significantly happier with their older closed environment, than
Pittsfield. The only two attributes in which Pittsfield was more content with the closed environment was their overall satisfaction with GDAIS and team productivity. As shown with the data, it is assumed that the employees of the Pittsfield site were more confident with their employer and worked well when collaborating, more so than the Scottsdale site.

Table 10: Comparison of Pittsfield and Scottsdale Closed Office Survey Results

**Approach Method of Open Workplace**

The researcher conducted a questionnaire to a smaller sample of employees two months after moving into the new space to understand how the employees were adapting to the new layout thus far. Interviews occurred on Tuesday October 11th and
Wednesday October 12th with an estimated 15 minute slot per employee. The management of AIS intends to conduct another survey with the same questions as used as in August, which will occur in May 2012. As previously learned from the Pittsfield case study, there was not enough substantial time between the pre and post occupancy evaluations. Therefore, the post occupancy renovation will be analyzed nine months from the move in, which will be after this thesis is presented. It is still beneficial to understand the overall happiness levels of the employees, which is able to be gauged at this time. The nine building components which directly affect productivity and well being of an employee were analyzed in depth within this interview, to show congruency throughout the research.

The October interviews were a verbal conversation, meant to be casual with open ended questions which allowed employees to discuss what was distinguishable about their workplace. The identities of the employees who participated in the discussion were left anonymous, to allow for a better spread of information without concern for losing one’s job. Employees were told at the start of the interview that their identity would be left anonymous in the research, as well as the sharing with AIS management. Overall, there were twelve participants, six males and six females. Three males and three females were interviewed per day, with no consistent order in how the participants were chosen to talk. The interviewer sent out a list of questions via email which may be discussed days prior to the interview, which is displayed in Appendix F. The questions were covered during the interview session, along with other information which was important to the employee who is described in Appendix C. Not all topics of the presented questions were covered, as the interviewer wanted to understand what the occupant considered important, thus understanding their experience better. The answers of employees were physically written down in a bulleted list; the answers of the employees were then typed up into a word document, which is shown in Appendix G.
**Results Analysis of Open Style Configuration**

Table 11 was developed to visually understand the factors which employees held as important to their personal success within the built environment. The blue areas signify satisfaction with the new environment; red signifies satisfaction with the old environment and purple signifies satisfaction with both the new and old environments. Areas which appear in black denote that the interviewee did not discuss their preference within that category. The preference for each factor was configured based upon the majority answer, which is labeled in the final row of Table 11.

### Table 11: Scottsdale Open Style Office Interview Results

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Work Surfaces</th>
<th>Work Panel</th>
<th>Storage</th>
<th>White Board</th>
<th>Chair</th>
<th>Cubicle Layout</th>
<th>Windows</th>
<th>Comfort of Cubicle</th>
<th>Break Room</th>
<th>Managers in Cubes vs. Offices</th>
<th>Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NEW</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>2</td>
<td>NEW</td>
<td>NEW</td>
<td>OLD</td>
<td>NEW</td>
<td>OLD</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>3</td>
<td>OLD</td>
<td>BOTH</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>4</td>
<td>NEW</td>
<td>NEW</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>5</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>6</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>7</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>8</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>9</td>
<td>OLD</td>
<td>BOTH</td>
<td>NEW</td>
<td>NEW</td>
<td>BOTH</td>
<td>NEW</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>10</td>
<td>NEW</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
<tr>
<td>11</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>12</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Answered</th>
<th>12</th>
<th>12</th>
<th>9</th>
<th>4</th>
<th>5</th>
<th>11</th>
<th>11</th>
<th>9</th>
<th>9</th>
<th>11</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Total</td>
<td>7/</td>
<td>58%</td>
<td>5/</td>
<td>42%</td>
<td>6/</td>
<td>67%</td>
<td>3/</td>
<td>75%</td>
<td>3/</td>
<td>60%</td>
<td>2/</td>
</tr>
<tr>
<td>New Total</td>
<td>4/</td>
<td>33%</td>
<td>4/</td>
<td>33%</td>
<td>2/</td>
<td>22%</td>
<td>1/</td>
<td>25%</td>
<td>2/</td>
<td>40%</td>
<td>9/</td>
</tr>
<tr>
<td>Both Total</td>
<td>1/</td>
<td>9%</td>
<td>3/</td>
<td>25%</td>
<td>1/</td>
<td>11%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1/</td>
<td>9%</td>
</tr>
</tbody>
</table>

| Preference      | Old | Old | Old | Old | Old | New | New | Old | New | Old | New |

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Technology in Shared Spaces</th>
<th>Phone Room</th>
<th>Huddle Room</th>
<th>Privacy</th>
<th>Wall Color</th>
<th>Workstation</th>
<th>Lighting Control</th>
<th>Personalization</th>
<th>Communication with Coworkers</th>
<th>Communication with Managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BOTH</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>2</td>
<td>BOTH</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
<td>NEW</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>3</td>
<td>NEW</td>
<td>NEW</td>
<td>OLD</td>
<td>NEW</td>
<td>OLD</td>
<td>NEW</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>4</td>
<td>BOTH</td>
<td>OLD</td>
<td>OLD</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>5</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>6</td>
<td>BOTH</td>
<td>OLD</td>
<td>OLD</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>7</td>
<td>OLD</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>8</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>9</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
<td>BOTH</td>
</tr>
<tr>
<td>10</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
</tr>
<tr>
<td>11</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
</tr>
<tr>
<td>12</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
<td>OLD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Answered</th>
<th>10</th>
<th>4</th>
<th>9</th>
<th>12</th>
<th>4</th>
<th>8</th>
<th>8</th>
<th>12</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Total</td>
<td>2/</td>
<td>20%</td>
<td>0</td>
<td>2/</td>
<td>22%</td>
<td>5/</td>
<td>42%</td>
<td>0</td>
<td>3/</td>
</tr>
<tr>
<td>New Total</td>
<td>5/</td>
<td>50%</td>
<td>3/</td>
<td>75%</td>
<td>6/</td>
<td>67%</td>
<td>4/</td>
<td>33%</td>
<td>4/</td>
</tr>
<tr>
<td>Both Total</td>
<td>3/</td>
<td>30%</td>
<td>1/</td>
<td>25%</td>
<td>1/</td>
<td>11%</td>
<td>3/</td>
<td>25%</td>
<td>0</td>
</tr>
</tbody>
</table>

| Preference      | New | New | New | Old | New | Old | Both | New | New |    |    |

Table 11: Scottsdale Open Style Office Interview Results
In order to understand the majority preference of those who were interviewed, at the commencement of the individual talk, the question was posed: “Which work style would you prefer to work in, for the duration of you time spent at General Dynamics AIS?” This question resulted in seven people preferring the new configuration, one person remaining unsure about which workstation would be more preferable, and four people wishing to return to the older workstation arrangement. The results of this question are graphically displayed in Figure 28.

![Figure 28: Scottsdale Post Occupancy Results](image)

*Satisfied Attributes of the Open Office Environment*

As displayed in Table 11, the attributes which were received well concerning the renovation of the AIS division include the following eleven elements:

- Windows
- Break Room
- Cubicle Layout
- Collaboration
- Technology in Shared Spaces
• Phone Room
• Huddle Room
• Wall Color
• Workstation Lighting and Lighting Control
• Communication with Coworkers
• Communication with Management

Overall, it seems that the characteristics of collaboration and communication are fostered in the new work environment, as people prefer the new office space for these qualities. The aesthetic enhancement of new furniture, paint colors, and technologies was also received well by employees.

Dissatisfied Attributes of the Open Office Environment

Additionally, the aspects which were not preferred in the renovated space include the following eight attributes:

• Work Station Surfaces
• Work Station Panel Height
• Storage
• White Board Availability
• Work Station Chair
• Comfort of Cubicle
• Managers whom formally were in an office and now are in a cubicle
• Privacy

Generally, the workstations themselves were received poorly. This may be that there is a significant less amount of surface area for desk space, lowered panel heights, less storage space, smaller white boards, and a different brand of workstation chairs.
Scottsdale AIS Renovation Photographs (Open Workplace)

Images taken in October of 2011, which appears below, display the employees in their new workplace. One can easily see across the room, seeing who is at their desk and who is standing up. The photographs were taken at 1:00pm, which displays the amount of daylight which penetrates the space; it seems to go clear across the room. The pops of color on the wall are extremely subtle, which allows for the employees to still concentrate within the space.

Figure 29: West, South and North Walls  Figure 30: South Wall Perspective
Figure 31: North Wall Perspective  Figure 32: View of West and North Walls
Hypotheses

After understanding the advantages and disadvantages of the open style workspace and the closed style office configuration, the following hypotheses can be answered:

1. If employees are content with their workplace design, then the employees will be more productive in the space.

   **TRUE:** The employees who were interviewed expressed very strongly, regardless what their office style preference was, that whichever style they did prefer, they worked better in it, aiding their ability to concentrate. As the
workspace may either be open or closed, there is not one style which can completely work for all employees, each employee will have their own preference on which style they prefer, which will promote their productivity.

2. It the employees build stronger relationships with one another and their managers, and then the employee will be more pleased with their employer.

TRUE: Employees in the open workplace began to socialize with their peers and management more than they previously did in the closed style workplace. This has made employees feel a stronger bond with their workplace, looking forward to work. The break room was shown to improve social situations with employees, as it is a central hub for all to converse in. Employees met others that they previously did not know, while waiting in line for their coffee.

3. If the workplace design is more collaborative, the teamwork will be more successful in the company.

TRUE: The open style workplace fosters collaboration more so than the closed style configuration, which allows for teams to be stronger. Employees believe that their work load is able to be completed at a quicker pace, as those who they do business with are situated near them. This configuration decreases the need for traveling around the building, allowing for a quicker spread of information.

Comparison of Closed versus Open Workplace in Scottsdale Facility

As one can gather from the presented information the open workplace was received better than anticipated. As the interviews were only conducted after the occupants had occupied the space for a month, it is difficult to leverage how successful the open space is at fostering communication and collaboration. It would be advisable for AIS management to continue renovations in the open style collaboration.
Chapter Eight: Conclusion and Recommended Prototype

In conclusion, the results of the Pittsfield and Scottsdale surveys and interviews indicated that employees prefer the open style configuration to the closed style configuration. Aspects in which the renovation from a closed style office environment to an open style configuration which were received well by both Pittsfield and Scottsdale sites include:

- Availability of natural light and exterior views to the surrounding site
- Quality of workstation light and lighting control
- Communication opportunities between coworkers and additionally with management
- Technology which includes: voice communication technologies, accessibility to computers and conferencing equipment
- Availability for diverse environments in which employees can work: break room, phone room, huddle room and conference room
- Collaboration which is fostered by the open style environment

The open style environment was not received perfectly, as elements from the closed configuration were missed by employees. These attributes of the open style configuration which were not well received include the following elements:

- Privacy from coworkers and management
- Availability and mobility of white boards
- Employee ability to concentrate due to auditory and visual distractions
- Workstation storage for personal items, files and other documentation
- Workstation panel height and workstation surface depth
- Overall comfort of the workstation and workstation chair
Three hypotheses were presented to the Pittsfield and Scottsdale case studies, in order to further understand if the change from a closed style configuration to an open style was truly beneficial. These three hypotheses were:

1. If employees are content with their workplace design, then the employees will be more productive in the space.
2. If the employees build stronger relationships with one another and their managers, and then the employee will be more pleased with their employer.
3. If the workplace design is more collaborative, the teamwork will be more successful in the company.

As the Pittsfield site underwent two different surveys, the data is able to be analyzed statistically. All three of the hypotheses were proved to be false, as there is direct data to support the claims. For the first hypothesis, the response is considered false as judging from Table 4, which denotes the difference from May to August, there was only a 0.28 difference, which was described as not significant. The productivity may be the same, despite the renovation in office. Productivity is fairly difficult to measure based upon surveying. For the second hypothesis, as Table 4 presents in the first question under “Overall Satisfaction Questions”, there is a 0.01 difference from May to August concerning the satisfaction with GDAIS. This change also is not considered significant, and therefore the hypothesis is considered false. Finally, the third hypothesis is considered false as the difference between May and August decreased by -0.09 which is not statistically significant.

In regards to the Scottsdale site, it was found that the three hypotheses were considered true when comparing the data of the pre and post move. As the final
questionnaire has not been given to the employees yet, the data came from the face to face interviews. It is suggested that the hypotheses be considered once again for significance, after the final questionnaire is given. For the first hypothesis, the employees who were interviewed expressed very strongly, regardless what their office style preference was, that whichever style they did prefer, they worked better in it, aiding their ability to concentrate. The second hypothesis was supported with the information that employees in the open workplace began to socialize with their peers and management more than they previously did in the closed style workplace, thus creating a stronger bond with the workplace. The third hypothesis was deemed true in that the open style workplace fosters collaboration more so than the closed style configuration, which allows for teams to be stronger.

From the Pittsfield and Scottsdale analysis which is more thoroughly discussed in the past two chapters, it has been concluded that employees prefer the open office configuration over the closed style office environment. General Dynamics AIS division should continue the renovation process with the open style configuration, as it has been deemed successful with the examples of Bloomington, Pittsfield and Scottsdale. As analyzed from the results of the Pittsfield and Scottsdale location the following areas should be taken into consideration:

- Choose workstation furniture which is able to have a top layer of frosted glass. This will allow for more privacy for each employee, while also allowing the dispersion of natural light throughout the space.
- Allow employees to choose their workstation chair from at least two different options. Although there will be different chairs located throughout the space, the employees will be pleased to be able to choose their preference. Additionally,
through giving different chair options, ergonomic problems may be avoided, as some chairs are not as versatile as others.

- Create a flat file room or include more storage options for employees to keep their files from the past five years. As employees may not need this information on a daily basis, it is still preferable to have the data on hand instead of in a warehouse. Additionally, this will allow employees to purge their workstations down, elevating the storage problem.

- Include whiteboards which are on casters, allowing the employees who need more writing space, a chance to do so. A storage closet should additionally be provided in the floor plan, to house the whiteboards which are not in use.

- The storage units beneath the workstation surfaces should also be on casters, so when the opportunity of moving presents itself, employees can move manageably. Employees within the AIS division move based upon what project they are allocated to, when a project ends, the employee is assigned to a different project which may be with different coworkers.

- Break rooms should be in a confined space, or should have doors put in place to avoid disturbing employees who are seated nearby. As coffee machines and casual conversations can be distracting, noises should be contained.

- Phone rooms, huddle rooms and conference rooms should have a panel system or wall separating the workstations from main pathways. As employees feel the privacy of using a huddle room with the manager is not that confidential, as their peers can see them enter and exit the room, a privacy wall should be added.

- Personal offices should be included in future renovations as a reservation space, for managers who are conducting their employees’ yearly reviews as well as employees who are presenting information to customers. This space will serve as
a more formal workstation, but can also be private. As the existing phone and huddle rooms are allocated on a first come, first serve basis, a need for a reservation smaller room is desired.

- Restroom entrances should not be visible from workstations, as employees will feel like they are being observed on how much time is spent in the restroom. To alleviate this problem in the future, walls should be extended, or workstations should be reconfigured to not view entrances.

As the main demographic of the employees who work at General Dynamics AIS in Scottsdale are over the age of 50, future studies should indicate how the different generations favor the configurations. The open style office layout may be more attractive to recent college graduates, thus placing a different level of priority upon the corporation as it moves forward with interior renovations. This incoming workforce is known as the Millennial generation, which includes people born between the years of 1981 and 2000. “By 2010, an estimated 31 million of them will be in the U.S. workforce, outnumbering Gen Xers and taking up the slack left by retiring Boomers” (Lee, 2011). This statistic displays the importance of understanding the Millennial generation, as they will be dominating the workforce for years to come. Personality characteristics of the Millennial generation include the following: special, sheltered, confident, team-oriented, achieving, pressured and conventional (Howe and Strauss, 2007). This generation carries a sense of entitlement with them, and may not understand the placement of space through a hierarchy based system. As the people within the Millennial generation grew up in a time of increasing safety measures, they were rarely left unsupervised and may not understand the concept of not being in close proximity to their management. Millennials are very assertive and are group oriented, believing in egalitarian leadership. This group may have different time schedules than the generations that came before them,
operating on a 24/7 time frame of accomplishing business tasks. Additionally, this
generation is motivated to accomplish job tasks through technology, especially up to
date smart phones, laptops and tablets. These personality characteristics are imperative
for executives of corporations to take into consideration, as their company’s values may
not align with the Millennial generation.

Therefore, drawing from this research about the Millennial generations, it is
beneficial for companies to understand how their workplace communicates, specifically
through spatial organization, technology, furniture choices and management techniques.
In regards to the General Dynamics AIS case studies, it is assumed that the Millennial
generation would also prefer the open style office environment, as opposed to the closed
configuration. This position is supported based on the information that the Millennial
generation prefers to work in teams as opposed to individually, preference to work on
their own terms and schedule, desire to interact with management and dislike of physical
hierarchy. When future studies are undertaken, it would be beneficial to study the
different generations within the space and understand how each group likes the space.

In closing, it has been determined from the analysis and research of the Pittsfield
and Scottsdale General Dynamics AIS sites, that the open style office configuration is
more successful in promoting employee productivity and morale, when compared to the
close style office environment. Future renovations should be completed in the open
office style, while taking into considerations which were suggested in Chapter 8.
General Dynamics AIS should continue their benchmarking standards as completed with
Pittsfield and Scottsdale, because a plentiful amount of information was learned from the
occupants’ results and interviews. Showcasing and publicizing the findings from the
surveys is beneficial for other companies, which is displayed in Appendix D as General
Dynamics AIS, Pittsfield site, was presented the Bronze Award by MassEcon. As modernity of office design tends to change rapidly in America, it is essential that building owners, facility managers and upper management survey their population to ensure that the workplace reflects the values of the company.
References


Real Estate Executive Board. (2009). *Mobility Marketing Playbook (Procter & Gamble)(pp. 4-13, Publication)*.

Real Estate Executive Board. (n.d.). *Work Pattern Analysis: GlaxoSmithKline* (pp. 135-149, Publication).


APPENDICES

Appendix A: Pittsfield Pre and Post Renovation Survey Questions

- Overall how satisfied are you with GDAIS?
- Overall how satisfied are you with your current working environment at GDAIS?
- Overall how satisfied are you that your current work environment facilitates your productivity?
- In particular, how satisfied are you with the following aspects of your current working environment?
  - Access to computer resources
  - Access to coworkers
  - Comfort of work station
  - Privacy
  - Ability to focus appropriately on my work without distractions
  - Ability to easily know whether my coworkers are available for interaction
  - Ability to find/use meeting spaces
  - Usefulness of technology in meeting spaces
  - Storage
  - Availability of white boards
  - Quality of natural light
  - Quality of light provided to perform my work
  - Voice communication technologies
  - Ability to exchange/ share information
  - Ability to collaborate with coworkers
  - Ability to collaborate across geographies
  - Team workspaces
  - Individual workspace
  - Ability to work on my own when necessary
  - My individual productivity
  - The productivity of my team

- Indicate your level of agreement with the following statements:
  - Working at GDAIS is fun and exciting
  - The environment is a catalyst that enables rich and varied employee interactions
o There is a campus atmosphere here
o The workspace is adjustable to suit work needs
o The workspace is interconnected with the work process
o I am proud to bring customers into our workspace
o Our workspace has a strong positive impact on our ability to get the job done
o There is sufficient room to accommodate an expanding employee population
o There are optional work space to match particular work efforts
o There is the right balance between team and individual work
o I enjoy working for GDAIS
o I enjoy working with my time
o I enjoy working on my day to day tasks and assignments
o I find my job satisfying
o GDAIS maintains a casual work environment
o The work environment is very collaborative/team oriented
o GDAIS provides employees with frequent opportunities to socialize with other employees
o Coworker quality at GDAIS is world class
o I would recommend GDAIS Pittsfield as a great place to work
Appendix B: Scottsdale Modernization of Workplace Survey

Scottsdale: Modernization of Workforce

SURVEY

The following questions have been developed to provide us with a baseline measure of satisfaction with your current or for employees temporarily located in the swing space previous working environment.

There are several pages to this survey, use the right hand scroll bar and CONTINUE button at the bottom of each page to move through the survey. Click the SUBMIT button on the last page to end the survey.

Please start with the survey now by clicking on the CONTINUE button below.
Scottsdale: Modernization of Workforce

SURVEY

Overall, how satisfied are you with GDAIS?

<table>
<thead>
<tr>
<th>Extremely Satisfied</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Extremely Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Overall, how satisfied are you with your current working environment at GDAIS?

Note: for employees temporarily located in the swing space answer this based upon your previous work location.

<table>
<thead>
<tr>
<th>Extremely Satisfied</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Extremely Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

Overall, how satisfied are you that your current work environment (office space, furniture, office equipment, technology, etc.) facilitates your productivity?

Note: for employees temporarily located in the swing space answer this based upon your previous work location.

<table>
<thead>
<tr>
<th>Extremely Satisfied</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Extremely Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

In particular, how satisfied are you with the following aspects of your current working environment?

Note: for employees temporarily located in the swing space answer this based upon your previous work location.

<table>
<thead>
<tr>
<th>Access to computer resources</th>
<th>Extremely Satisfied</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Extremely Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access to co-workers</th>
<th>Extremely Satisfied</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Extremely Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

N/A
<p>| Comfort of work station | | | | | | | | | |
| Privacy | | | | | | | | | |
| Ability to focus appropriately on my work without distractions | | | | | | | | | |
| Ability to easily know whether my co-workers are available for interaction | | | | | | | | | |
| Ability to find/use meeting spaces | | | | | | | | | |
| Usefulness of Technology in meeting spaces | | | | | | | | | |
| Storage | | | | | | | | | |
| Availability of White Boards | | | | | | | | | |
| Quality of natural light | | | | | | | | | |
| Quality of light provided to perform my work | | | | | | | | | |
| Voice communication technology | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to exchange/share information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to collaborate with coworkers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to collaborate across geographies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team workspaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual workspace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to work on my own when necessary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My individual productivity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The productivity of my team</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you are dissatisfied with any of the above aspects of your work environment, please tell us why, (referencing the particular aspect):
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Extremely Important</th>
<th>Very Important</th>
<th>Important</th>
<th>Unimportant</th>
<th>Very Unimportant</th>
<th>Extremely Unimportant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to computer resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to co-workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort of work station</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to focus appropriately on my work without distractions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to easily know whether my co-workers are available for interaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to find/use meeting spaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usefulness of Technology in meeting spaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please rate the **importance** of each of these aspects.
<table>
<thead>
<tr>
<th>Availability of White Boards</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of natural light</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of light provided to perform my work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voice communication technologies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to exchange/share information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to collaborate with co-workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to collaborate across geographies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team workspaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual workspace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to work on my own when necessary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My individual productivity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please indicate your level of agreement with the following statements. Answer based upon your current work environment. 

**Note:** for employees temporarily located in the swing space answer this based upon your previous work location.

<table>
<thead>
<tr>
<th>The productivity of my team</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working at GDAIS is fun and exciting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The environment is a catalyst that enables rich and varied employee interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The workspace is adjustable to suit work needs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The workspace is interconected with the work process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am proud to bring customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
into our workspace

Our workspace has a strong positive impact on our ability to get the job done.

There is sufficient room to accommodate an expanding employee population.

There are optional work spaces to match particular work efforts.

There is the right balance between team and individual work.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

I enjoy working for GDAIS.

I enjoy working with
my team.

I enjoy working on my day to day tasks and assignments.

I find my job satisfying.

GDAIS maintains a casual work environment.

The work environment is very collaborative/team-oriented.

GDAIS provides employees with frequent opportunities to socialize with other employees.

Coworker quality at GDAIS is "world class".

I would recommend GDAIS Scottsdale as a great place to work.

Please let us know of any questions, comments or concerns you have with respect to the implementation of the open workspace.
Appendix C: Post Occupancy Face to Face Interview

Questions for 10/11 and 10/12 Interviews

Stephanie Fanger is completing her Master’s Thesis on the AIS move from a closed style workplace environment to an open style. She is interested in understanding which layout is more beneficial for the employee, through their morale and productivity. Employees who are interviewed will be asked questions similar to what is listed below. She will not use your name, but may use your quotations for measuring which office style is more successful. Interviews will be no more than 15 minutes in length.

- **Assigned workstation**
  - Are you happier in this new workstation compared to the old one?
  - Do you prefer the work surfaces in the new cubicle?
  - Do you prefer the new storage units in this configuration?
  - Do you feel ergonomically comfortable in the workstation?
  - What could make your new workstation better?

- **Accessibility to the outdoors**
  - Are you more able to view the outdoors in this new office environment?
  - Does the natural day lighting of the new space affect your happiness?
  - Is there glare from the sunlight penetration through the windows?
  - Do you feel more relaxed in the space because of the natural day lighting?

- **Workplace Amenities**
  - Do you approve the new break room?
  - Do you enjoy having a Starbucks coffee machine?
  - Does the break room seem inviting to you?
  - Do you prefer the new break room to your previous one?
  - Do you use the break room as a place to have informal meetings?

- **Organizational Hierarchy**
  - Do you sense any distinct difference in rank in the new layout?
  - Are you able to easily communicate with your manager or supervisor in the new layout?
  - Do you feel that your opinions matter?
  - Do you feel you are treated equal to others within the new space?

- **Technology**
  - Are you satisfied with the technology presented to your workstation?
Questions for 10/11 and 10/12 Interviews

- Do you feel that the new workplace is more technologically modern than the old workplace?
- How does using a laptop as your equipment compare to your previous work experiences?

- Temperature and Lighting Control
  - Are you happy with the temperature and lighting of the new environment?
  - Are you satisfied with the task lighting provided in the new cubicle workstation?
  - Do you prefer the lighting in the new workstation compared to your old workstation?

- Privacy
  - Do you feel that this open office style workstation provides less privacy than your previous closed office style workstation?
  - Are you able to hear your coworkers’ conversations?
  - Are you able to focus on your assigned work in the new workstation?
  - Do you prefer the acoustics of the workplace, compared to your old configuration?
  - Do you frequently use the phone rooms, huddle rooms and conference rooms as places to conduct your business besides your assigned workstation?

- Personalization
  - Do you feel satisfied with the ability to personalize your desk?
  - Is your old cubicle more preferable in terms of personalization?

- Communication and Collaboration Opportunities
  - Are you satisfied with the areas to collaborate with your peers?
  - Have you met new employees that you had not previously intervened with in this configuration?
  - Do you feel a stronger friendship with your coworkers in this open office style configuration?
  - Are you able to accomplish work tasks with others easily within this department configuration?
Appendix D: GDAIS Pittsfield Bronze Award

Fanger, Stephanie-p65625

From: Okamura, Patrick-P18691
Sent: Tuesday, October 11, 2011 7:12 AM
To: Schall, Lyle-P12366; Mansor, George-P19288; Tellefsen, Thor-P64302; Fanger, Stephanie-p65625
Cc: Adams, George-P17297
Subject: RE: AIS background/culture
Importance: Low

Thanks for the note Lyle. Glad we could participate and support this concept here in Scottsdale.

Patrick

From: Schall, Lyle-P12366
Sent: Friday, October 07, 2011 2:58 PM
To: Okamura, Patrick-P18691; Mansor, George-P19288; Tellefsen, Thor-P64302
Subject: AIS background/culture

Of interest:

16:02 GMT, October 7, 2011 Pittsfield, Mass. | General Dynamics Advanced Information Systems has been named as a bronze winner for the Team Massachusetts Economic Impact Awards, awarded annually by MassEcon (Massachusetts Alliance for Economic Development). The awards celebrate companies that have made an outstanding contribution to the Massachusetts economy.

General Dynamics Advanced Information Systems was chosen as a winner because it has hired 220 new employees since 2010. In addition, it has recently invested $12.6 million in facility upgrades to support this employment growth, directly providing an additional positive economic impact to the Berkshires region.

Many of those new jobs are a result of General Dynamics Advanced Information Systems being awarded the systems integrator role for the 12 "Independence"-variant ships in the U.S. Navy’s Littoral Combat Ship (LCS) program. General Dynamics Advanced Information Systems is responsible for the design, integration and testing of the LCS’s mission systems. Currently four of the 12 LCSs are under contract. The company also added high-technology jobs in 2011 to support its work on U.S. Navy submarine programs, a role it has held for more than 50 years.

The company currently has job opportunities for an additional 44 workers in Pittsfield. Systems engineers, quality engineers, and business management specialist are all required. Job listings can be found online at www.gd-ais.com/careers.

Lyle Schall
480-441-4457

This message and/or attachments may include information subject to CDC4S S.P. 1.8.6 and GD Corporate Policy 07-706 and is intended to be accessed only by authorized personnel of General Dynamics and approved service providers. Use, storage and transmission are governed by General Dynamics and its policies. Contractual restrictions apply to third parties. Recipients should refer to the policies or contract to determine proper handling. Unauthorized review, use, disclosure or distribution is prohibited. If you are not an intended recipient, please contact the sender and destroy all copies of the original message.
Appendix E: GDAIS Sustainability Elements of Renovation

Fanger, Stephanie-p65625

From: Duffina, Terry L. [Terry.Duffina@gd-ais.com]
Sent: Thursday, May 19, 2011 10:30 AM
To: Fanger, Stephanie-p65625; McGuire, Vincent F.; Niedzielski, Kevin; Johnson, Lemelle-P64934
Subject: Summary of Sustainability Elements for AIS Scottsdale Space

Per our conversation today, all of these are in the design for the space and C4S is implementing them unless otherwise noted. Please let me know if I missed anything or misrepresented anything.

Construction & Demolition Waste
- Interior walls are metal, modular so will be stored on-site for reuse
- Carpeting will be stored for reuse when feasible
- There will be asbestos-containing material wasted out (carpet, some duct insulation, some ceiling)
- C&D waste will be segregated and recycled per the overall campus recycling program

Lighting –
- approximately 600 T-12 fixtures will be replaced with ~300 T-8 fixtures
- fluorescent bulbs are x% direct and x% indirect
- all lights will be motion sensored
- daylighting will be maximized due to removal of offices lining the exterior wall, opening up the space for full benefit
- windows won’t be modified, currently have appropriate tinting

HVAC –
- Is and will be tied into the Building Automation System
- It’s possible that one small unit will be added. If it is, it will be Energy Star and will be tied into BAS

Material Selection/Procurement –
- New carpet with pre/post consumer recycled material
- Recycled content base boards
- Low or no VOC carpet, adhesive, paint
- Pantry appliances (two microwaves, one fridge) will be Energy Star (AIS responsibility)

Energy conservation -
- Space is not sub-metered
- NFPA 70e requirement will be met and folded into building calculations
- Two electrical panels will likely be replaced
- Discussed possibility of motion sensored power strips. More investigation to be done. (Terry)

Post Construction
- Recycling bins will be reused from before the project
- Furniture (AIS responsibility) – more investigation will be done as to recycled content (Terry)

Terry Dufinna
Energy & Sustainability Manager
General Dynamics-Advanced Information Systems
(650) 966-3696 office
(650) 333-5935 cell
(650) 966-2200 fax

GDAIS employees, please visit our Energy website or email us with your ideas.
Appendix F: GDAIS Scottsdale Post Occupancy Interview

Fanger, Stephanie-p65625

From: Butler, Thomas M. [Thomas.Butler@gd-ais.com]
Sent: Monday, October 10, 2011 7:02 PM
Cc: Fanger, Stephanie-p65625
Subject: New Workspace Occupancy Interviews

Greetings,
Stephanie Fanger from C4S will be conducting 15 minute interviews in huddle room H2200W Tuesday and Wednesday mornings this week. We are collecting data about our new workspace in an effort to improve the area and plan for future implementations. Stephanie is also using the data as part of a Masters Thesis. She and I will be coming around in the morning soliciting your help and looking for volunteers to participate. In exchange for your time you will receive some food and maybe a special prize! Attached is a quick synopsis of questions that might be asked if you would like a preview.
Thanks,

Tom

10.11 and 10.12
Interview Ques...

Stephanie J. Fanger
LEED AP BD+C, ASSOC, IDP, FMP
IFMA Greater Phoenix Chapter | Student Chapter Advisor
IDP Southwest Chapter | VP of Student Affairs
Appendix G: GDAIS Scottsdale Post Occupancy Interview Results

Interviewee 1

- Assigned Workstation
  - More distracted in the new environment, although he/she is not concerned with others viewing his/her computer screen
  - Feels the space is easier and more pleasing on the eyes, but is not productive in it
  - Layout of the cubicles is okay
  - Storage space is bad
  - White board space is limited, there is a problem with the white boards and secrecy, as in the previous location they were not viewed by others and were more covered
  - Dry erase markers and erasers are a problem and leave streaking
  - Believes that the cubes should be raised by a foot with the panel height
  - Believes change is good
  - Layout by discipline was how the cubicles were formulated, immediate needs are within a close distance

- Accessibility to the Outdoors

- Workplace Amenities
  - He/she has used the huddle space but believes there are bad acoustics associated with it, does not believe there is availability for confidential conversations to take place
  - Break room is nice, is nice to have free coffee
  - Wants more color, suggested the east wall to get painted a color

- Organizational Hierarchy
  - Believes it would be more beneficial for management to be in offices for confidentiality reasons
  - Believes management is more visible to see you, which also means more available for questions
  - Management is located in a central hub
  - Feel new layout makes him/her feel more accounted for by management

- Technology

- Temperature and Lighting Control
  - Temperature has been okay, huge problem with it being too warm in the beginning
  - Uses a personal fan when it’s too warm
  - Lighting is functional

- Privacy
  - If in need of privacy, he/she goes for a walk and prefers to not use the phone rooms

- Personalization

- Communication and Collaboration Opportunities
  - Audio noises were distracting, made it difficult to focus on high task jobs but could understand the other noises
  - Hates the lack of collaboration
  - Problems with coworkers talking loudly
  - Believes there is immediate collaboration but there was never a problem with collaboration beforehand
Would prefer to go back to old configuration

Interviewee 2
Worked for GD for a year

- Assigned Workstation
  - Love the workspace
  - Like the color selection for the walls
  - Used similar accent colors in his/her house based off of his/her work
  - Like panel height, can't see over it. Never see his/her coworkers eyes, put monitors in the way so awkward eye connection didn't happen
  - Chair is fine, improved from last one

- Accessibility to the Outdoors
  - He/she feels much happier with the daylight
  - Enjoy seeing the sunset when working late
  - Excellent outside view

- Workplace Amenities
  - Has used the huddle room before, successful at using it without reservations. One day there was a huddle room which was really busy and people fought over it
  - Phone rooms are being used
  - Like the break room, wish the television had a remote to it. Thinks maybe someone took the remote, or it never had one.

- Organizational Hierarchy
  - Feel he/she is at the same level of management, feel more comfortable. Feel that approachability to managers is easier.
  - Liked the daily meetings and how managers are starting to get more familiar with faces

- Technology
  - Same computer as previous workspace

- Temperature and Lighting Control
  - Previous environment was really dark, couldn't see well since the previous room was kept with half of the lights off
  - Temperature is well, doesn't have to use heaters or fans
  - No glare on computer screen
  - Lighting is perfect and task lighting provides just enough light

- Privacy
  - No problems with noise, no one has used the speaker phone
  - Privacy is not a priority, too busy to focus on privacy

- Personalization
  - Good availability for personalization, same things are up in the cubicle as the previous office

- Communication and Collaboration Opportunities
  - Enjoys walking to the factory, as she/he spends a lot of time in the factory and likes the exercise. Believes older engineers don't like traveling to the factory
  - Love who he/she is seated by, have the right players next to her, can easily talk about the space
  - Believes that there is more passing of information with talking
  - Collaboration is much easier in this space, there were time issues and mistakes in the old workspace
Would prefer to stay in current configuration

**Interviewee 3**
Overall feels like it’s a mixed bag with new configuration, has its pluses and minuses. Person has been with the closed style office since 1997. He/she wasn’t happy about changing spaces. He/she has been here for 23 years.

- **Assigned Workstation**
  - Was comfortable with old space, as work habits were developed
  - Panel height is not a problem
  - Knees hit the wall, need a deeper surface area under the writing desk, can’t stretch legs out
  - Fit and finish is nice
  - Relatively modern other furniture in old workspace
  - Believes furniture is “premium stuff now”
  - Don’t like the chairs in the new space, doesn’t recline well and sweating issues n the seat

- **Accessibility to the Outdoors**
  - Concern with confidentiality with the windows, questionable if someone could use binoculars to see the monitors
  - Security is an issue, thinks that security wasn’t thought of with the renovation, especially with the window situation

- **Workplace Amenities**
  - Huddle rooms are not good acoustically
  - Break room is no big deal, seems nice though
  - Not crazy about the coffee machine

- **Organizational Hierarchy**
  - Don’t notice a rank or hierarchy in the space
  - Feel like being watched by management and surrounding employees
  - More obvious insight of management
  - Motorola stigma had an entitlement to it, with doors and walls
  - This person is not motivated by furniture, maybe more so by money

- **Technology**

- **Temperature and Lighting Control**
  - Too bright in the old area
  - During the daytime thinks that they should turn off the overhead lights, people can use personal lights, can save money spent on electricity
  - Too overloaded with combination of natural and artificial light
  - Temperature is okay

- **Privacy**
  - Can hear people walking down the hallways, not so private in huddle rooms
  - Acoustics is not good in the conference room or huddle rooms

- **Personalization**
  - Same personalization as old office, just less square footage than the old office, no area to hang posters or large frames because panel size

- **Communication and Collaboration Opportunities**
  - Collaboration is good, which is an obvious, can turn around and fix issues immediately and people can lean on the short wall to talk about work
  - Work layout is advantageous
Not sure which he/she would prefer for ideal configuration

**Interviewee 4**
He/she as been with the company since it was Motorola. He/she was very surprised that he/she would enjoy the workspace so much. Considers this the best workstation he/she has ever worked in.

- **Assigned Workstation**
  - Wouldn’t change anything about the space
  - Panel heights are good
  - Workstation fits ergonomic needs
- **Accessibility to the Outdoors**
  - Love the windows, makes a huge difference and affects his/her mood
  - Entrance to exterior for smoking permitted area is decently close
- **Workplace Amenities**
  - Break room is good, like the coffee
  - Participated in a Wii game one night when he/she and other coworkers stayed late to work
  - Had a fun time playing bowling together
  - Huddle room allows for quick meeting rooms, hard to find conference rooms
  - Likes the different locations to work in
- **Organizational Hierarchy**
  - Less of a hierarchy, more of a team environment
- **Technology**
  - Feel that technology is improved
- **Temperature and Lighting Control**
  - Temperature has been good
  - Lighting is sufficient
  - No glare on computer screen
- **Privacy**
  - Privacy isn’t an issue
  - No noise issues, no one uses speaker phone
- **Personalization**
  - Personalization is good
- **Communication and Collaboration Opportunities**
  - Love her teammates being there, quick transition on getting things done
  - So much easier to collaborate

😊 Would prefer to go stay in the new configuration

**Interviewee 5**
This person has been with the company since 1972, also starting to warm up to the new configuration. He/she generally likes the newness of space with the effort of the new technology.

- **Assigned Workstation**
  - Wish there was more counter space
  - Wish the cubicle was easier to bring people into, not easy to work with someone else in there
  - Workspace feels claustrophobic
Stands at cubicle for work because back problems, the workstation does not do well with back issues
Wish that his/her monitor situation didn’t take up the entire desk
Work desk is too shallow, can’t get configured in it comfortably
Wish the surface of the workstation was not so wobbly
People are organized by functions

Accessibility to the Outdoors
Hardly notices the window

Workplace Amenities
Has not used the break room really. Doesn’t drink coffee so that does not benefit him/her
Screen material in the conference room does not display as crisp of an image as the old workspace
When the huddle rooms are being used it can be a bit distracting for others
Huddle rooms don’t reduce the amount of scheduled meetings

Organizational Hierarchy
Bosses in cubicles is not a concern, believes they are just as accessible as before, thought that they would be more disruptive but they have not
Office or cube isn’t a concern for approachability
Has a perception that managers view it as more people in a smaller space, negative perception as the bulk of people has been cut along with 401k, and one less week of vacation days
Believes that the people chosen to be in the renovated space were strategically chosen, and it is seen as an opportunity to experience something different

Technology
Technology is newer, but has not taken advantage of it
Does not possess a laptop

Temperature and Lighting Control
Feels that the lighting is better, more open feeling
No glare from the window
Temperature has been comfortable

Privacy
Disrupted by others with the talking and dealing with personal family issues. Finds it awkward to be around
Management needs to put up a map in the area of where the employees sit so people don’t walk back and forth down the rows looking for people. This can be very distracting
Feels that the area is treated like a library, everyone is way too quiet

Personalization
He/she has not worked hard to personalize the desk yet
Took home past decorations, as they were posters and could not be hung up in current cube configuration

Communication and Collaboration Opportunities
Feels the company’s mindset is to work with less storage. Feels very limited
Communication is different than previous work station because you have to filter off into a huddle room
New space challenges his/her view on productivity as there is a shift on relying on printed matter and spreading out space.

😊 Would prefer to stay in current configuration

**Interviewee 6**
This person has worked with company for 16 years.

- **Assigned Workstation**
  - Feels like the cubicles are arranged eye to eye
  - Old higher paneled cubicles cut out phone conversations better
  - Storage is not enough
  - Could use more length on the counter surface, too shallow
  - Prefers to have more workspace
  - Doesn’t like that the surface is white, gets dirty all the time and is constantly cleaning it
  - Does not use the white board frequently

- **Accessibility to the Outdoors**
  - Feels that the natural light is harder on the eyes
  - Likes looking out the window
  - His/her eyes have felt more tired in the new space
  - Old room was much darker
  - Bad choice for break room table to be white, see residue

- **Workplace Amenities**
  - Has used the break room, but has never seen anyone eat their lunch in it
  - No one uses the break room as a conference space

- **Organizational Hierarchy**
  - Doesn’t like that the managers don’t make eyesight or say good morning
  - Managers are very aware of what is going on

- **Technology**
  - Using the same computer as old workspace
  - Thinks everyone should have security screens on computer monitor

- **Temperature and Lighting Control**
  - Temperature is a bit warm, but the use of personal fan makes it bearable
  - No glare experienced on the screen

- **Privacy**
  - Conversations haven’t been too horrible, can put on headphones to drown it out
  - No one has used speaker phone
  - Feels new layout isn’t private at all, has not used the phone rooms yet
  - Sometimes it’s hard to concentrate when doing a high stress task
  - Feels it was harder to concentrate in old environment than new
  - Noise levels were worse when working in old environment
  - Misses the privacy of the old environment

- **Personalization**
  - Feels that personalization is important, you are in that space for so many hours a day and need to feel happy in that space

- **Communication and Collaboration Opportunities**
  - Stated that everyone in the space was whispering the first day, space is viewed as a library
  - No disruptions from stairwell transients
Feel the environment is more interactive and collaborative
Likes that if he/she needs to get a hold of engineers, you can see where that person sits and if they are in
People are more aware of the noises they make and controlling their volume in the new configuration
More social in the new workspace

Would prefer to stay in current configuration

**Interviewee 7**

- **Assigned Workstation**
  - Has no problem with panel height
  - Did not like the previous work stations flipper doors, likes the current work stations lower storage
  - There is no room for an extra chair for consulting in one’s cube.
  - “When you are showing someone how to use a tool it is easier for both to sit in front of the monitor. Just thought I would throw that out there in case no one else mentioned it. It the last open environment our workspace was a little bigger and we had room for an extra chair.”- From an email from the Interviewee sent after the interview

- **Accessibility to the Outdoors**
  - Likes the natural light, likes the openness
  - Feel more relaxed with the natural light, not as depressing
  - Likes being able to see the weather

- **Workplace Amenities**
  - Likes not having to wash the coffee cup in the sink
  - Loves the Starbucks machine
  - Nice to play the Wii games as a distraction from time to time
  - Carpet has been absorptive to conversations
  - Loves the colors on the wall, but thinks there needs to be some art work
  - Suggested the idea of having employees artwork on display on the walls

- **Organizational Hierarchy**
  - Does not think there is a problem with rank
  - Knows the managers now, did not know them previously
  - Can put a name to face now with the open seating, didn’t know the people previously
  - Collocation is nice for support, easier for communication to happen

- **Technology**
  - No glare on computer screen
  - Using the same computer as before
  - Wish the new workplace had Wi-Fi
  - Prefers to be mobile, working anywhere from a laptop but this is not an option at the time
  - Use the company version of instant messenger (EIM) a lot to communicate with coworkers

- **Temperature and Lighting Control**
  - Lighting of previous space was too dark, had no windows
  - Has not used the task lighting yet, feels it looks similar to a microphone, have fun with other employees pretending it’s a microphone
  - Temperature has been good
- **Privacy**
  - Space has been very quiet
  - Has worked in an open atmosphere before and is used to it
  - Hard to have a private conversation on the cell phone, has used the phone rooms for personal conversations

- **Personalization**
  - Same personalization as previous workstation

- **Communication and Collaboration Opportunities**
  - No difference in productivity of the different spaces
  - Easy to walk up to people and accomplish task, don’t get side tracked as in the older work style

😊 Would prefer to stay in current configuration

**Interviewee 8**

- **Assigned Workstation**
  - Prefers higher panels on the cubicle
  - Needs a bigger cubicle in order to facilitate customers who come into the space, not comfortable moving customers away from the desk to speak with them
  - Needs more storage, likes to hold on to a 5 year history of documentation but has no place to store it
  - Believes the workstation height is at an awkward height with eyesight

- **Accessibility to the Outdoors**
  - Able to see the windows, but not directly near it
  - Able to view the sunlight through the windows
  - Believes the windows poses a security threat

- **Workplace Amenities**
  - Hates the concept of the Wii system, finds it a rarity to ever have a moment to get away for a bit and do something not work related
  - Starbucks machine doesn’t apply, does not drink coffee
  - No one eats in the break room
  - Phone and huddle rooms are useful, but annoying to transfer calls because it adds an extra step

- **Organizational Hierarchy**
  - Put many years into the company and has no physical entity to show this
  - Liked that in the old workplace the skill set matched the position which was physically shown with office size
  - Not comfortable with more managers
  - Feels managers are hard to approach, management is bad
  - Feels that there are two type of people in the company, those who are corporate America climbers and those who just want to work and most of the people she works with are adaptable
  - Not happy with lack of raises in the past few years, feels this renovation was a waste of money by management and that it could have gone to raises for employees
  - Feels like his/her opinions do not matter
  - Feels like he/she doesn’t matter to management and that he/she would be replaced in a second for half the amount of money

- **Technology**
Curious where the monitor holders are
Believes the technology was not improved and there are less choices to offer to the employees
Not comfortable with the security of the space

- Temperature and Lighting Control
- Privacy
  - Privacy is a big factor to this person, thinks the workplace will swing back to the old style because no one likes it
  - Restroom doors being exposed near the managers cluster is very awkward for going to and wanting to use
- Personalization
  - Personalization is not important to this person
  - Does not like having personal belongings in plain view
- Communication and Collaboration Opportunities
  - Does not agree that this new space is collaborative
  - Believes that he/she is more distant from their team

😊 Would prefer to go back to old configuration

**Interviewee 9**

- Assigned Workstation
  - Previous work station was bigger, could keep more stuff in it
  - Previous work station had a door, felt it was a downgrade
  - Height of the cubicle panel doesn’t make that big of a deal
  - Easy to see if people are at their desks
  - First few days in the space was visually distracting, but have gotten used to it now
  - Would like a bigger bulletin board
  - Does not like the chairs in the workstation
  - Would like some more organizers in the desk storage
  - Storage is sufficient, purged down prior to move
  - Misses the square footage of the old cubicle
  - Not invested in the desk, just sees it as a way to get things accomplished

- Accessibility to the Outdoors
  - Like the window likes being able to see outside
  - Likes seeing Camelback mountain
  - Natural light has no effect

- Workplace Amenities
  - Used coffee machine, like it but have heard it is very noisy
  - Coffee machine is so popular you have to plan out when you will get a cup because it gets busy in the mornings
  - Like having a TV in the conference room, can watch the news or watch when the Diamondbacks were in the playoffs
  - Huddle rooms work out well and are easy to use, nice to have TVs in them

- Organizational Hierarchy
  - Believes managers should have their own office for confidentiality reasons
- It is a distraction when you want to talk to your manager in an open area like this and it is obvious when you go to a private room to discuss something
- Feels that managers have had an open door policy always
- This setting may be helpful for entry level employees to talk to their managers
- Believes upper managers need more privacy

- **Technology**
  - Feels technology is about the same
  - Wi-Fi would be preferred in the space

- **Temperature and Lighting Control**
  - No difference in lighting from old workspace
  - Temperature is fine, not too cold or hot
  - Does not use the task lighting, but it functions for its intention

- **Privacy**
  - Doesn’t mind the noise or visual distraction
  - Wish he/she could see people walking up behind him, doesn’t like being tapped from behind
  - No security issues with the work

- **Personalization**

- **Communication and Collaboration Opportunities**
  - New space provides communication and collaboration, does well on what it was advertised to do
  - Can communicate better in the new space
  - Good for younger employees to interact with one another

😊 Would prefer to go back to old configuration

**Interviewee 10**

- **Assigned Workstation**
  - Like this workstation better, believe it is more user friendly
  - Does not have a lot of space, need more than 3 doors
  - Like the cleanliness and openness of the area
  - This is this persons third move in a year
  - Depth of surface on is sufficient
  - Is fine with the chair

- **Accessibility to the Outdoors**
  - Enjoys the window, the light is shared well
  - Blinds are able to be rotated to shade the daylight if it’s too much

- **Workplace Amenities**
  - Likes the break room, enjoys the Starbucks machine but can hear its noises
  - Wii system is used seldom, usually in the early mornings or late afternoons
  - Likes the phone room and huddle rooms respect other coworkers
  - Believes the kitchen needs to be reconfigured as the openings go into the hallways and it is disruptive to those who work around that area
  - Problem with other department using the Starbucks coffee machine, not just that department using it

- **Organizational Hierarchy**
- No difference in hierarchy compared to this person's other office style
  - Like being able to see his/her boss easily
  - No problem with approaching management
  - Believes that employees are now held more accountable as the layout is very open

- **Technology**
  - Much better technology in the new office
  - Had a bad glare on computer screen from window, but adjusted it with the blinds

- **Temperature and Lighting Control**
  - Uses the task light, has good visibility
  - Temperature has been really reasonable
  - Believes the openness helps with the temperature
  - Good lighting at desk station

- **Privacy**
  - No disruptions from people in the break room, just the coffee machine noises
  - Hasn't heard anyone on the speakerphone
  - No issues with privacy
  - Takes business calls at desk, rather than using a phone room
  - Does not like the managers being seated outside of the restroom, would like to see a panel added so visual is not there

- **Personalization**
  - Believes personalization matters
  - Can still do personalization in new workstation and make it his/her own
  - Would like to see more plants put around the office

- **Communication and Collaboration Opportunities**
  - Communication is much easier than before, easier to collaborate with coworkers that he/she is seated near
  - Has a lot of visitors because of work related tasks, uses extra task chairs quite often
  - People who talk a lot in former workspace are much quieter in this one

😊 Would prefer to stay in new configuration

**Interviewee 11**

- **Assigned Workstation**
  - Had a hard wall office in old environment
  - Doesn't have a problem with closed or open style configuration, just a place to work. Both have advantages and disadvantages
  - Dry erase markers and erasers are bad quality and leave many marks
  - Wishes the storage units under the workstation were on wheels so they could be easily moved and people could be arranged easier

- **Accessibility to the Outdoors**
  - Likes the natural lighting, sits two workstations from the window
  - Likes to look at Camelback mountain
  - No glare on computer from the window
  - No problems he/she sees associated with security and the window

- **Workplace Amenities**
  - Has not used the phone rooms
Coffee machine is good, minus the first week the decaf and regular were crossed. Wishes that there was 3 regular and 1 decaf
Believes huddle rooms are important, thinks they will be highly used at the end of the year, closing out projects
Break room seating is not ideal
Have to use the table to use the Wii
Has met new employees and others who are not familiar through the break room

Organizational Hierarchy
Does not feel the office is viewed as an entitlement

Technology
Believes there is no problem with security
Has given laptops to all his/her employees already
His/her employees all have a blackberry or a company issued phone
Allows employees to work from home as need be, flexible with working remotely
Wish Wi-Fi was present in the space
Would like to see a camera built into the huddle rooms for saving the white board spaces, maybe implement a smart board

Temperature and Lighting Control
Temperature is fine, was too hot in the first week

Privacy
Likes privacy screen on computer
Surprised at how quiet the space has been, thinks people are being paranoid about talking in the space
Has not heard anyone use a speakerphone
Doesn’t like people approaching from behind, needs to put a mirror on the monitor for one this happens

Personalization
Personalization is not important

Communication and Collaboration Opportunities
Believes its more collaborative and communicative, more open communication
Easier to talk to people in this configuration
Thinks it is beneficial to have multiple places to work at, need to have 10 minute breaks to re focus on work

Would prefer to stay in current configuration

Interviewee 12
This person has been with the company for 16 years.

Assigned Workstation
Believes the new configuration is a huge mistake and that there was no research done prior to the design. Misunderstanding in the beginning about number of computers and monitors needed for job
Finds the openness completely distracting and not helpful
Not enough space for storage
The panels need to be raised to be 1.5 to 2 feet taller
Needs more whiteboard space
Length problem hitting knees on the panels
• Hates the chairs, believe the produce excess sweat in the seat
• Believes everyone hides behind their monitor which creates an ergonomic issue
• Gets to new office early and leaves early to avoid people

• Accessibility to the Outdoors
• Likes the natural light but switch to the old office style in a heartbeat to not have to be in the new space

• Workplace Amenities
• Huddle rooms are beneficial, didn’t use them before but didn’t needed them before either
• Believes the phone room is a dumb idea

• Organizational Hierarchy
• Doesn’t understand why management went through with the renovation when they laid off many people this year and continue to do so, thought is that people’s jobs could be saved without the renovation
• Thinks that peers have found other places to go work in the facilities because they hate the new configuration so much
• Doesn’t think that management is more approachable in equal cube
• Thinks VPs and Managers should have an office for confidentiality reasons
• Feels conversations with managers are very hurried and other people listen in
• Feels like he/she cannot tell managers real opinion about the space or he/she will lose their job
• Feels a huge disconnect between management and employees
• Believes the management style is very poorly executed

• Technology
• Thinks technology has not improved, if anything it may have gone backwards
• Believes the move was done to add more people in a small space

• Temperature and Lighting Control
• Temperature is okay

• Privacy
• Distracted by noises especially the white sound noise, wants to bring in a noise meter to observe it
• Has observed no one on the speakerphone
• Very distracted by others conversations
• This person misses the quietness of previous environment
• Believes there is no privacy, hates other people seeing him/her

• Personalization
• No area to hang personal belongings, little wall area and surface area on the desks

• Communication and Collaboration Opportunities
• Does not think this work style is collaborative at all
• All of projects related to his/her job are located at a different area so it is not very convenient
• Believes other work environment was beneficial for getting things done and working in a team
• Was more productive in a team and individually in the old space
- Hard to fit others in cubicle to look at computer screen, some things you cannot collaborate in a huddle room and need to use the desk

瞑 Would prefer to go back to old configuration

♂ 6 Males Interviewed
♀ 6 Females Interviewed
12 Total People Interviewed