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Designing a Shared, Collaborative Office Space to Accommodate Young and Aging Employees

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DESIGNING A SHARED, COLLABORATIVE OFFICE SPACE TO
ACCOMMODATE YOUNG AND AGING EMPLOYEES

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This work is dedicated to:

My family past and present; for what you were never able to do for yourselves, you dreamed for me and I accomplished.

My daughter; for what I was able to do for myself, I dream a bigger dream for you.

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ABSTRACT

This study addressed the relationship between the design of the office environment and aging workers in a collaborative office that is shared by younger employees. In both developed and developing countries, workers are staying in employed positions well beyond the traditional retirement age and changing the makeup of the workforce. With an increased aging population and many developed nations displaying negative birth rates, a growing gap between adults able to work and youth entering the workplace is forcing employers to find new ways bridge this fissure. Many industries have begun hiring employees beyond the traditional working age in order to stay competitive and to fill hiring gaps; however, with this shift in the makeup of the workforce, there has yet to be a shift in how office spaces are designed. The emphasis of this study is the manner in which office spaces are currently designed and how they can be redesigned to assist older workers within the office environment.

The objective of this study was to better understand and implement in a theoretical design, elements that assist older adults within an office environment selected for this project, located in Chicago, Illinois. The goal of this study is to create criteria for designing an office space that accommodates older workers who share an office space with younger employees. This developed criteria will then be demonstrated in a theoretical design of a space that is used by these workers. In order to develop design criteria for redesigning this office, the researcher reviewed published studies and materials focusing upon theories of current office design, ergonomics, universal design, lighting, and job accommodation. Focus group interviews with employees and customers within the target age range of 55 and older were then conducted after an interview with the head of the Human Resource division was completed. Twelve hours of onsite observations were also conducted with photographs used to document the current design and use of the office.
The result of the research was a design that met criteria developed from published literature and testimonials from employees who use the office space. The design met these criteria through a solution that focused on: how employees were grouped within the space; creating a custom and enjoyable working environment; utilizing a combination of exterior views and sunlight in the office; the combination of various types of artificial lighting sources and fixtures; and the selection of furniture and materials to accommodate older workers. This study contributed new information to the subject of aging and office environments by implementing the published theories into a specific application that is designed for older workers but flexible enough to be used by their younger colleagues.
“It is within [the] context of change that a new workscape is emerging.”
(Becker, 1995, p. 49)

Change is one of the most powerful elements within the human existence; it is said to be the only constant element within one’s life and upon the earth. However, we as humans rarely respond positively or quickly to this one constant element that surrounds and often shapes our lives. In many countries including the United States, the concept of aging is changing, and in the process it is creating a ripple effect that is causing many to change their perceptions of retirement (AARP, 2005) and work. This study developed as a result of and a reaction to: the changes in the global population; changes in the attitudes regarding aging and retirement; and a reaction to the deficiencies of work spaces in terms of accommodating aging persons and workers. This study aims to address the needs of those ages 55 and over, who are currently in need of equality and comfort within their working environment (Roper, 2007). For interior designers especially, this change has created many opportunities to understand how the manipulation of space can influence positive relationships toward aging adults and their working environments.

There is a precedence of workplace protection, inclusion and equality within the United States for those of all ages (OSHA, 2009). The fair treatment and hiring of workers within the United States is protected by laws making it illegal to discriminate against people because of age (U.S. Department of Labor, 42 U.S.C. Section 6101-6107). Organizations like the Occupational Safety and Health Administration (OSHA) promote the safety of workers by making it illegal to provide a hazardous working environment for employees (OSHA.gov). However progressive and protective the laws are, aging adults have an additional set of concerns and needs for the workplace that should be included to suit the changes within the global demographic of employees. In order to understand
where U.S. laws and OSHA safety standards fall short, it is important to look at other areas like ergonomics, universal design, and job accommodation to understand how to best design work spaces for older workers.

Currently, there are many examples of spaces that are not only designed to house adults as they age, but to also assist in increasing their comfort, safety and productivity in spaces where these adults choose to be active. These spaces are not only thoughtfully designed homes for aging, but they also exist as beautifully designed public spaces like community shopping centers and squares where persons of all ages convene. To understand how to design an office space that includes aging adults, it is important to understand how spaces, both those designed specifically for older adults and those for the general public, can assist aging adults in being independent and productive.

This study and its subsequent conclusions are different from many similar studies that focus upon aging because the purpose of this inquiry is not to create an office environment that is solely suitable for an aging workforce. Meaning that, this study is not focusing upon creating a community center or facility used solely by older employees. This study aims to create a prototype of an office space that is well designed for employees age 55 and over, that allow these adults to work at equal levels of productivity as younger employees who used the same office area.

1.1 Purpose of Study

The purpose of this study is to create a well designed office environment that specifically accommodates older employees who share a collaborative office space that is also used by younger employees.

1.2 Justification of Study

The last major changes to the design of the office environment were the introduction of open office landscaping, also known as open office systems, in
1970 (Becker, 1995) and the introduction of widespread computer use in the 1980s. The lack of change to the design of the office environment within the past twenty years has resulted in many office environments developing into virtual dinosaurs within the design community and a liability to many organizations (AARP, 2004). This negative positioning of the office environment has resulted from a lack of change to the office in concurrence with the change to the working population that is aging (AARP, 2004). Therefore, the redesign of office interiors to accommodate an aging workforce may be the vital change that will increase global productivity as an older workforce becomes the standard practice and not the exception.

1.3 Design Opportunities

Through research, observation and analysis, there is an opportunity to add to the body of knowledge within the interior design community and the office environment. The opportunity lies within creating design criteria for designing office spaces for aging adults that can be easily implemented within many types of spaces. It is hoped that the design criteria developed in this study will assist in reversing the current stagnant nature of progress within the office environment by providing basic comfort and opportunities to aid older workers.

1.4 Goals

The primary goal of this study is to create criteria for designing an office space that accommodates aging workers and to redesign an office that is shared by their younger coworkers based upon research, observations and interviews of older employees.
1.5 Research Questions

The primary research question guiding this study and the subsequent design solution is: *What is an appropriate design solution for an office space that is conducive to employees over the traditional retirement age who work in a collaborative office space that is shared with younger employees?*

To answer this primary question, the researcher will also seek to answer the following questions:

1) How can design elements of ergonomics and job accommodation work together to create an office space that is conducive to employees ages 55 and over?

2) What is an appropriate balance of task and ambient lighting for older employees?

3) Are exterior views and the inclusion of sunlight within the office environment significant to the overall wellbeing of older employees?

4) What is an appropriate balance of public and private spaces needed for employees, ages 55 and older?

5) What are the materials and finishes within the office that best accommodate older employees?

6) How can an office be designed for older employees to work in a shared and collaborative space?

7) What other features should be included in the office design to make the workplace more accommodating to older employees.

These primary and secondary questions derived from preliminary research of published materials on aging in combination with casual interviews and conversations with employees over the age of 55.

1.6 Design Approach

In order to design an office space for an older workforce, the following steps will be taken:
1) Review the literature published on aging, retirement, health issues related to aging, design issues related to aging, and design issues related to the office;
2) Select an office that holds a significant population of employees ages 55 and over in order to observe how they use the space;
3) Conduct focus group interviews within the selected office using employees of the target group to better understand their attitudes about the space and how they feel the office does, or does not, serve their needs; and,
4) Use information gained through the literature review, observations, and the focus group interviews to create a theoretical office design that addresses the physical needs of the older workers in the office.

1.7 Definition of Terms

**Aging Workforce**: Pool of employees who are close to or over traditional retirement age in their respective country, ages 55 and over.

**Baby Boomers**: Persons generally agreed to have been born between the years of 1946 and 1964 (Dychtwald, 1999).

**Daylighting**: The illumination of indoor space by natural light (Merriam-Webster, 2009)

**Cumulative Trauma Disorders (CTDs)**: “Term used for injuries that occur over a period because of repeated trauma or exposure to a specific body part, such as the back, hand, wrist and forearm. Muscles and joints are stressed, tendons are inflamed, nerves pinched or the flow of blood is restricted. Common occupational induced disorders in this class include carpal tunnel syndrome, epicondylitis (tennis elbow), tendonitis, tenosynovitis, synovitis, stenosing tenosynovitis of the finger, DeQuervian's Syndrome, and low back pain” (Ergoweb, 2009).

**Customers**: A term given to the persons that Organization Community Improvements serves.

**Ergonomics**: “An applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely”
(Merriam-Webster, 2009): “The science of work; Ergonomics removes barriers to quality, productivity, and safe human performance by fitting products, tasks and environments to people” (Ergoweb, 2009).

Footcandles: “A unit of illuminance on a surface that is everywhere one foot from a uniform point source of light of one candle and equal to one lumen per square foot” (Merriam-Webster, 2009)

Forced Retirement: When an employee feels as though they have been forced to leave the workforce (Szinovacz, 2005)

Job Accommodations: A change within the work environment that allows the user to work, regardless of their health condition (AARP, 2004)

Musculoskeletal disorders/injuries (MSD): “Injuries and disorders of the muscles, nerves, tendons, ligaments, joints, cartilage and spinal disc; examples include carpal tunnel syndrome, rotator cuff tendinitis, and tension neck syndrome” (Ergoweb, 2009).

Office System Furniture: Also known as cubicles. A common type of furniture used in open plan offices, developed in the 1960 that allows multiple employees to have semi-private work areas in one large office area.

Organizational Ecology: “How an organization’s leaders choose to convene their employees in space and time in pursuit of a long-term competitive edge” (Becker, 1995, p. 11-12)

OSHA: “Occupational Safety and Health Administration. The mission of the Occupational Safety and Health Administration (OSHA) is to save lives, prevent injuries and protect the health of America's workers. To accomplish this, federal and state governments must work in partnership with the more than 100 million working men and women and their six and a half million employers who are covered by the Occupational Safety and Health Act of 1970” (Ergoweb, 2009)

Phased Retirement: When retirement happens gradually, over a period of months to years (Dodds, 2007).

Universal Design: “The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (Ron Mace of the Center for Universal Design, 2008)
Visitability: A movement based on altering home construction practices to spread the presence of universally designed home (AARP, n.d.).

Workplace-making: The entire process of creating or modifying a workplace (Horgen, 1999).

1.8 Summary

The purpose of this study is to create a well designed office environment that specifically accommodates aging employees who work in a collaborative office space shared by younger employees. The primary question of this study is ‘what is an appropriate design solution for an office space that is conducive to employees over the traditional retirement age who work in a collaborative office space that is shared with younger employees?’ In this chapter, the central research topics of this study were outlined including key changes to the global population, the relationship of the human body and the working environment, job accommodations, design elements, and changes to the working environment. The following is a review of published literature that is multifaceted in its approach to the relationship of the office environment and the aging workforce. It explores many issues related to aging and the work environment including retirement, global populations, ergonomics, job accommodations, universal design, and fall prevention.
CHAPTER 2
REVIEW OF LITERATURE

The following review of literature is multifaceted in its approach to the relationship of the office environment and the aging workforce. It begins with a review of the changing global population and life expectancy, changes to retirement, and the saturation of older adults into the workforce. A review of the relationship between the human body and the design of the work environment is explored by focusing upon concepts of fall preventions, job accommodation, and universal design. This section is followed by a review of ergonomic principles and the significance of lighting design within the office space. Concluding the review of literature is a focus upon changes to the workplace and ideas of how to better design the office environment especially for older employees.

2.1 A Change in the Global Population

The population of the world is vastly changing. This global population change is a phenomenon evident in both developed and underdeveloped countries, expressed in a growing cohort of aging individuals. According to the 2007 report sponsored by the National Institute on Aging, the National Institutes of Health, and the United States Department of Health and Human Services, “In 2006, almost 500 million people worldwide were 65 and older. By 2030, that total is projected to increase to 1 billion, [equaling] 1 in every 8 [persons on] the earth.” This report also stated that developed countries will be most affected by a globally aging population with a 140 percent increase of those 65 and older by the year 2030 (Li, 2007). Between the years of 1990 and 2020, the population of those 65 to 74 is expected to grow by 74 percent (Goldberg, 2000). For example, Japan is expected to have a population of 65 and older in the year 2020 of 71 million, a total that the United States will match ten years later (Lockwood, 2003). Germany in the year 2030 is expected to have a population of adults 65 and older equal to 28 percent of their country’s population.
(Lockwood, 2003). For the United States, these projected population changes allude to a population of those over the age of 65 equaling the largest elderly population in history by the year 2030 (Dychtwald, 1999).

This growth of an aging population is not an isolated event that will only affect developed countries. Developing countries are also seeing the effects of an aging population on their inhabitant makeup. In Latin America and the Caribbean for example, by the year 2025 the cohort total of those 65 and older is expected to increase 138 percent over totals seen in the year 2000 (Loewy, 2004). This shift in the global population is affecting the way continents and countries view seniors, their contributions to economies, social institutions like Social Security, and activities like retirement. However, the growth in the number of those over 65 is not the only reason that the population is aging. The average life expectancy is also rising in all countries, especially those that are considered to be developed countries.

The increase in life expectancy is significantly affecting how institutions view seniors. The oldest old, which are those 80 years and older, are not only expected to live longer, but are also increasing in number and frequency. In the Caribbean, it is estimated that in 2024, 10 percent or more of the elderly will be over the age of 80 (Loewy, 2004). The increase of this small age group is not only due to medical advancements, but most importantly it is due to lifestyle changes, including staying active and healthy (Department of Health and Human Services Administration on Aging, 2008). In addition to the increase of the old and the oldest old shaping global populations, declining birth rates in developed countries are also shaping the global population makeup, thus resulting in a decreased number of working age young adults. According to Tomáš Sobotka (2004) and his research on fertility and childbearing, “In 2001, more than half of Europe’s population lived in societies with [fertility rates] at or below the threshold of lowest-low,” (p. 212) thus resulting in many scholars declaring a trend of rapid population decline in the entire 33 European countries examined within the study (Sobotka, 2004). Italy, for example, was the first nation to have more people over 60 years of age than under 20 years of age. Italy found that as early as
1998 their country’s fertility rate was only 1.2, a total that will not repopulate the country (Goldberg, 2000).

The same trend of declining birthrates found in European countries is also happening in other developed countries including the United States. It is estimated that between the years of 1990 and 2020 the population total of the United States for those under 65 years of age will grow only 24 percent, a percentage that will not support repopulation in this country (Goldberg, 2000). Therefore, by the year 2030, people ages 65 and over will equal four times the total of those under the age of 65 (Goldberg, 2000). However, the combination of the aging population, the increase of the oldest old, and the decrease of birthrates articulate one central implication: there will untimely be less young adults available to enter the workforce and numerous older adults leaving the workforce, creating major employment gaps that will cause a strain on the workforce and global economies. The result of the two diverging events of increasing older adults and decreasing young working age adults is creating a potential crisis of reduced economic expansion due to lack of personnel (Li, 2007). In addition to the strain that the current and continual exodus of aging adults is placing upon the workforce, global population changes are also alluding to a workforce that is dynamically and quickly changing in areas of personnel and retirement. By hiring adults who are over the traditional retirement age of 65 to fill the void left by the massive amounts of retirees and insufficient numbers of working age young adults, the workforce is having to reinvent itself as friendly to all ages and redesign its spaces for intergenerational cooperation. In order to understand how the workforce is changing to accommodate those returning to the workforce, one must understand the current trend of retired persons moving out of retirement and into working positions.

2.2 Aging and Retirement

There are currently many changes and trends surrounding retirement that are creating a new way for future generations to experience retirement.
According to a survey conducted by AARP (2003) entitled *Staying Ahead of the Curve*, 70 percent of workers ages 50-70 years in the United States plan to either never retire, continue working during retirement, or work into at least their 70s. This study reiterates the trend echoed during the past 20 years of workers working past the traditional retirement age of 65 (Cahill, 2006). However, the reasons for working longer differ for individuals, but have consistently centered around four realities of retired life: the need for financial security (Lockwood, 2003), participation in programs like phased retirement, the feeling of having to retire involuntary, and the need for medical benefits provided by employers (Lockwood, 2003).

Retirement has become more expensive than many retirees have planned for. The results of a 2005 AARP survey stated that 76 percent of workers 50-65 years of age expressed the need for capital as the major reason for working past the traditional age of retirement (AARP, 2005). This need is a sentiment resonating in the results of a survey conducted by the Employee Benefit Research Institute in 2001 who found that 57 percent of those currently 48-57 years of age and 64 percent of those 39-49 years of age have already predicted working through retirement in order to pay for retirement. Recently, the Employee Benefit Research Institute’s 2008 confidence survey has stated that, “Americans’ confidence in their ability to afford a comfortable retirement as dropped to its lowest level in seven years, reflecting worries about health cost, the economy, and home values” (p. 1). These worries result in only 18 percent of Americans feeling very confident about having enough money for a suitable and comfortable retirement. Many contribute this sharp downturn in confidence to current economic conditions, exorbitant food prices, and a crashing housing market. However, recent studies and surveys state that 36 percent of workers have not properly prepared for retirement by engaging in traditional activities like accumulating savings (Schramm, 2005) or wealth, both vital resources needed to sustain them throughout retirement (Tift, 2007).

The patterns of saving in the United States have drastically changed over the past 38 years, resulting in many Americans (especially those considered to
be baby boomers, persons generally agreed to have been born between the
years of 1946 and 1964) facing their retirement years in poverty (Dychtwald,
1999). The average savings rate for American households in the 1950s was
11.7 percent, which decreased to 10.8 percent in the 1970s, and then again in
the 1990’s to 4.9 percent, a percent total that includes personal savings and
employer pension contributions. If one were to exclude company pension plans
and only include personal savings, Americans have on average only
accumulated one to two percent in personal savings, a savings amount that will
absolutely not sustain them throughout retirement (Dychtwald, 1999). With these
saving patterns, or lack thereof, it is estimated that of the 133.75 million
Americans that are currently considered to make up the United States’ middle
class, one third, about 44.58 million, will be considered to be in poverty in their
elderly years (Dychtwald, 1999). This total is startling when compared to the four
million elderly currently considered to be poverty stricken (Dychtwald, 1999).
Although many of these soon to be impoverished Americans have paid into and
are dependent upon Social Security, the reality is that Social Security will likely
not be a viable option that they can turn to for assistance. According to Ken
Dychtwald (1999) in his book Age Power:

   In the year 2013, just two years after the first baby
   boomers begin turning 65, the annual surplus of
   Social Security tax revenues over outlays will turn
   negative. By 2030, when all the surviving boomers
   will have reached 65, Social Security alone will be
   running an annual cash deficit of $666 billion.
   (p. 174-175)

This reality of Social Security means that even if its flaws are corrected, the
surplus of Social Security will only be able to provide 70 to 77 percent of
benefactors with benefits and will still deplete its resources by the year 2029
(Dychtwald, 1999). When medical insurance programs like Medicare are then
added to the equations of Social Security, the deficit of Social Security in the year
2029 will equal $1.7 trillion (Dychtwald, 1999). This lack of personal preparation
and the reality of a false dependence on Social Security are resulting in many
employees choosing to phase themselves into full retirement instead of promptly breaking from the workplace.

Many workers of retirement age who have not yet retired are now considering and participating in phased retirement. Phased retirement is when the worker reduces their work time down to three-fourths time, one-half time and so on until they have fully exited the work force (Dodds, 2007). Phased retirement can last anywhere from 5-15 years and can start as early as 45 years of age. With phased retirement as a viable option to bridge the financial gap workers can, in theory, stay in the workforce until they are 65, 70, or 75 if they choose. In 2005, AARP reported that of Americans 50 years of age and older who participated in their survey, 38 percent were interested in phased retirement and 78 percent said that phased retirement was a viable way for them to work past traditional retirement age (AARP, 2005). The 2006 Urban Institute report expressed the lack of desire of those 60 years and older to retire and stated phased retirement as a viable option for achieving the inevitability of retirement (Dobbs, 2007). Phased retirement not only has benefits for the financial status of the employee that seeks to utilize it, it also has major benefits for the employer who chooses to implement this exiting option within their firm.

Forced retirement is another element that is shaping retirement. Forced retirement occurs when the employee feels as if they have been forced to leave the workforce because of events outside of their control. Although according to Maximiliane Szinovacz (2005), only disability and job displacement can prompt an employee to feel as though retirement was forced. Many reasons for perceived forced retirement can also include health, spousal care, company ultimatum, or company restructuring. Three sets of cost-benefit factors that motivate a person to retire willingly are work conditions, benefits, and retirement expectations and timing (Szinovacz, 2005). When these elements are manipulated or do not live up to the retiree’s expectations of retirement, one can feel as though retirement was forced upon them. People who feel they have been forced to retire or feel they retired earlier than desired, are twice as likely to return to the workforce than those who feel as though retiring was solely their
choice (Szinovacz, 2005). However, many retirees, whether retirement was forced or a choice, find themselves returning to work in order to either pay for their medical needs or to receive medical benefits from an employer. With many changes and cutbacks to Medicare and Medicaid many retirees have been forced to work longer in order to pay for medical needs (Cahill, 2006). Working part time during retirement, also known as having a bridge job, or beginning an entirely new career after retiring from another career is a new trend started by baby boomers (Cahill, 2006). Like phased retirement, working during retirement can be initiated by various reasons including, but not limited to, the cost of health care, desire for medical benefits, the need to stay active, and the desire to pursue a dream. With the abundance of information on how to live healthier and longer, people are living well into the oldest old category and therefore demanding quality social interaction like that often found in the workplace.

The continuity theory has been suggested as one such demand for quality social interaction. The theory reiterates the need for quality social interactions in stating that continuing habits, interest, lifestyles and relationships from midlife into the elder years is the key to successful aging (Jessell, 2007). More so, the theory states that the quality of activities one participates in during ones elder years is much more important than the quantity of activities performed (Jessell, 2007). Therefore, the ability to and the participation in working becomes more than an activity for elderly individuals but it becomes a social and mental needed. Nancy Lockwood (2003) has stated that, “Work as a social outlet has become increasingly important. In the workplace, older workers have a sense of accomplishment and responsibility. Therefore, older Americans may be more willing to continue working past traditional retirement age” (p.5). These changes to retirement, population makeup, and population age are all factors that are pushing aging adults back into the workforce and demanding a change in the way the workplace is designed.


2.3 The Workforce and the Aging Population

The movement of retirees into the workforce is a global phenomenon that is happening in most developed countries. In South Korea, for example, the traditional retirement age is 54. However, many retirees are returning to the workforce by accepting part-time or low wage jobs, consequently extending their years in the employment arena by an additional 14 years (Li, 2007). In the United States, half to almost three-quarters of baby boomers surveyed indicated that they were expecting to participate in some type of part-time work during their retirement (Goldberg, 2000). The movement of older adults into the workforce is not only beneficial to those who seek to reenter the workforce, but this trend is also highly encouraged, accepted, and welcomed from the employment sector resulting in major benefits to the companies and the economies of countries facing an aging population.

According to many survey reports, the effects of an aging population are already visible upon the workforce. Currently, adults that have retired are returning to the workforce in totals larger than ever seen since the idea of retirement became a social norm. In the year 2002, 34.5 percent of employees in the United States were 55 years and older, and in the year 2003, 35.7 percent of workers in the United States were 55 years and older (Rix, 2004 Chart 1), an increase of 1.2 percent. The global community is currently seeing people staying in the workforce and working longer without retiring. Europe, for example, is seeing a shift in the ages of those participating in the labor force. Currently, there are four working adults for every older citizen; however by the year 2050, this number is expected to change dramatically to only two workers for every older citizen (Li, 2007). This change in the labor force is also expected with similar results in the United States, where the current ratio of four working Americans under 65 to one retired American is expected to reduce by half, resulting in only two working Americans under the age of 65 to one retired American by the year 2027 (Tift, 2007).
However, this relationship of older adults and employers is not only beneficial to the adults. The workforce is in true need of older workers to prolong retirement or return to the workforce to fill vacancies left by their peers. In a recent Society of Human Resource Management (SHRM) survey of over 200,000 human resource professionals, 43 percent believe that the retirement trend leading to a shortage of skilled workers will have a major impact on the workforce, causing a radical restructuring of the workplace (Schramm, 2005, Table 1, p. 12). In order to prepare for the predicted shift in the workplace left by exiting baby boomers, 18 percent of large companies (that is, companies having 500 or more employees) surveyed by SHRM have indicated that they have already implemented significant policy and management changes to prepare for the labor shortage. Whereas 43 percent of small businesses with between 1 and 99 employees, 35 percent of medium size businesses with between 100 to 499 employees, and 38 percent of large companies surveyed are just beginning to examine their company’s policies and management practices as a step toward preparation for and aging workforce (Schramm, 2005, Chart 2). These changes within United States company policies are welcomed by those in the government who are bracing for a massive slowdown of the gross domestic product (GDP).

The trends of companies located in the U.S. preparing for an aging population and the U.S government bracing for a slowdown in GDP totals are present in many other developed countries. According to the International Monetary Fund (IMF) Japan, a country that is estimated to feel the dramatic effects of an aging population before most developed countries, will experience over the next century a level of real GDP reduced by 20 percent and an economic stimulation of zero (Muhleisen, 2003). For Japan, this total means that between the years of 2025 and 2075 an aging population will actually cost the country, in terms of reduced GDP (Muhleisen, 2003). Because of the potential lost in GDP, many developed countries are beginning to look at activities like phased retirement and a returning to the workforce as having major benefits to the government as well as the employer. Phased retirement allows employers to benefit from having fewer vacancies in job positions, vacancies that may stay
empty longer than usual with the reduction of younger working age adults. These vacancies are predicted to eventually slow production totals that makeup GDP, a scenario that most developed countries do not desire. However, in addition to keeping production totals constant, employers have also stated other reasons for keeping or hiring older workers, reasons that include their work ethic, experience, ability to serve as mentors, and their willingness to work different schedules (James, 2007). There is, however, one flaw in the integration of ages in the workforce and that is the stereotyping of those who are aged and participating in the workplace.

2.3.1 Stereotypes and the Workforce

The workforce has been seen as a place for young adults to prosper since the institution of retirement became a social norm and older individuals proceeded to exit the workforce. This reflection on the workforce has therefore created a less than hospitable environment for those over the traditional retirement age. With the massive “graying” of the workforce, stereotypes and assumptions about the abilities of aged workers have acted as stalemates that have slowed the process of age integration into the workforce. Sean McLeagham Horton (2007) wrote in a recent dissertation for Queens University titled Aging Stereotypes: Effects on the Performance and Health of Seniors that “…the danger inherent in negative aging stereotypes is that they influence beliefs about aging, beliefs about what is possible and appropriate in later life. Ultimately these beliefs may affect long-term health outcomes by influencing health behaviors” (p. 18-19). This negative influence of aging stereotypes is also true for stereotypes regarding the work performance and abilities of those over the age of 65, thus creating an environment where managers are hesitant to hire older workers citing reasons like competence in technology, expenses, and flexibility (Lockwood, 2003).

In her book entitled Age Works, Beverly Goldberg (2000) lists many assumptions as well as rebuttals regarding aged workers and the perceptions of their contributions to the workforce. These assumptions include, but are not
limited to, a perceived lack of attendance due to illness, an inability or discomfort with receiving instructions from younger managers, a higher cost and difficulty to retain or hire older workers, a reduced level of creativity, and reduced levels of contribution compared to their younger counterparts. These stereotypes, although not seen in positions where one is expected to be older, are a global reality that echo not only in the United States, but also in countries like Germany and Singapore (Goldberg, 2000). In the global manufacturing market, older workers are assumed to be slow and unable to keep up with the levels of production desired by companies. The reality, however, is that many manufacturing processes are automated to the point that the speed of human workers in the manufacturing plants is virtually irrelevant (Goldberg, 2000). In creative fields like advertising, it may be true that younger associates propose more ideas than their older counterparts. However, the experience that comes with being an older worker often results in choosing to present fewer ideas of quality than a quantity of weak ideas (Goldberg, 2000).

The stereotypes that older workers are absent more days than their younger counterparts and are less flexible to change are both misnomers. Approximately 13.6 percent of the workforce consist of workers that are over the age of 55, and this group has a tendency to request fewer weeks off, have less injuries reported on the job, and file for fewer workers compensation claims that those under the age of 40 (Goldberg, 2000). In addition to their presence on the job, workers in their late 40s and 50s were responsible for the majority of job changes due to receiving advance degrees or seeking personal satisfaction (Goldberg, 2000). The realities of these stereotypes are that they are combinations of ignorance, self fulfilling prophecies forced upon older workers, and design obstacles (Horton, 2007), that can be eliminated in order to eliminate age stereotypes and facilitate intergenerational cooperation within the workplace.
2.4 Understanding the Relationship of the Human Body and the Office

There are many aspects in the relationship between the human body and the office environment that have been published. Although there are many issues and topics that can be discussed, three topics will aid in redesigning the office environment. These topics are fall prevention, job accommodations, and universal design.

2.4.1 Fall Prevention and Job Accommodations

Aging often comes with an increase in the number of chronic illnesses one has (Ness, 2005) and the normal wearing of the body. According to Shari McMahan and Kimari Phillips in their article titled *America’s Aging Workforce: Ergonomic Solutions for Reducing the Risk of CTDs*, wearing of an aging body is seen in three areas: “(a) a reduction in joint mobility and manual dexterity; (b) a decrease in muscular strength; and (c) a slowing of reaction and movement times” (McMahan & Phillips, 1999). In an aging adult, the most significant wearing of the body happens in the joints, thus affecting a person’s ability to grasp objects, twist the body, and turn objects like door knobs (McMahan & Phillips, 1999). The depletion of the body’s joints also affects larger and more pertinent movements, especially important to an older worker, like walking, sitting and reaching (McMahan, 1999). The combination of worn and depleted joints result in many undesired consequences like fatal falls, lacking surface discrimination, and an overall decline in an aging employee’s ability to function at peak levels.

Understanding the causes of falls is important to designing a workplace for aging adults because of the role that falls play in the health and safety of these adults. Forty percent of fatal falls involving older adults occur outside of the home in places of employment, for example (Holmes, n.d.). These falls are one of the top five accidental injuries in the United States for older adults and are so numerous that in the year 1995, 7,700 deaths of adults ages 65 and over were attributed to accidental fatal falls (Holmes, n.d.). However numerous these incidences of fatal falls are among aging adults, there are nonetheless many
reasons for these falls including, according to Melzer, et al., in their article *Effects of Regular Walking on Postural Stability in the Elderly*, “…a decrease in walking ability, functional performance, muscle strength, and postural steadiness” (Melzer, 2003). Other reasons for a decrease in walking ability could be a combination of incorrect footwear (Menz, 2006), design elements like rugs and runners that account for more that 6,800 injuries in the U.S. for people age 65 and older (Holmes, n.d.), a lack of balance control (Melzer, 2003), and aging eyes that are unable to differentiate textures and surfaces (McMahan, 1999). It has been proven, however, that older adults who walk regularly fall less and are more able to stand upright (Melzer, 2003), an important medical fact that can be incorporated into the design of office spaces to aid in the health of older employees.

Whether a natural result of the aging process or a combination of many preventable choices, falls lead to a decrease in the functionality of older employees and a decrease in the quality of the work they produce (Shephard, 2000). This possible decrease is due to a lack of control, as Martha Jessell states in her article *Activities, Control and Health in Older Adults*, “…if an elderly person has a stronger sense of control… his or her ability to function more successfully may be at a higher level than those individuals whose perception of sense of control is lower” (Jessell, 2007). The possible result of lower levels of control, decrease in functionality and a decrease in work quality can lead to a decrease in confidence (Shephard, 2000) and ultimately the exiting of these adults from the workforce.

### 2.4.2 Job Accommodation and Universal Design

According to an article published by The Association for the Advancement of Retired Persons (AARP), the principle of job accommodation is “…something that lets you do your job when you have a health condition or a disability” (AARP, 2004). These changes vary from a change in the way an employee actually does their work because of an illness to the use of devices to work, like the use of Braille for those who cannot see or a flicker-free monitor for those with vision...
problems, in the workplace that helps an employee offset the change in productivity. These accommodations are not only welcomed by employees but happily provided by employers who report that the effectiveness of their employees increases by more than 80 percent when accommodations are provided to them (AARP, 2004). Employers not only report benefits of a $35+ U.S. dollar return for every U.S. dollar they send on employee accommodations, but other benefits as well: (1) keep or hire qualified employees, (2) avoid the cost of training new employees, (3) save on worker’s compensation and insurance, and (4) increase worker productivity (AARP, 2004). Because of the aging of a global workforce, major accommodating efforts like universal design may be ideal in not just creating well design office spaces but in an effort to increase the productivity of these older workers who plan to stay or reenter the work force.

Universal design is a movement within the design community that is used within spaces as a means to accommodate aging populations. However, with so many different ages accommodating design terms within the design industry, it is difficult to understand what universal design is and how it is allowing many aging adults to live independent lives. Ron Mace, of The Center for Universal Design, defines universal design as, “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design”. The American Association of Retired Persons (AARP) defines universal design (in terms of a universally designed home) as a space that is designed to allow everyone the ability to use the space regardless of height, abilities, health, or weight.

Universally designed homes have gained in presence and popularity because of many reasons including the rising cost of nursing homes and in-home nursing care (The National Council on the Aging, 2005). However, actions like the “Visitability” movement are also spreading the presence of universally design homes by altering home construction practices to allow for this new method of designing homes to become the standard method of home construction (AARP, n.d.). These methods of change include making gradually sloping walkways to the front door a common design practice over the use of steps to the front door
and reducing the size or use of front door thresholds to keep environmental elements at bay. Unlike home construction where there is no federally mandated accessibility code for design, commercial design must follow accessibility codes that meet the Americans with Disabilities Act (ADA) mandate; however, there is a growing consensus that universal design principles should be the standard for accessibility because ADA design is an inefficient minimum standard and does not foster spaces that are all persons inclusive. By looking to the standards of universal design and to elements of universally designed homes, it is possible to design office spaces that allow older employees to feel confident and function at their peak (AARP, 2004).

2.4.3 Seven Elements of Universal Design

According to Joseph Kelly II in an article titled, Universal Design: Inclusive, Attractive… and an Essential Consideration for Today’s Residential Designers, there are seven primary principles for universal design. These principles are (1) equitable use, (2) flexible use, (3) simple and intuitive, (4) perceptible information, (5) tolerance for error, (6) low physical effort, and (7) size and space for approach and use (2004). Although these seven principles were written with a focus upon residential design, an examination of these principles can prove their value to commercial design and how their use can aid to the designing of office spaces for older employees.

The universal design principle of “equitable use” states that everyone who uses a building should be able to use the building equally, meaning that every person should have the same access to not just the building but also the facilities that the building has to offer. This principle also insist that, if the facilities cannot be exactly the same for everyone then the facility should be, “equivalent in terms of their privacy, security, safety and convenience” (Kelly, 2004). The “flexible use” principle states that design elements and features within a design space should allow for more than one way to use the features. The example that the article gives is of a countertop that can be used at seated or standing and by persons who are either right or left handed users.
The “simple and intuitive” principle of universal design asserts that a building should be designed simply so that its user can understand how to use design features within the space. The example given within the article is of a lavatory faucet in a washroom that is design so that the users can easily know by looking how to operate the faucet. The “perceptible information” principle is the fourth universal design principle and it states that a building and the spaces within should have multiple forms of communicating information to its users. This communications should be done in a combination of written, symbolic, tactile, and/or verbal manners to insure the maximum dissemination of information to the user.

The “tolerance for error” principle is the fifth universal design principal discussed and defined here by Kelly:

Ideally, the building’s design should eliminate, isolate or shield any design features that could prove hazardous or inconvenient to any user. When potentially dangerous conditions are unavoidable, users should receive warnings as they approach the design feature (Kelly II, 2004).

To paraphrase, dangerous design features should be avoided but when they are unavoidable, users should be thoroughly warned of the danger. More importantly, designers should anticipate dangers in order to minimize them and to warn the users. The “low physical effort” principle states that little effort should be required to use features within the space. The push behind this principle is to allow anyone to use the space without any “awkward or hazardous body position” (Kelly II, 2004).

The seventh principle of universal design is the “size and space for approach and use” principle. This principle requires that “a building’s design features should provide an adequate amount of space that is appropriately arranged to enable anyone to use them” (Kelly II, 2004). This principle also prescribes that there should be enough clear traveling space between design features so that anyone can move through the space freely.
These seven principles, although specified for a residential space within the article are crucial design elements that, when followed, help to design an appropriate space for any person. The inclusion of these principles within the workforce may be equally beneficial for employees, especially for older employees who may need a more accommodating environment than their younger counterparts.

2.5 Principles of Ergonomics and Lighting

Ergonomics is defined as, “An applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely” (Merriam-Webster, 2009): “The science of work; Ergonomics removes barriers to quality, productivity, and safe human performance by fitting products, tasks and environments to people” (Ergoweb, 2009). As these definitions highlight, there are many aspects of ergonomics that are important and applicable to the office environment. The following paragraphs specifically discuss the effects that ergonomic principles have upon the workplace. These paragraphs include a discussion on how lighting is an ergonomic issue and why it is important for the office environment.

2.5.1 Ergonomic Principles

The incorporation of ergonomic design principles and ergonomically designed instruments has been the source of ongoing change within the office environment. This change is in response to many reasons like productivity and employee comfort, but this change is mainly a drive to decrease employee injury and workers compensation cost (McMahan, 1999). Shari McMahan and Kimari Phillips stated in their article titled America’s Aging Workforce: Ergonomic Solutions for Reducing the Risk of CTDs, “Work-related injuries and illnesses due to ergonomic injuries and illnesses, specifically cumulative trauma disorders (CTDs), repetitive motion disorders (RMDs), and musculoskeletal disorders (MSDs) may lead to an increase in workers compensation costs” (McMahan,
Kathy Roper and Daniel Yeh recently restated U.S. Bureau of Labor Statistics and OSHA facts in their article *Ergonomic Solutions for an Aging Workforce*, expressed interesting statistics:

...injuries and illnesses [related to ergonomic deficiencies] ...accounted for the greatest number of days away from work, surpassing fractures and amputations. In addition, injuries caused by repetitive motion, such as grasping and typing, resulted in the longest absences from work... These injuries cost businesses $15 to 20 billion in workers' compensation costs each year, and indirect costs run as high as $45 to 60 billion dollars a year... (p.174)

However, with a shift in the global workforce toward massive amounts of older employees, the inclusion of ergonomic principles within the design of working spaces is now a critical method of reducing the affects of cumulative trauma disorders (CTDs), illnesses that impact older workers and individuals and the cost of injury claims businesses face annually (McMahan, 1999). In order to understand the best methods of incorporating ergonomic principles within the design of an office space, it is first important to understand 1) ergonomic principles that affect the aging body, 2) how instruments within the office affect employees and how they can be improved upon, and 3) ergonomics solutions that have been studied and proven viable within the office and other working environment.

Changes within the body because of the aging process affect many aspects of one’s life including one’s ability to work. According to the article *Job Accommodations Can Allow You to Keep Working*, written by AARP, conditions that affect the joints like carpal tunnel syndrome, arthritis and back pain as well as conditions like heart disease and diabetes are prevalent in workers ages 50 and over (AARP, 2004). These workers also have chronic conditions that affect hearing, sight, and the heart muscle (AARP, 2004). In addition to chronic conditions, three major changes to an aging body are seen in a reduction in joint mobility, muscular strength, and the ability to move about quickly without laboring (Roper, 2007). As stated by Jukka Vittasalo et, al., in the 1985 article *Muscular*
Strength Profiles and Anthropometry in Random Samples of Men Aged 31-35, 51-55, and 71-75 Years, and restated by Kathy Roper and Daniel Yeh in their article titled *Ergonomic Solutions for an Aging Workforce*, “Muscular strength in humans peaks between the ages of 25 and 30. Around the age of 40, a steady decline can be evidenced… with reductions in physical strength, common job tasks can become hazardous” (Roper, 2007). In an attempt to reduce hazardous conditions for aging workers, it is important to understand the relationship of ergonomic principles to the basic operations of the body and more specifically its relationship to a working body.

The human body is a continual system with its parts and organs working together for everyday movement and motion; the head working with the eyes, the arms working with the hands, and the torso and base working with the feet (Dainoff, 1987). However, it is this everyday movement that can cause a need for ergonomic designed spaces especially in the office environment. Damage due to straining for objects too far away from the body’s center (Dainoff, 1987) can cause serious injury that builds from small injuries that occur at different times (figure 2.1).

![Forward Reach Capability of a Small Operator](Chengalur, 2004)

Injuries can also be sustained or further exhausted while an employee is seated as Marvin Dainoff et. al., notes in their book *A Manager’s Guide to Ergonomics in*
the Electronic Office, a person who is improperly seated can cause a slowing of blood circulation (Dainoff, 1987). Dainoff also explains that the two major sources of problematic seating are, “improper height, angle, depth, and shape of the seatpan and/or pressure from the top of the thighs being forced against the underside of a table which is too low” (Dainoff, 1987). However, these injury caused by design flaws can be alleviated if not eliminated by using ergonomic principles as a job accommodating method for aging adults just as ADA design is used as accommodating design elements for those with disabilities (Chengalur, 2004).

Ergonomic principles and their incorporation within the office environment have been studied as a method of accommodation for many kinds of workers. In order to design a good office environment for older employees, it is pertinent to understand the studied ergonomic principles and how these principles are ideally incorporated within the office. In the book *Kodak’s Ergonomic Design for People at Work*, Somadeepi Chengalur et. al., highlights four main principles for ergonomically sound working, specifically from a seated position like that seen in an office environment. These four principles state that when working from a seated position; 1) All the continuously needed items should be in arm’s reach without any strenuous reaching, 2) An employee’s hands should not be more than 6 inches (15 cm) above the work surface when in use, 3) Handling more than 10 pounds (4.5 kg) should not be required from a seated position without mechanical assistance, and 4) The major task done from the seated position should be light tasks like writing or fine assembly (Chengalur, 2004). Shari McMahan and Kimari Phillips, in their article titled *America’s Aging Workforce: Ergonomic Solutions for Reducing the Risk of CTDs*, define three objectives when designing an ergonomically sound space. These three objectives are to 1) reduce extreme joint movement through many suggested steps including “Minimize working conditions that require unusual posture such as twisting the spine, reaching above the head, and leaning to one side”, 2) reduce excessive force by “[locating] all operations within a comfortable range of movement”, and 3) reduce highly repetitive tasks by providing many different kinds of tasks for the
employee to perform (McMahan, 1999). David Rempel et. al., similarly highlights several ergonomic solutions for a computer work station in the article *Effects of Wrist Posture on Carpal Tunnel Pressure while Typing*: “…changing the height of the keyboard, using a thinner keyboard, a split keyboard, tilting the keyboard so that it is flat or negatively sloped, or using a forearm support” (Rempel, 2008).

Ergonomic solutions for the office is not just limited to surfaces and furniture, ergonomic solutions are also important when looking at lighting within the space to accommodate older individuals within the office space.

### 2.5.2 Lighting Principles

Lighting is not only a means of illumination. It is also usually the most prominent design feature within any space, especially within the office environment, and can either create or prevent hazardous working conditions. In previous decades illumination standards were ample, between 100-150 footcandles or 1,000-1,500 lux (Tetlow, 2007). This standard resulted in wasted energy and many user discomforts including eyestrain and headaches (Tetlow, 2007). In the 1970’s, offices with open office floor plans and the above mentioned lighting standards provided light by using overhead 4 foot x 2 foot ceiling mounted fluorescent lights, known as troffer, and limiting or eliminating natural light (Tetlow, 2007). However, lighting standards have been heavily scrutinized because of recent strives towards a sustainable planet and towards understanding the relationship between lighting and health. A recent study of fifteen offices that used an open office floor plan determined that illumination levels above 1000 lux increased irritants like deep shadows, reflections and excessive contrast for users of the space (Grandjean, 1987).

This lower level of illumination, however, may be contradictory to the needs of aging workers and their specialized requirements. Karin Tentlow, in the article *Task Lighting Solutions: Their Economic and Ergonomic Benefits*, highlight the difference between an aging adult’s eyes and a younger person’s, stating that a person in their 20’s has sight that is about eight times better than an adult in their 60’s and about four times better than an adult in their 50’s.
(Tetlow, 2007). Operating with inadequate illumination levels can result in health issues like eyestrain, headaches, and eye fatigue (Tetlow, 2007), symptoms similar to over illumination. Complications from over or under lighting affect older workers substantially more than younger workers (Schwerha, 2002); but as the 1990 Cornell study states, a fact restated by Karin Tentlow, “…eyestrain [is] the number one health hazard in the workplace- ahead of radiation, asbestos, or exposure to AIDS” (Tetlow, 2007).

The best solution for this delicate illumination balance may be the addition of more illumination choices. Flexibility in types of illuminating sources may be the best solution for designing a space that works for all workers, including older employees, and for the majority of tasks performed within the space. Karin Tentlow, in the article *Task Lighting Solutions: Their Economic and Ergonomic Benefits* state:

> The majority of work that most office workers perform today is a combination of viewing a monitor and reading documents or other printed material. Yet these two tasks require significantly different levels of light because monitors are a source of light whereas paper reflects light. In fact, reading documents requires four to five times the amount of light needed for viewing a monitor. (p.5)

She further states that instruments in the office (like computers) warrant a more integrated approach to lighting, calling for light sources at each employee’s work station that can be positioned (Tentlow, 2007). The addition of light sources that can be positioned by the employee often results in an ergonomic improvement that increases employee efficiency and productivity (Dwyre, 2001).

### 2.6 The Changing Workplace and Changing Design

Each office environment is dynamic and unique in how it operates. In recent years there have been theories on why the office environment is changing and how it can be changed. In order to redesign the office environment for an
aging workforce, this study will look at some of these theories to understand: how the workplace is changing through to further the connection between the working environment and the employees who use the space; how these workplaces can be designed to create a dually beneficial system for the employees and the organizations who employ them; and what design elements should be included in the redesign of these workplaces.

2.6.1 The Evolving Workplace

The workplace and ideas of its makeup are constantly evolving to accommodate populist needs and wants. This evolvement is due to the greatly integrated nature of an organization, its employees, and changing technology all depending upon each other for survival (Becker, 1995). To an organization, its employees are its most precious, expensive, and often its most fluid commodity; however, an organization’s employees are also its only commodity that is most affected by its surroundings (Becker, 1995). This phenomenon of the design of the working environment affecting employees greatly is also an element within the equation of a company’s competitiveness (Becker, 1995) and ultimately its success. By understanding the relationship of working space and employee, designers can understand how to best design spaces for the changing working landscape and employers can understand why this change is most needed.

In the book *Workplace by Design: Mapping the High-Performance Workscape*, the authors, Franklin Becker and Fritz Steele, discuss the integration of employee and working environment as “organizational ecology”. The authors define organizational ecology as “how an organization’s leaders choose to convene their employees in space and time in pursuit of a long-term competitive edge” (p.11-12). The authors stress that there are three decisions that the concept of organizational ecology addresses: 1) the physical working area, 2) the planning and designing of the workplace, and 3) the manner in which space, equipment and furnishings will be dispersed and used within the office space (Becker, 1995). These three concepts are vital in understanding the relationship between an organization and its employees. Organizational ecology takes into
consideration the functions of the organization; like the organization’s structure, pay structure, and corporate culture (Becker, 1995). While doing so, organizational ecology also considers design elements that will directly affect the worker’s comfort and ability to complete tasks; like ventilation, air quality, furnishings, and noise (Becker, 1995). The purpose of the organizational ecology is to emphasize how the business is supported by the design of the spaces where employees work (Becker, 1995) in an effort to provide the best possible design for the most desired outcome, efficiency and productivity.

Ultimately, the concept of organizational ecology touches upon a fundamental change in office design. This change is the design of an office space reflecting and accommodating the expectations and needs of its employees (Becker, 2004). Currently, the average office space is landscaped to fit the maximum amount of employees in the minimal amount of square footage through the use of a “one type cubical fits all” style of design. This design, although relatively inexpensive and simple to manipulate, expresses little thought of what these working spaces convey to the employee of their worth and value to the company. Franklin Becker highlights this physical correlation of space and value in his book *Offices at Work: Uncommon Workspace Strategies that Add Value and Improve performance*, by clearly stating that, “workspace design can convey, more clearly than we might desire, just what we value. The physical cues of the office send environmental messages. Some are intentional, some are not” (p.4). By rethinking its structure, company culture, and corporate values, among other things, many types of businesses are trying to stay solvent during economic difficulties (Horgen, 1999) and reduce cost like those driven by employee turnover. But as Turid Horgen, et. al, states in *Excellence by Design: Transforming Workplace and Work Practice*, “the new world of work should logically be reflected in new workplaces and new ways of designing them” (1999, p.6), and the best place to begin the new way of designing the workplace is to understand how the current spaces are failing.

Previous schools of thought for designing office spaces expressed a series of recommendations: individuals need their own assigned space; there are
only three areas for work; being at the desk, the terminal, or in a meeting; rewards or perks for seniority are best expressed in corner or large offices; the use of one-size or type of furnisher, equipment, layout, etc., in necessary for persons in similar stations within the office (Becker, 1995). However, these dictations for designing office spaces are proving to be too rigid and stifling for the current employee makeup (Becker, 1995) and for the new ways that these employees are working. By continuously following these formulas for designing workspaces, companies are ignoring the function of the work area for their employees and ultimately designing company flaws that are reflective of a company’s lack of what Becker calls “problem solving and adaptability” (p.23), which is a company’s ability to make short- or long-term changes to solve problems and thus create opportunities (Becker, 1995). Franklin Becker and Fritz Steele state, in their book *Workplace by Design: Mapping the High-Performance Workscape*, provide a contemporary definition of what the function of the workplace is:

… [it should] provide good health and high –quality experiences for its people… It should therefore be both a practical and an ethical concern of organizational leaders that the work setting promote the well-being of its users: physiological health and safety, mental health, the ability to grow and develop, and high-quality work experiences as the normal pattern of work life rather than the exception. (p. 86)

Although there have been many debates and differing ideas of what the purpose of redesigning the workplace is, for the employer it may be a necessary expense. As Becker states, “office design that fails to improve the quality of work life for employees… may actually decrease organizational effectiveness” (Becker, 1981, p.68). Vast improvements to offices can be made by simply addressing areas of recent worker concerns of health and safety, temperature, sound conditions, lighting conditions, and body positions in repetitive work (Becker, 1995). By also deemphasizing or diminishing the value placed upon old ideas of workplace management, advancing organizational hierarchy, and
promoting separation in departmental functions (Becker, 2004), the office environment can be made increasingly worker friendly.

2.6.2 Theories for Designing the Evolving Workplace

Before designing, or redesigning, an office environment to suit an aging workforce, one must first ask what the role of the space is to the employee. As Franklin Becker states in his book, *Workspace: Creating Environments in Organizations*, “The obvious role of the physical setting is to provide one the requisite support to engage in one’s job or carry out an activity effectively, comfortably, and with dignity” (p. 9). However, the office environment also plays a psychological role within the relationship of the office environment and employee through a constant communication of messages, both intentional and unintentional (Becker, 1981), of value, rank and importance to the company. When members of an office environment feel they are not being served or included within the environment, redesigning the space through the use of “workplace-making” may prove most effective and productive (Horgen, 1999).

Workplace-making is defined by Truid Horgen, et. al., as, “…the entire process of creating or modifying a workplace” (p. 37). This redesigning is a process that begins with awareness of the problem, followed by the development of a new working environment, and is followed up by maintenance, management and later redesigning the environment at the end of the space’s usefulness or life cycle (Horgen, 1999). Different medical problems for older employees, like a reduction in range of motion, lost in contrast sensitivity, decrease in dark adaption, decline in color sensitivity, and problems with glare (Schwerha, 2002) are only exacerbated within the office environment by design elements that include but are not limited to computer screens, poor work station design, heights of computer terminal (Schwerha, 2002) which limit these worker’s productivity and daily activities. Although changes to the working environment may highly impact not only the employees but also the business or organization (Becker, 2004), workplace-making strives to create a high-quality space through critical
thinking and research of what both the business and employee need (Horgen, 1999).

High-quality designed spaces, according to Franklin Becker, pay attention to detail, are well lit, are to the human scale, have interesting things to look at, and contain features that allow people to make their own choices about how to use them (Becker, 1995). Spaces designed for aging workers, according to Getty and Getty and restated by Kathleen Kowalski-Trakofler et. al., in their article *Safety considerations for the Aging Workforce*, include an ensured sense that the aging worker is accepted, their contributions to the workforce are acknowledged, and an involvement in all aspects of their work ownership and inputs of their capabilities and experiences (Kowalski-Trakofler, 2005).

### 2.6.3 Elements for Designing the Evolving Workplace

In order to design distinctive and flexible spaces that employees desire to work in (Becker, 2004) design elements should be included. These elements promote community and are combinations of public, or open, work stations and private spaces that allow for individual concentration (Becker, 1995). This combination of spaces can be successfully achieved through not only using immovable walls, but also boundaries that create distinctive areas of community (Becker, 2004) without using walls. These types of boundaries also allow for and promote exterior views for employees not adjacent to windows, views that promote a sense of connections to one’s surroundings (Becker, 1995) and allow for the reduction of artificial lighting use within a space. The use of daylighting and exterior views have been so greatly beneficial to companies that many governments in northern European countries, have instituted laws requiring that all employees have access to natural daylight at their personal workstations (Becker, 1995). Many offices are beginning to understand the benefits of daylighting by developing policies that limit or eliminate closed offices along window walls, thus allowing only open office systems to be located along the windows (Becker, 1995), and indirectly redefining the traditional role of window views and corner offices in the reward structure of an organization.
The traditional role of furniture within the office environment has also been redefined in terms of its quality. It is no longer the most expensive pieces and finishes that are of the highest quality, but the pieces that support similar activities (Becker, 2004) and that are able to be manipulated by the user. These pieces are seen as highly valuable because it allows workstations to be designed for and manipulated by all genders, heights, abilities, and ages to meet sight and reach parameters for the largest cross section of people (Schwerha, 2002). Examples of such quality furniture pieces are work surfaces that can easily be raised and lowered to reduce bending, reaching, and other awkward body postures (Roper, 2007) that further limit ones productivity; work surfaces with cut-out areas to allow workers to move closer to their work, thus reducing eye strain and awkward body positioning (Roper, 2007); and work stations that slide or role to reduce lifting and carrying (Roper, 2007).

The introduction of technology within the office environment can also have dramatic design opportunities that allow older employees to conduct their work productively. Work conducted at the computer can cause stress to employees either because of the technology used or the working conditions employees find themselves in (Durham, 2008). In order to help reduce this psychological stress, designing a computer workstation with neutral body positioning and comfortable working posture in mind will reduce stress and strain upon the muscles, tendons, and skeletal system, helping to reduce chances for developing a musculoskeletal disorder (Durham, 2008) and other workplace injuries (Roper, 2007). The use of split keyboard is another improvement that will reduce workplace injuries by avoiding hazardous wrist extensions (Rempel, 2008) and allowing persons with wrist and hand problems comfort while working. Improvements to air-conditioning systems especially assist aging workers by helping to reduce excessive heat within the body and thus increasing mental capacities (Shephard, 2000), a mental health improvement that increases productivity.

Another means of improving the health of older employees through design is through injury prevention by promoting physical fitness both outside and inside the office environment. Introducing items like shower facilities within restrooms
promote exercise through allowing employees to walk to the office which improves strength and stability, two key factors that help to prevent elderly falls (Becker, 1995; Melzer, 2003). Within the office environment, the placement of frequently used items like copiers and fax machines in a location that promotes walking, can improve the health and strength of aging workers because walking distances that total five minutes each day can improve an employee’s strength and promote community within the office (Becker, 2004). Preventing injuries is only one way design can improve productivity for aging office workers. When injuries or disabilities like eye disorders or mobility limitations exist, designers can make small adjustments that allow persons to do their job. Using anti-glare paper on a computer monitor can allow persons with eye disorders to read computer screens (AARP, 2004) and using items like a page turner and bookholders can allow a person with arthritis handle paperwork easier (AARP, 2004).

2.7 Summary

The populations of both developed and underdeveloped countries are aging because of rising life expectancies and increasing numbers of the oldest old age category. Declining birth rates have also contributed to aging population numbers by ultimately creating a situation of fewer young working age adults entering the workforce as many older adults are retiring. A practice of hiring adults over the traditional retirement age of 65 has begun in order to fill the gaps left by large numbers of retiring baby boomers and insufficient numbers of working adults.

Workers over the traditional retirement age are deciding to work longer because of financial security needs, rising living expenses, participation in programs like phased retirement, the need for medical benefits, feelings of involuntary retirement, beginning new careers, and the need for quality social interaction. However, negative realities of the workforce, like age stereotypes and design obstacles that affect older adults, combined with the phenomenon of
large numbers of older workers moving back into the workforce and older workers staying in the workforce for longer periods of time suggest that change in the way the workplace is designed may be desirable.

The redesign of the workplace should be rooted in an understanding of elder medical afflictions, fall prevention, job accommodation, universal design, ergonomic principles, and lighting design. Fall prevention is critical for designing an office space that accommodates older workers because falls lead to a decrease in an older worker’s ability to function and be productive, thus reducing the quality of their work. Job accommodations are central in the design of an office space for older workers because it not only benefits the worker by allowing them to work productively but it also allows employers to keep or hire qualified employees, avoid training cost, lower worker compensation cost, and increase worker productivity. Universal design principles are important to an office design because its seven principles (equitable use, flexible use, simple and intuitive, perceptible information, tolerance for error, low physical effort, and size and space for approach and use) allow older employees to be productive within an office environment designed for any person with any disability.

Ergonomic principles are most important to designing an office environment for older employees because they have been studied as a valuable method of job accommodation for any workers, and when used, they are meant to reduce extreme joint movement, reduce excessive force, and reduce highly repetitive tasks. Flexible lighting options are necessary because it allows for the majority of task to be performed the majority of persons regardless of abilities. Each of these topics of understanding highlight the relationship of the working environment and the employees who use them, and understanding the relationship of the working environment to the employees is crucial in understanding how to best design the working environment.

Organizational ecology takes the previously stated relationship and expands it to emphasize how the business is supported by the design of the spaces where employees work in order to provide the best possible design for all workers including aging workers. Therefore, office designs that create guides to
healthy living and allow older workers the ability to work at the same productivity as their younger counter parts is needed to support companies that hire older workers and to suit the older employee. In order to design such office spaces, the following criteria, as previously discussed, should be met: 1) the presence of public and private spaces; 2) the presence of non-rigid boundaries; 3) views to natural light for all employees; 4) flexible furniture that raises, lowers, and has work surface cutouts; 5) technology that allow for natural body positioning when working at it; 6) the use of ergonomically sound items like split keyboards and anti-glare paper for computer screens; 7) having an advanced air conditioning system to minimize unwanted body heat; and 8) the use of design features that promote fitness. The next chapter will detail the methodology needed to explore this topic further.
CHAPTER 3
DESIGN PROGRAM

The following chapter presents the design program for a nonprofit organization in Chicago, Illinois given the pseudonym Organization Community Improvement. The chapter is organized into eight sequential sections that are formatted to provide the reader with a comprehensive understanding of the organization. This method was employed to not only highlight the design obstacles currently found in the building that houses the organization, but to also explain the inherent design opportunities that will later be explored in chapter five.

The chapter begins with a review of the organization’s history and a description of what their functions entail. This is followed by a description of the customers, a term given to the persons served by the organization, and employees who are ultimately the users of the space. The fourth section details the research purpose, research method, design methodology, researcher goals, and customer goals. The existing site conditions are then clarified in the fifth section. The sixth section discusses design obstacles and considerations. The seventh section details specific building codes and regulations needed to make the design functional and code-compliant, followed by the final section which is a summary of the chapter. In total, these sections strive to create an overview of Organization Community Improvement and highlight the obstacles and opportunities later explored in the chapter five.

3.1 Company History and Description

Established in 1987, Organization Community Improvement is a national non-profit organization dedicated to promoting education and employment within low-income communities. Organization Community Improvement provides job training, internships, job placement opportunities, and other economic programs as a part of its mission to provide mobility and self sufficiency within its targeted
communities. The Company’s goal to produce employees for high skill/high wage jobs is exemplified through the inclusion of internal institutions like the Organization Community Improvement Business and Technical Institute and its cooperation with organizations that promote youth development. Organization Community Improvement also provides educational resources like GED preparation courses, after school programming for all levels of primary education, and financial literacy courses for all members of the community.

Organization Community Improvement currently employs 113 employees in two customer service divisions and three operations support divisions. All divisions are organized with their own responsibilities, structure, and challenges that contribute to the success of the organization. The current demographic composition of the organization is largely Latino, reflecting the demographic in which the company serves, and ranging from teenagers to senior citizens. Most employees within the organization report to either a supervisor or a department officer who then reports to the executive director, the administrator of the entire nonprofit organization. The organization is arranged in four levels that can be found in Table 3.1.
Table 3.1. Abbreviated Organization Chart
This structured hierarchy aids in Organization Community Improvement’s goal to provide the best possible service for its customers through the division of labor and programs.

### 3.2 Organization Customer and Employee Profile

Organization Community Improvement has seven programs that focus on assisting their customers, all of which either currently operate or have operated out of the current location. These seven programs are (with pseudonyms given to protect the company’s privacy): Y&E, Cicero, 26th, Garfield, West, Youth, and Seniors. Y&E, Cicero, Garfield, and West operate out of separate locations and are not a space consideration for the redesign of Organization Community Improvement’s main office location. However, the part-time employees of the Youth, 26th, and Seniors programs all operate out of Organization Community Improvement’s main office. Because of their use of the office, their space requirements will be considered along with the needs of the fulltime employees for the redesign. These programs are described in further detail below.

#### 3.2.1 Programs Stationed at the Main Office Location

_Youth_ is a program of 15 part-time employed young adults who run the after school programs and tutor minors at area schools. While these employees work “out in the field”, they are stationed and work several hours a day out of Organization Community Improvement’s main location and thus require space for various support activities. _Seniors_ is the second program stationed at the main office location and has two full time staff members and a case load of approximately 50 senior workers. This program assists senior workers in re-entering the workforce by offering computer training, job training, resume building, job placement services at various locations, and temporary job placement within the main office for some senior workers while they are looking for work. _26th_ is a comprehensive program which provides career training and
skills building, GED courses, and computer comprehension classes through a series of courses and workshops run out of the main office location. This program caters mainly to high school students, but also includes young persons seeking employment opportunities. Youth, Seniors, and 26th require many different facilities within the main location including classrooms, computer labs, and shared working spaces in order for these programs to run productively and effectively.

3.3 Design Research

The purpose of this study is to create a well designed office environment that specifically accommodates young and older employees in a shared, collaborative office space. Thus, creating spaces and solutions that may contribute to overall well being within the office environment for these older employees. In order to uncover suitable design options, information gathering will be essential and will be procured through discussions with the employees. Observations of how employees currently use the space will also assist in information gathering.

3.3.1 Research Method and Design Methodology

Information for the design will be gathered through interviews with human resource management, focus group interviews, observations and photo documentations.

1. An interview with the head of human resources will be conducted with the purpose of gathering basic information on how the current design for the space was developed and what the general design needs are for the department.

2. More information on design elements that work, as well as those elements that do not work within the space, will be gathered during a focus group interview(s) with at least five older employees. These employees will act as a cross section of older employees that use the space regularly. During this interview session, questions will be asked that focus on understanding what job
accommodations and ergonomic solutions are currently used in the office. These questions will help the researcher to further understand how the employees are currently using the space, how design elements in the office affect the workers, and what design elements in the office are not working for the target group. Questions regarding the availability of daylight and/or exterior views in the office will also be asked in an attempt to study whether there is an importance to the inclusion of daylight and exterior views in this office for these employees. Questions regarding the use of ambient and task lighting will also be asked during the focus group interview session to understand what options for and amounts of illumination are available to the employees. These questions will allow the researcher to understand what accommodations, if any, are being used to compensate for the illumination levels.

3. Twelve hours of onsite observations will be conducted to verify how the employees choose to use the space and how the current design dictates their behavior within the space. These observations will allow the researcher to not only understand the design limitations that the employees are unable to express in interview but to also understand the limitations that employees are unaware of or unable to convey. These observation hours will focus on understanding the current working arrangements in the office to uncover the amount of cooperative working employees do in the office and what kinds of spaces are needed by the target group. This understanding will be instrumental in developing a balance of public spaces for cooperative working and private spaces for individual working.

4. Lastly, photo documentation will be used to document the current use of the space, the lighting in the space, and any other design features that need to be addressed within the design solutions.

3.3.2 Research Goals

The goal of this thesis is to (1) create criteria for designing an office space that is suitable for older adults who work collaboratively in a space that is shared by younger co-workers; and (2) create an appropriate theoretical design solution
that exemplifies the criteria for older employees using the Organization Community Improvement office as an example.

3.3.3 Clients Goals

The clients for this theoretical design project are the employees of Organization Community Improvement and their customers. Although this design is theoretical, the organization is currently undergoing an actual major office expansion and redesign project that will allow them to completely occupy the floor in which they are located. The client’s goals for this planned renovation, as expressed by the head of human resources, are to (1) accommodate more customers and staff; (2) upgrade the furnishings and fixtures; (3) create better spaces for employees to work; (4) create more privacy to conduct business with customers; and, (5) create more connectivity among the fulltime office workers and department heads. The client’s goals for this theoretical redesign are to obtain an outsider’s perspective in discovering design solutions that address the inherent problems of the space. Organization Community Improvement also hopes to find ways to better accommodate the senior workers who make up a major portion of the population served by the company. Although the research goals of this study intersect with the goals of Organization Community Improvement, the goal of this study remains creating criteria for designing various office spaces for aging adults.

3.4 Existing Site Conditions

3.4.1 Existing Design Conditions

The main office of Organization Community Improvement is located in an indoor mall-type complex and currently occupies about 10,500 square feet of the second story. The space is rectangular in shape, with varying ceiling heights and windows on its south facing wall (figure 3.1). There is one main entrance along the north wall that opens from a communal space considered outside of the office, which must be monitored by a receptionist.
Figure 3.1: Current Floor Plan of Organization Community Improvement
The office space currently accommodates seven enclosed employee offices that are a mix of shared and single use spaces, one conference room with seating for 10, one break room, two computer labs, one lecture room, a reception computer area, one reception area, one office supply area, three shared open office system configurations, and a wall of semi-closed desk spaces. Because of the company’s success, it has had opportunities to implement and develop more programs which require additional staff. However, this success has increased pressure for the already burgeoning office to provide spaces for employees who are currently operating in whatever unoccupied space they can find. In addition the organization needs more classrooms for programs that float throughout the space. In order to better serve their customers and employees, Organization Community Improvement is currently expanding its space to approximately 19,000 square feet which will occupy three window walls and a restroom area which are both currently outside of the office area (figure 3.2).
Existing design conditions and challenges are very unique to the company’s function, culture, and space allotment. These unique challenges are best explained when the organization’s functions and needs are divided into five categories: (1) the need to accommodate a customer base, (2) the movement and separation of people within the space, (3) large group activities, (4) small group activities, and (5) individual activities. These five categories were chosen because they allow the researcher to begin examining the organization in terms of large groupings of people or what large groups of people do in the space and then concentrate on the individual needs of customers and employees in the organization. These categories are further explained below.
3.4.2 Accommodating Customers

The organization’s customer base requires a design that should account for the unique needs of these customers and for the amount of time they spend in the office. Currently, the design of the office provides a shared break room (figure 3.3, figure 3.4) for both employees and customers. While this break room is often accessible during the day, it is often closed and unavailable for customer use during evening classes, a fact that many customers see as a negative.

Figure 3.3: Break Room  Figure 3.4: Break Room

In addition to needing a break room, customers who are members of the Seniors and Youth programs are in need of a designated work area that would allow for comfort and productivity while eliminating the current practice of shuffling their work area between temporarily vacant desks (figure 3.5) and tables that block traffic (figure 3.6).
3.4.3 Traffic and Separation within the Space

The current layout of the office is such that customer-oriented spaces are separate and independent in relation to spaces where fulltime employee offices are located. The design for this thesis will acknowledge and sustain the desired customer/employee spatial separation and strive to create a noticeable division between spaces that welcome customer use, and those that do not. This standard is kept as a result of wishes of the Human Resource Manager and the explanation given about how the organization works and their desired levels of privacy needed in the office. Because the office is located on the second floor of a mall-like complex, current established egress patterns out of the office and building will be upheld and left as-is by the designer.

General traffic flow (figure 3.7) to the office is available through the use of either an elevator or staircase that are both currently in a shared mall space. Traffic flow within the office is heavy along the front end, between the reception area and the classrooms, and includes primarily customer traffic flow. The separation of the areas used predominately by customers (indicated in figure 3.7 as a blue line) and areas predominately used only by fulltime employees (indicated in figure 3.7 as a red line) create a clear traffic flow pattern that is virtually independent of customer use.
3.4.4. Large Group Activities

Large group activities within the office include service to customers and gatherings for employees. Large gatherings of customers, usually 20 to 40
persons are for classes or orientations conducted within the office for customer benefit. Currently, the classes are held in computer lab one (figure 3.8), computer lab two (figure 3.9), and the lecture room (figure 3.10).

![Figure 3.8: Computer Laboratory One](image)

![Figure 3.9: Computer Laboratory Two](image)

![Figure 3.10: Lecture Room](image)

Large gatherings of employees are centered on employee meetings and often take place in the conference room (figure 3.11). Currently, the design of the conference room does not allow all employees to be in the meetings at one time, which is a design aspect that the human resource managers say they would like to change.
3.4.5 Small Group Activities

Few activities within the Organization Community Improvement are accomplished without the assistance or coordination of a fellow colleague. Most activities dealing with customer programs are done in coordination with either a supervisor or other specialist who will carry out the program activities. Therefore, supervisors and specialists need a space where they may converse and plan courses and activities for customers.

Employees currently share small enclosed office spaces (figure 3.12) and open office system areas with desk, chairs and filling cabinets (figure 3.13). Because of these shared spaces, individual work space is limited. Employees and supervisors are often strained to find private spaces to conduct one-on-one meetings with customers, hold performance reviews, and conduct other sensitive meetings that require privacy.
Figure 3.12: Shared Office Spaces for Part-time Employee

Figure 3.13: Shared Office Spaces for Fulltime Employee

3.4.6 Individual Activities and Requirements

Each employee within Organization Community Improvement works concurrently in the daily completion of tasks and classes all focused around helping the community in which they serve. Employees spend the majority of the day engaged in varied tasks including answering phone calls, creating class curricula, working in the field to recruit students for programs, completing office work, finding work for customers within the community, and conducting various business and employee support activities that allow the company to continue to operate. These tasks are each employee's respective main focus and are completed within the employee’s allotted cubicle or work space.
The basic needs for this space include one computer, one phone, storage, a tack-able message board, and acoustical privacy when dealing with customer information (figure 3.14, figure 3.15).

Figure 3.14: Non-personalized Work Area

Figure 3.15: Non-personalized Work Area

Beyond these basic needs, the cooperative culture of the office and the nature of the tasks preformed is one that often requires impromptu meetings to take place in any vacant space available at short notice (figure 3.16, figure 3.17).

Figure 3.16: Group Brainstorming or Meeting Area
Space requirements for the *Seniors* and *Youth* programs are unique to their functions within the office. Employees in the Seniors program who work part-time in the office, often work in secretarial support roles conducting light filing and data entry work when required. These employees will often work as a team to complete tasks assigned to them and need a space where they can easily work together. Employees in the *Youth* program work in the main office part-time, and work in assigned schools part-time. When these employees are in the office, they work with their teammate to organize and plan the execution of various lessons they will use in the schools where they work. In the office, these employees need a small space to collaborate with each other and retrieve information from the company server.

### 3.5 Design Considerations and Challenges

It is important to uncover the current design challenges in the space in order to further understand the design needs of Organization Community Improvement. The following chart was created by the researcher prior to the actual visit to the site to explain those current design aspects and to provide solutions. This chart will be used during the observation period and as a design tool to guide the design solutions. The chart is formatted with a column for the design considerations and questions to be answered. The column “Current Design” expresses elements of design currently in place throughout the office.
The column “Issues to Consider” are questions derived prior to the office visit by the researcher and will be used as guiding questions for the observations conducted by the researcher. These issues stated in the observation chart are mainly based on the design challenges and ideas presented in the Literature Review, the existing floor plan, and an initial visit to the site. The chart was necessary preparation for the observation period because of the site location in Chicago Illinois and all necessary information must be gathered by one week visit to the site.
### Table 3.2. Site Observation Chart

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lighting</strong></td>
<td>Overhead 2&quot; x 4&quot; troffers at various increments, housed in a grid system</td>
<td>1) Is there enough light for employees with aging eyes?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) Is there too much light?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Is task lighting needed?</td>
</tr>
<tr>
<td><strong>Daylighting</strong></td>
<td>One wall with windows that are only visible in the conference room and the executive director’s office.</td>
<td>1) Is the daylight controllable in rooms with a view?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) Is the daylight accessible to everyone? If not, how can it be shared?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Is the lack of daylight or views to daylight affecting the quality of the work environment?</td>
</tr>
</tbody>
</table>

**Figure 3.18**

**Figure 3.19**
Table 3.2. Site Observation Chart Continued

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private and Public Spaces</td>
<td>1) Large groups of employees in connected open office systems with 6'-0&quot; high walls and solid fabric panels</td>
<td>1) Is there a need for a meeting area that is not enclosed?</td>
</tr>
<tr>
<td></td>
<td>2) Closed door offices with many employees sharing the space</td>
<td>2) Is there a need for separate spaces from customers for employee lounging and conferences?</td>
</tr>
<tr>
<td></td>
<td>3) Isolated break room and conference room that is accessible to both customers and employees.</td>
<td>3) Are there positive gains from sharing spaces?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4) Is there need for acoustical privacy?</td>
</tr>
</tbody>
</table>

Figure 3.20

Figure 3.21
**Table 3.2. Site Observation Chart Continued**

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
</tr>
</thead>
</table>
| Groupings      | 1) Supervisor/department heads located along the outer walls  
2) Employees located in the center of the office in large groupings of open office systems                                                                                                         | Does the location of supervisor offices and employees work spaces allow for good communication within the office?                                                                                             |
|                |                                                                                                                                                                                                            |                                                                                                                                                                                                              |
| Space Allotment| 1) One window wall with a conference room and executive office located along window wall  
2) Additional office space for part-time employees located against major traffic corridor.                                                                                                               | 1) Does the current placement of the window wall allow light to permeate into other areas within the office?                                                                                                 |
|                |                                                                                                                                                                                                            | 2) Does having part-time employees in major traffic area cause problems for employees?                                                                                                                       |
Table 3.2. Site Observation Chart Continued

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>1) Tall, fabric lined cubical walls to dampen employee conversations&lt;br&gt;Figure 3.24&lt;br&gt;2) Acoustical paneling on the ceiling to dampen employee conversations&lt;br&gt;Figure 3.25</td>
<td>1) Is there another method of dampening noise without enclosing the employees in tall cubicles?&lt;br&gt;2) Can the acoustical panels be replaced with a better noise dampening system?</td>
</tr>
</tbody>
</table>
### Materials and Finishes

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Dated carpeting and unattractive wall finishes</td>
<td><img src="image1" alt="Figure 3.26" /></td>
<td>What are the materials and finishes within the office that best accommodate older employees?</td>
</tr>
<tr>
<td>2) Dark stain on desk surfaces</td>
<td><img src="image2" alt="Figure 3.27" /></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.2. Site Observation Chart Continued
3.6 Codes and Regulations

The design will be created in accordance with the State of Florida Building Codes and regulations of 2004. The implementation and use of Florida Building Code will be appropriate for this project because Florida Building Code is very similar to the International Building Code used in the state of Illinois. The building codes that affect the space are as follows:

*Table 3.3. 2004 Florida Building Code Chart*

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Building Code Section</th>
<th>Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Egress: Chapter 10</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupancy</td>
<td>1004.1.2</td>
<td>100 sq.ft gross per occupant</td>
</tr>
<tr>
<td>Aisles and Walkways</td>
<td>1005.1</td>
<td>0.2 inches per occupant</td>
</tr>
<tr>
<td>Flooring Surface Illumination</td>
<td>1006.1.3</td>
<td>illuminated to values of at least 1 footcandle (10 lux) measured at the floor.</td>
</tr>
<tr>
<td>Doors</td>
<td>1008.1.1</td>
<td>clear width of not less than 32 inches (813 mm)</td>
</tr>
<tr>
<td>Number of Exits</td>
<td>1018.1</td>
<td>2 per 1-500 persons</td>
</tr>
</tbody>
</table>

**Accessibility: Chapter 11**

Space Allowances and Reach Ranges:

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Building Code Section</th>
<th>Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheelchair passage width</td>
<td>11-4.2.1</td>
<td>The minimum clean width for single wheelchair passage shall be 32 inches (815 mm) at a point and 36 inches (915) continuously.</td>
</tr>
<tr>
<td>Width for wheelchair passing</td>
<td>11-4.2.2</td>
<td>The minimum width for two wheelchairs to pass is 60 inches (1525 mm).</td>
</tr>
</tbody>
</table>
### Table 3.3. 2004 Florida Building Code Chart Continued

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Building Code Section</th>
<th>Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Floor and Ground Space for Wheelchairs</td>
<td>11-4.2.4.1</td>
<td>The minimum clear floor or ground space required to accommodate a single, stationary wheelchair and occupant is 30 inches by 48 inches (760 mm by 1220 mm). The minimum clear floor or ground space for wheelchairs may be positioned for forward or parallel approach to an object. Clear floor or ground space for wheelchairs may be part of the knee space required under some objects.</td>
</tr>
<tr>
<td>Size and Approach</td>
<td>11-4.2.4.2</td>
<td>One full unobstructed side of the clear floor or ground space for a wheelchair shall adjoin or overlap and accessible route or adjoin another wheelchair clear floor space. If a clear floor space is located in an alcove or otherwise confined or all or part of three sides, additional maneuvering clearances shall be provided as shown in Figure 11-4(d) and Figure 11-4(e).</td>
</tr>
<tr>
<td>Relationship of Maneuvering Clearance to Wheelchair Spaces</td>
<td>11-4.2.5</td>
<td>If the clear floor space only allows forward approach to an object, the maximum high forward reach allowed shall be 48 inches (1220 mm). The minimum low forward reach is 15 inches (380 mm). If the high forward reach is over an obstruction, reach and clearances shall be as shown in Figure 11-5(b).</td>
</tr>
<tr>
<td>Forward Reach</td>
<td>11-4.2.6</td>
<td>If the clear floor space allows parallel approach by a person in a wheelchair, the maximum high side reach allowed shall be 54 inches (1370 mm) and the low side reach shall be no less than 9 inches (230 mm) above the floor. If the side reach is over an obstruction, the reach and clearances shall be as shown in Figure 11-6(c).</td>
</tr>
</tbody>
</table>
**Table 3.3. 2004 Florida Building Code Chart Continued**

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Building Code Section</th>
<th>Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessible Route Widths</td>
<td>11-4.3.3</td>
<td>The minimum clear width of an accessible route shall be 36 inches (915 mm) except at doors. If a person in a wheelchair must make a turn around an obstruction, the minimum clear width of the accessible route shall be as shown in Figure 11-7(a) and Figure 11-7(b).</td>
</tr>
<tr>
<td>Protruding Objects: Headroom</td>
<td>11-4.4.2.</td>
<td>Walks, halls, corridors, passageways, aisles, or other circulation spaces shall have 80 inches (2030 mm) minimum clear head room. If vertical clearance of an area adjoining an accessible route is reduced to less than 80 inches (2032 mm) (nominal dimension), a barrier to warn blind or visually-impaired persons shall be provided.</td>
</tr>
<tr>
<td>Ground and Floor Surfaces:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Level</td>
<td>11-4.5.2</td>
<td>Changes in level up to 1/4 inches (6 mm) may be vertical and without edge treatment. Changes in level between 1/4 inch and 1/2 inch (6mm and 13 mm) shall be beveled with a slope no greater than 1:2. Changes in level greater than 1/2 inch (13 mm) shall be accomplished by means of a ramp that complies with Section 11-4.7 or 11-48.</td>
</tr>
<tr>
<td>Carpet</td>
<td>11-4.5.3</td>
<td>If used on ground or floor surface, then it shall be securely attached; have a firm cushion, pad, or backing, or no cushion or pad; and have a level loop, textured loop, level cut pile, or level cut/uncut pile texture. The maximum pile thickness shall be 1/2 inch (13mm). Exposed edges of carpet shall be fastened to floor surfaces and have trim along the entire length of the exposed edge. Carpet edge trim shall comply with Section 11-4.5.2.</td>
</tr>
<tr>
<td>Area of Concern</td>
<td>Building Code Section</td>
<td>Space Requirement</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Doors:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Width</td>
<td>11-4.13.5</td>
<td>Doorways shall have a minimum clear opening of 32 inches (813 mm) with the door open 90 egress, measured between the face of the door and the opposite stop. Openings more than 24 inches (610 mm) in depth shall comply with Section 11-4.2.1 and 11-4.3.3.</td>
</tr>
<tr>
<td>Maneuvering Clearances at Doors</td>
<td>11-4.13.6</td>
<td>Minimum maneuvering clearances at doors that are not automatic or power-assisted shall be as shown in figure 11-25. The floor or ground area within the required clearances shall be level and clear.</td>
</tr>
<tr>
<td>Thresholds at Doorways</td>
<td>11-4.13.8</td>
<td>Thresholds at doorway shall not exceed 3/4 inch (19 mm) in height for exterior sliding doors or 1/2 inch (12.7 mm) for other types of doors. Railed thresholds and floor level changes at accessible doorways shall be beveled with a slope no greater than 1:2.</td>
</tr>
<tr>
<td>Door Hardware</td>
<td>11.4.13.9</td>
<td>Handles, pulls, latches, locks, and other operating devices on accessible doors shall have a shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist to operate. Lever-operated mechanisms, push-type mechanisms, and U-shaped handles are acceptable designs... Hardware required for accessible door passage shall be mounted no higher than 48 inches (1219 mm) above finish floor.</td>
</tr>
<tr>
<td>Door Closer</td>
<td>11-4.13.10</td>
<td>If a door has a closer, then the sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (76 mm) from the latch, measured to the leading edge of the door.</td>
</tr>
<tr>
<td>Door Opening Force</td>
<td>11-4.13.11</td>
<td>The maximum force for pushing or pulling open a door shall be... 5lbf (22.2 N) for an interior hinged door.</td>
</tr>
</tbody>
</table>
Table 3.3. 2004 Florida Building Code Chart Continued

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Building Code Section</th>
<th>Space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Interior Environment: Chapter 12</strong></td>
</tr>
<tr>
<td>Temperature</td>
<td>1204.1</td>
<td>a minimum indoor temperature of 68°F (20°C) at a point 3 feet (914 mm) above the floor on the design heating day</td>
</tr>
<tr>
<td>Lighting-Natural</td>
<td>1205.2</td>
<td>The minimum net glazed area shall not be less than 8 percent of the floor area of the room served.</td>
</tr>
<tr>
<td>Lighting-Artificial</td>
<td>1205.3</td>
<td>average illumination of 10 footcandles (107 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.</td>
</tr>
<tr>
<td>Room Widths</td>
<td>1208.1</td>
<td>Habitable spaces, other than kitchen, shall not be less than 7 feet (2134mm) in any plan dimension.</td>
</tr>
<tr>
<td>Ceiling Heights</td>
<td>1208.2</td>
<td>Occupied spaces, habitable spaces and corridors shall have a ceiling height of not less than 7 feet 6 inches (2286 mm).</td>
</tr>
</tbody>
</table>

3.8 Summary

Established in 1987, Organization Community Improvement is a national non-profit organization dedicated to promoting education and employment within low-income communities. The organization currently administers seven programs to best serve their targeted community, employs 113 people, and houses 50 fulltime employees at their Chicago headquarters. This organization proves to be ideal for this study because of its complex employee and customer makeup as well as their current practice of assisting seniors in job placement.

Methods to uncover elements for an appropriate design solution were discussed in detail. These methods include planning an interview with human resource management, developing focus group interviews with users of the office, and developing a chart to conduct observations and photo documentations. The challenges of the space were divided into five categories.
and discussed in detail. With these information gathering methods, the researcher aims to create criteria for designing an office space that is suitable for aging adults and to create an appropriate design that exemplifies the criteria for older employees who share the office space with their younger colleagues. The next chapter will detail the results from the interviews and observations conducted at the office of Organization Community Improvement.
CHAPTER 4
RESEARCH FINDINGS AND INTERPRETATIONS

The purpose of this chapter is to discuss the findings from the interviews and observations. The chapter will begin with findings from an interview with the head of Human Resource department, followed by findings from focus group interviews and then findings from site observations. The secondary research questions will also be restated as an attempt to answer each question as it relates to the respective findings. Within this section, close attention will be given to explaining and organizing the responses to the interview questions.

In order to create an appropriate design solution for an office space that is inclusive of an aging workforce, the following question must be answered: What is an appropriate design solution for an office space that is conducive to employees over the traditional retirement age who work in a collaborative office space that is shared with younger employees? This section will aim to answer the question in addition to the seven sub-questions discussed in the chapters one and three, as a result of the conducted manager interview, focus group interviews, and site observations. These seven sub-questions are:

1) How can design elements of ergonomics and job accommodation work together to create an office space that is conducive to employees ages 55 and over?
2) What is an appropriate balance of task and ambient lighting for older employees?
3) Are exterior views and the inclusion of sunlight within the office environment significant to the overall wellbeing of older employees?
4) What is an appropriate balance of public and private spaces needed for employees, ages 55 and older?
5) What are the materials and finishes within the office that best accommodate older employees?
6) How can an office be designed for older employees to work in a shared and collaborative space?
7) What other features should be included in the office design to make the workplace more accommodating to older employees.

4.1 Results from the Interview with the Head of Human Resources

The purpose of the interview with the head of the Human Resource department was to solidify background information on the organization regarding the design of the facility. This interview was also used to understand the goals of the organization and how these goals will be reflected in the current expansion and this project. An interview with the head of the Human Resource department was conducted on site. In order to protect the privacy of the organization, a general synopsis of findings from this interview will be given for this section.

It was important to understand the current design climate and existing conditions of the office that older employees and customers utilize. Therefore, questions regarding office design and furniture selection were asked. During the interview, the head of human resources stated that the space planning of the office and furniture selection was conducted on an as-needed basis. Specifically, the design and layout of the office came about as the organization employed more people and expanded the services they provide. They also stated that the consideration for the types and quality of furniture were dependent on a very limited budget because of the limited amounts of funds and types of resources available to the organization.

Some limitations of the office, as they relate to office size, were also discussed during the interview. On the matter of office size, the head of the Human Resource Department expressed the company’s disappointment in having many employees of the same department share small offices. This limitation within the office often manifests itself as privacy problems and often requires supervisors to occupy valuable spaces for temporary private meetings. For example, if a supervisor has to meet with a subordinate to discuss a private matter, they will occupy the often overscheduled lecture room. These impromptu meetings often result in the delay of classes needing the lecture room at that
time. Another limitation with regard to the size of the office is seen in the small
size of the conference room. Meetings are often scheduled throughout the day in
order to properly address all employees, a practice the head of the Human
Resource Department often called their meeting cycle. This continuous cycle of
employee meetings is a direct result of having insufficient conference room
space, resulting in the occupation of precious space for significant amounts of
time and a costly increase in employee working hours.

The interview with the Human Resource Department manager, and the
subsequent answers that followed, were important in understanding the
challenges and limitation of the current design of the office. This interview was
also critical in understanding the organization’s culture, background, and goals in
regards to this project and their future expansion. As a result of this interview,
the researcher was able to understand the results of the focus group interviews
and site observations.

4.2 Focus Group Interview Results and Interpretations

The purpose of the focus group interviews was to find design elements in
the office that work for the targeted age group, and to determine design elements
that could be improved upon. The intended target audience for these focus
group interview sessions was older workers, mostly full time employees and
customers in the Seniors program. However, older customers from different
programs, in addition to full time employees, were also welcomed and included in
the targeted group because of the amount of time they spend within the office
and the difference in their needs compared to the employees. The focus group
interviews were conducted for two days on site for approximately 30 minutes
each session. A total of four interview sessions were conducted with a
combination of employees from the Seniors program and older customers from
different programs. A total of eight individuals from these focus group interview
sessions consented to the use of their responses. Some employees deciding not
to participate once the consent forms were presented and they were asked to
sign to them. Although this issue proved challenging, the responses given were very useful in the overall project.

The following focus group questions were developed to answer the research question *How can design elements of ergonomics and job accommodation work together to create an office space that is conducive to employees ages 55 and over?* To better answer the research question, the following interview questions were asked.

*Describe what you like most about the general office space?*

The answer given by three respondents to this question was “not much”. Meaning that within the office there were very few, if any, elements that they liked.

*What makes you comfortable in the general office space?*

Of those who responded to this question, one person stated the advantage of being in the reception area of the office was that there was more space to work, along with the chair they have. Another respondent stated that the respect that their colleagues showed for each other in spite of having work areas that were too close was what made them most comfortable within the office. No respondents stated any design elements within the office as something that made them comfortable within the office.

*What do you not like about the general office space?*

Six respondents answered this question in many ways. Some stated that the clutter in the office made them feel trapped in their own work areas and others felt the compact nature of the office made the office feel cramped and uncomfortable. The majority of customers felt that the placement of the restrooms outside of the office was unsafe and created trepidation when they had to use the facilities after standard business hours. This hesitation is because of a feeling of minimal security after office hours and the ability of anyone to access to the second floor restrooms.
How do you feel about the temperature of the general office space?

a. If not comfortable, how do you compensate for the temperature?

Of the eight responses, most respondents stated that the office was too hot. However, many pointed out the fluctuation in the temperature throughout the office, even stating that some areas were too cold. Of these respondents, none offered the methods of compensation. Only two respondents, however, stated that the temperature was comfortable for them and had no complaints. Although this is a concern of the heating, ventilation and air cooling system (HVAC) and will not be addressed in the design, this discomfort was a major concern of the employees and customers who use the office.

How do you feel about the conference room?

Three employees stated that the conference room was adequate, presumably in its design. However, one respondent did state in an answer to a later question that the room would be ideally used as a lounge because of the windows and exterior views.

How do you feel about the break room?

and

Do you take your breaks in the break room?

Seven respondents answered that the break room was too small and therefore they rarely used it. For those who took breaks, some had their lunches at the desk and some dined by the computers. Only two respondents stated they used the break room, and of those two, one stated that they used it infrequently.

If you could change one thing about the general office, what would you change?

Answers to this question were varied by the five participants. Most participants stated they would change the office layout, the fulltime employee
stated they would include rooms for private conversations, and both the fulltime employees and the participants from the Seniors program stated they would increase the size of overall office space.

Describe what you like most about your work space?

Four customers responded they did not like anything about their work area, which are the computer laboratories. The employee who had a permanent work station stated their personal desk as the only element they liked about their work space. Other employees who did not have a permanent work space stated the computers in the areas they share as the only thing they liked about their work space.

What makes you comfortable in your work space?

Only an employee responded to this question in the focus group interview, however, many employees offered responses that were significant to the study. Of these employees, those who had permanent work spaces stated the level of cleanliness in their personal work area as the element that makes them comfortable in their work space. Three employees who do not have permanent work spaces stated working with their colleagues when they have enough space to work comfortable was a positive factor in their work space, and one stated that when they have a good chair at their desk they are most comfortable.

Is your desk chair comfortable?

a. If not, what do you do to make yourself more comfortable?

Of the seven respondents, some employees stated that their chairs were comfortable, mostly because they have adjustable and padded office chairs. Employees without these adjustable chairs stated that their chair could be better because they were uncomfortable. One respondent stated that they changed their chair to the adjustable chair in order to make themselves comfortable. Customers who primarily use the computer and lecture rooms, on the other hand,
stated their chairs were not comfortable because hard plastic chairs were used in the computer laboratory.

*Is your work surface at a comfortable height?*

*a. If not, what do you do to work on this surface?*

*b. Does this adjustment cause you any discomfort?*

Most of the seven respondents to this question answered that their work surfaces were at comfortable heights. One respondent stated that the height of their desk was correct once the use of an adjustable chair was included. One respondent stated that their work surface was not at a comfortable height and stated the discomfort in their neck and back because of using this equipment in an uncomfortable position. This respondent’s desk was stationary and not adjustable.

*Within your work space, can you easily reach the electrical outlets to plug in equipment?*

The researcher had four responses to this question. Each respondent stated that they could not easily reach an electrical outlet (figure 4.1, figure 4.2).

![Figure 4.1 & 4.2, Electrical Outlet Located Under the Desk](image)

Although they could not reach an electrical outlet, every employee stated that they would like to use the outlets but the inconvenience of having the electrical outlet under their desk prevented them from doing so.
What was the driving force behind you personalizing your work space?

Three respondents stated that they do not personalize their work space for many reasons including its small size and the lack of a permanent work space. One employee who had a permanent work space, said the main reason for personalizing their space with photos, etc., was to create an environment for themselves so that they could relax and work, which they felt made them more efficient and effective.

If you could change one thing about your work space, what would you change?

The answers to this question were varied. The employee with a permanent work space stated that they would change their desk, the orientation of their computer, and its location on their desk. The other three employees stated they would change the location of the electrical outlets, the lack of space, and include within the office permanent individual work desks. Four customers, especially from the Seniors program, stated the limited amount of space available as a major problem and the orientation of the computers in the computer laboratories as dysfunctional for lecturing. This dysfunction is because of the placement of computer screens away from the instruction or in a position where the computer user must turn their head to the right or left to see the instructor.

The research question of, what is an appropriate balance of task and ambient lighting for older employees, was answered by the following focus group questions:

How much time do you spend working at your computer?

Most respondents stated that they spend the majority of their time or work day working on a computer within the office.

Are you easily able to see your computer? If not:
a. When do you find it difficult to see your computer?
b. Why (or why not)?
c. How do you currently remedy this problem?

Three respondents stated they could see the computer, and only one responded stated they could not. However, of the respondents that stated they could see the computer, each had points for improving the light they have to work with when on the computers. These improvements were to increase the amount of light available and to reduce the amount of glare to the keyboards caused by the overhead lights. The respondent who said they could not see the computer stated that it was because it was too dark within their working space and that the overhead lights available were "just not right" because of how the light shines on the computer. One respondent stated that they brought in a desk lamp for their desk because there was not enough light to see materials.

How much time do you spend reading written materials?

The responses to this question were varied. The four customers stated they take notes and test, which were minimal and not the main focus of the class. The four employees who responded stated mixed amounts of reading within the office.

Are you easily able to see written material? If not,
a. How do you remedy this problem?

The six respondents answered yes to this question. However, one stated that the light bothers them when they are reading. The respondent did not, however, offer their chosen remedy to this problem.

The balance of controllable and overhead lighting proves to be delicate and varied depending on the respondent. Most employees within the Organization Community Improvement office stated difficulty in completing their work because of problems with the overhead lighting system causing glare on computers and keyboards. With this stated fact, many participants believe that the artificial overhead light is inadequate for completing their task. Therefore, a
design solution for this office and for the older employees who inhabit the office should include a combination of indirect overhead artificial lighting systems that eliminates glare problems, and task lighting options that can be adjusted by the user.

The following focus group questions were developed to answer the research question; **Are exterior views and the inclusion of sunlight within the office environment significant to the overall wellbeing of older employees?**

*Do you have a window? A view to the exterior?*

  a. Can you control the amount of light that comes through the window?

  b. If not, does this cause impact the quality of the work space?

Seven respondents answered negatively. Although no one stated a direct impact of not having a window within their work area to the quality of their work space or their work, the responses to the next question indicates an indirect impact to the employees.

*Of those who do not have a window view, would you like one?*

Of all seven people who responded to this question, only one response, which was given by a customer, said it was not important. Everyone else answered affirmatively to this question, stating in some case that a window would make them “feel better”. One respondent stated that having a window “would be like taking a break without leaving their desk”, and one said that it makes them “cheery” to work in the spaces in the office that do have windows.

These focus group questions assisted in answering the question of the importance of sunlight and exterior views for older employees. The employees of Organization Community Improvement desire a window and state positively that having a window would improve their mood and well-being within the office environment. Therefore, an appropriate design solution for this age group and within this office should provide and pay close attention to exterior views and sunlight for as many work stations as possible.
In order to answer the question, **what is an appropriate balance of public and private spaces needed for employees, ages 55 and older**, the following focus group question was developed:

**Do you feel as though your work space lends to collaborating with your colleges?**

This question was asked to the four employees to understand how the target audience used the space and how much interaction was required among their colleges. Many of the answers to this question highlighted the close proximity of their working areas and the lack of permanent working space. Employees emphasized the enjoyment of working next to their colleagues but also expressed their overwhelming need for more space.

The answers identified that the desirable balance of social interaction and privacy needed for older employees varied. While older employees within the Organization Community Improvement office enjoy the interaction they receive from their colleagues, they require adequate amounts of space, work areas that allow them to interact with colleagues, and individual work spaces that afford concentration and seclusion when desired. It would then be correctly assumed that these employees equate privacy in the office with having an individual work space or an adequate amount of work space at shared desk where they can work.

### 4.3 Interpretation Summary

The interview questions and responses imply that ergonomic and job accommodation principles discussed in the Chapter 2 play an important role in improving the office environment for older employees. Employees and customers of company Organization Community Improvement stated their discomfort and difficulties in working because of furniture that does not currently meet the guidelines of the ergonomic and job accommodation principles discussed in the Chapter 2. Therefore, the inclusion of well designed elements
and furniture that adheres to ergonomic and job accommodation principles would be beneficial in preventing injury employees. Figure 4.3 lists the needs and suggestions derived from the responses of both the employees and customers.
More space
Permanent work areas
A lounge space separate from their customers
A large conference room where they can participate in office meetings with at least 50 employees present
Private meeting areas
Exterior views
Cooperative working areas

Ergonomically design chairs
Properly working equipment
Appropriate lighting throughout the office
An efficient space plan for the office, including laboratories and lecture rooms, that accounts for traffic movements
Quality thermal system throughout the office

A separate lounge area from the employees
More exterior and artificial light
Unassigned computer areas for working and spontaneous use
Computer laboratories with work stations all facing the instructor

Figure 4.3: Employee/Customer Preferences Diagram
4.4 Observation Results

The purpose of the onsite observations was to observe how employees use the space in order to discover both positive and negative design elements in the office. Observations were conducted for four business days at a length of three hours each day, thus totaling 12 observation hours in one week. As previously stated, an observation chart (table 3.2) was developed to accurately record particular elements of concern. The column titled “Current Design” expresses elements of design currently in place throughout the office. The column “Considerations” includes questions developed prior to the office visit by the researcher and guided the observations conducted by the researcher. Table 4.1 shows the observation chart (table 3.2) expanded to include a column titled “Findings”. This column provides answers to questions in the “Considerations” column, additional elements observed by the researcher during office visits, and concerns offered to the researcher by employees and customers during observations periods that were outside of formal interview sessions. The observations were important in understanding how the target group responds to their work environment.
Table 4.1. Site Observation Chart with Findings

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
<th>Findings</th>
</tr>
</thead>
</table>
| **Lighting**   | Overhead 2" x 4" troffers at various increments, housed in a grid system | 1) Is there enough lighting for employees with aging eyes?  
2) Is there too much light?  
3) Is task lighting needed? | There is not enough lighting. Older employees are bothered by the artificial light in the space and the glare it creates. Task lighting is needed for all employees in order to do work activities. |
| **Daylighting**| One wall with windows that are only visible in the conference room and the executive director’s office. | 1) Is the daylighting controllable in rooms with a view?  
2) Is the daylight accessible to everyone?  
3) Is the lack of daylight or view to daylight affecting the quality of the work environment? | Daylighting is currently controlled through curtains that are translucent. Although there is ample light in the two rooms that have windows, the sunlight does not penetrate other spaces in the office. The lack of daylighting and exterior views are affecting the energy of employees and their moods. |

Figure 3.18

Figure 3.19
<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private and Public Spaces</td>
<td>1) Large groupings of employees in connected open office systems with 6'-0&quot; high partitions and solid fabric panels</td>
<td>1) Is there a need for a meeting area that is not enclosed?</td>
<td>There is a need for private meeting spaces that are enclosed.</td>
</tr>
<tr>
<td></td>
<td>2) Closed door offices with many employees sharing the space</td>
<td>2) Is there a need for separate spaces for employee lounging and conferences?</td>
<td>Employees expressed a need for a separate break room or lounge from the one currently used by both employees and customers.</td>
</tr>
<tr>
<td></td>
<td>3) Isolated break room and conference room that is accessible to both customers and employees.</td>
<td>3) Are there positive gains from sharing spaces?</td>
<td>Older adults currently enjoy working in spaces shared with their cohorts, however, they want an individual work space. They prefer the ability to use shared working spaces when they choose.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4) Is there need for acoustical privacy?</td>
<td>Acoustical privacy is needed throughout the entire office.</td>
</tr>
</tbody>
</table>
**Table 4.1. Site Observation Chart with Findings Continued**

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
<th>Findings</th>
</tr>
</thead>
</table>
| **Groupings**  | 1) Supervisor/department heads located along the outer walls  
2) Employees located in the center of office in large groupings of open office systems | Does the location of supervisor offices and employees work spaces allow for good communication within the office? | Communication between employees and supervisors is good. However, there is need for privacy and areas where employees and supervisors can have private conversations. |
| **Space Allotment** | 1) One window wall with conference room and executive office located along window wall  
2) Swing office space for part-time employees located against major traffic corridor. | 1) Does having conference room and executive office against window wall allow light to permeate into other areas within the office?  
2) Does having part-time employees in major traffic area cause problems for employees? | Light is not permeating throughout the space.  
Having employees in major traffic areas is not working for neither employees nor the customers because of sound issues. |
### Table 4.1. Site Observation Chart with Findings Continued

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Noise          | 1) Tall, fabric lined cubical walls to dampen employee conversations | 1) Is there another method of dampening noise without enclosing the employees in tall cubicles?  
2) Can the acoustical panels be replaced with a better noise dampening system? | Currently, the use of cubicle and acoustical panels are the only methods of noise dampening. Both systems are not meeting the noise dampening needs of the organization. |
|                | 2) Acoustical paneling on the ceiling to dampen employee conversations | | |

Figure 3.24

Figure 3.25
Table 4.1. Site Observation Chart with Findings Continued

<table>
<thead>
<tr>
<th>Design Element</th>
<th>Current Design</th>
<th>Issues to Consider</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials and Finishes</td>
<td>1) Dated carpeting and unattractive wall finishes</td>
<td>What are the materials and finishes within the office that best accommodate older employees?</td>
<td>Employees and customers do not like the dated nature of the finishes in the office.</td>
</tr>
<tr>
<td></td>
<td>Figure 3.26</td>
<td></td>
<td>The dark writing surfaces are undesired by the users of the space.</td>
</tr>
<tr>
<td></td>
<td>2) Dark stain on desk surfaces</td>
<td></td>
<td>Writing surfaces that are too light, however, are also undesired.</td>
</tr>
<tr>
<td></td>
<td>Figure 3.27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.26

Figure 3.27
As a result of the observations and observation chart, the researcher discovered that within this office environment the older employees enjoy communicating regularly with colleagues of similar age while working. However, they also expressed requirements of needing private spaces where they can conduct concentrated tasks without interruption. The researcher also observed the difficulties expressed by the employees and customers of working in areas dominated by traffic and walkways.

4.5 Summary

This chapter presented the interview results of employees and customers from Organization Community Improvement in response to questions presented by the researcher. An interview with the head of the Human Resource department presented the researcher with critical information regarding the organization’s culture, background, and goals in regards to this project and their future expansion. This interview provided the researcher with the needed information to understand the results of the focus group interviews and site observation in regards to the forward mobility of the organization and space restrictions of the office. Responses from the focus group interviews expressed the older employees’ discomfort in working within the office and their desire for design elements within the office that adhere to current ergonomic and job accommodation principles. As a result of the focus groups, the following suggestions were given; exterior views for every employee, cooperative work areas, private meeting areas, a large meeting space and larger office spaces. These elements were suggested in addition to requests for more daylight included within the office, better chairs and equipment, and better overall artificial lighting throughout the office area.

Results of site observation were also explored in depth with regards to answering the previously stated research questions. As a result of the observation, the researcher was able to better understand how employees within
the space communicate with each other and the importance of private spaces.
In addition, the researcher was able to observe compensation methods used by
the office employees to work within the office with various design challenges.
The following chapter will present a theoretical design that is appropriate for
accommodating employees over the traditional retirement age in the shared,
collaborative office space.
The purpose of this chapter is to present gathered information in the form of a design solution that accommodates older employees while at the same time accommodating youth. The chapter will begin with an explanation of the proposed design and a list of the design criteria developed from the literature review, interviews, and site observations. These design criteria will serve as a base for explaining the space planning, furniture choices, and material choices within the design in a later section. This section is then followed by a detailed description of the proposed design solutions and how they meet the design criteria, including an explanation of the furniture and materials chosen for the space. The chapter is concluded by a section summary.

5.1 Design Criteria

In order to develop an appropriate interior for Organization Community Improvement, design criteria were developed based upon the extensive study of published literature, four focus group interview sessions with customers from the organization’s Seniors program and older employees, and site observations. Table 5.1 lists: 1) the design issues, 2) design questions, 3) criteria from the review of literature, and 4) criteria gathered from the interview with the human resource manager, focus group interviews and site observations.
Table 5.1: Design Criteria from the Literature Review and Field Research

<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Design Question</th>
<th>Criteria from Literature Review</th>
<th>Criteria from Interviews and Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Groupings and Space Allotment</td>
<td>What is an appropriate balance of public and private spaces needed for employees, ages 55 and older?</td>
<td>The presence of public and private spaces</td>
<td>Adequate amounts of space for each employee</td>
</tr>
<tr>
<td></td>
<td>How can an office be designed for older employees to work in a shared and collaborative space?</td>
<td>The presence of non-rigid boundaries</td>
<td>Permanent work areas for both part-time and full-time employees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Separate lounge spaces for customers and employees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A large conference room or multiple conference rooms where employees can participate in large office meetings or smaller group meetings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Private meeting areas where employees may conduct interviews with customers in confidential settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cooperative work areas for both customers and employees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Open computer areas for customers to use when they are not in training sessions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Organized computer laboratories with table layouts that allow the customers to easily view the instructor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>An office area that houses temporary groups like the Youth and Seniors, while they are in the office</td>
</tr>
<tr>
<td>Design Issue</td>
<td>Design Question</td>
<td>Criteria from Literature Review</td>
<td>Criteria from Interviews and Observations</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Natural Light &amp; Exterior Views</td>
<td>Are exterior views and the inclusion of sunlight within the office environment significant to the overall wellbeing of older employees?</td>
<td>Exterior views and natural light for all employees</td>
<td>Exterior views for each employee or exterior views in common areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More daylight used to illuminate most areas of the office</td>
</tr>
<tr>
<td>Artificial Lighting</td>
<td>What is an appropriate balance of task and ambient lighting for older employees?</td>
<td>Flexible types of illuminating sources</td>
<td>More ambient, artificial light in combination with task lighting used throughout the office</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Controllable light sources at each employee station</td>
<td></td>
</tr>
<tr>
<td>Job Accommodating Principles</td>
<td>How can design elements of ergonomics and job accommodation work together to create an office space that is conducive to employees ages 55 and over?</td>
<td>Technology that allows for natural body positioning when working at it; The use of ergonomically sound items like split keyboards and anti-glare paper for computer screens; Having an efficient air conditioning system to minimize unwanted body heat;</td>
<td>Office equipment and chairs that minimize discomfort and allow ease of use</td>
</tr>
<tr>
<td>Expressed as Furniture</td>
<td></td>
<td></td>
<td>Consistently mild temperatures throughout the office</td>
</tr>
</tbody>
</table>
Table 5.1: Design Criteria from the Literature Review and Field Research Continued

<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Design Question</th>
<th>Criteria from Literature Review</th>
<th>Criteria from Interviews and Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials and Finishes</td>
<td>What are the materials and finishes within the office that best accommodate older employees?</td>
<td>The use of design features that promote fitness.</td>
<td>Improve materials on the work surfaces employees and customers use</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Address contrast sensitivity lose, dark adaption decrease, decline in color sensitivity, and problems with glare</td>
<td>Improve the quality and aesthetics of the flooring materials throughout the entire office</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contrast in colors and patterns in materials should be reduced</td>
<td></td>
</tr>
</tbody>
</table>

5.2 Office Space Planning

The first step for designing the interior was to organize the office into specific areas that meet the requirements of the organization as discussed in the Chapter 3. Therefore, the office was organized into six distinct areas (figure 5.1); the mall area used by all of the building, waiting and reception, Youth and Seniors area, customer classrooms and lecture rooms, fulltime employee area, and administrative office area.

![Space Designation Floor Plan](image)

Figure 5.1: Space Designation Floor Plan

The common area is located outside of the office space designated for Organization Community Improvement, and consists of a set of stairs, elevators,
and restrooms that are accessible to anyone who enters the mall complex. The “waiting and reception area” is the first area located inside of the organization’s designated office space. This area is used by both customers and employees. The “Youth and Senior area” is assigned to the Seniors program for 20 hours each week as well as to the Youth program 20 hours a week, thus, creating an area that is continuously used by these two groups. The “customer classroom and lecture room area” is the designated area for customer use and is separate from the rest of the office. This separation is designed to create specific traffic patterns and zones that are for employee use only. This separation further addresses the privacy needs of employees expressed by the head of the Human Resource Department and reinforces the wants expressed by both customers and employees in the design criteria that asks for separate lounge spaces for employees and customers. The “fulltime employee area” is designated for all fulltime employees, excluding administration but including workers of the 26th program, and will consist of permanent work stations for employees. The “administrative office area” houses all administration and support offices and their assistants.
Figure 5.2: Office Floor Plan (Line Drawing)
Although all areas of the Organization Community Improvement office are important and potentially used by the older employees, the final design solution for this project focuses on the specific area assigned to the Youth and Seniors programs (figure 5.3). This area, approximately 1400 square feet of space, was chosen because of its extensive use by those selected for the study. In addition, this area is used by a combination of ages and therefore should be flexible enough to accommodate both Youth and Seniors customer groups and their specific needs.

![Figure 5.3: Youth & Seniors Area Relationship Floor Plan](image)

The design for the Youth and Seniors area (figure 5.4, figure 5.5) organizes the space in a well defined area that is somewhat removed from other areas of the office. By using the closed offices and meeting room as a divider, the Youth and Senior open office area is removed from major corridors and other office traffic that is not specifically for this area (figure 5.6). This division allows
supervisors the ability to monitor their employees while providing exterior views to the greatest number of employees using this space.

Figure 5.4: Youth & Seniors Area Floor Plan
Figure 5.5: Youth & Seniors Area Perspective Drawing
Using mobile, extendable and opaque privacy screens (figure 5.7) in the open office area allows the users to further define their space and level of desired privacy. These six feet high mobile privacy screens act as an architectural wall that helps to absorb sound while allowing light to filter through the opaque fabric.
These screens are flexible enough to move through the office and adapt to the rearrangements of the workstations. Electrical and data outlets have also been placed in the office area to allow for rearranging the workstations. Outlets were placed in the concrete floor and accessed through the wood floor in addition to being placed in the wall. This arrangement was created so that each station has power no matter their placement and so that all necessary wires are controlled.

Figure 5.7: Mobile, Translucent Privacy Screens

5.3 Employee Groupings and Space Allotment for the Youth and Seniors Office Area

It is important to understand what an appropriate balance of public and individual work spaces required for the Youth and Seniors employees is in order to develop appropriate groupings for these employees. This balance is further complicated by the nature of work completed by these employees and the amount of co-working required to complete their tasks. The following section discusses design elements developed and implemented to meet the required balance of public and individual work spaces in the Youth and Senior open office area. This section begins with table 5.2, which specifically addresses the
information regarding employee groupings and space allotments presented in table 5.1 with the addition of the design solutions.

Table 5.2: Employee Groupings and Space Allotment

<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Employee Groupings and Space Allotment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Question</td>
<td>What is an appropriate balance of public and individual spaces needed for employees, ages 55 and older?</td>
</tr>
<tr>
<td></td>
<td>How can an office be designed for aging employees to work in a shared and collaborative space?</td>
</tr>
<tr>
<td>Criteria from Literature Review</td>
<td>The presence of public and private spaces</td>
</tr>
<tr>
<td></td>
<td>The presence of non-rigid boundaries</td>
</tr>
<tr>
<td>Criteria from Interviews and Observations</td>
<td>Adequate amounts of space for each employee</td>
</tr>
<tr>
<td></td>
<td>Permanent work areas for both part-time and full-time employees</td>
</tr>
<tr>
<td></td>
<td>Lounge spaces for customers and employees</td>
</tr>
<tr>
<td></td>
<td>A large conference room or multiple conference rooms where employees can participate in large office meetings or smaller group meetings</td>
</tr>
<tr>
<td></td>
<td>Private meeting areas where employees may conduct interviews with customers in confidential settings</td>
</tr>
<tr>
<td></td>
<td>Cooperative work areas for both customers and employees</td>
</tr>
<tr>
<td></td>
<td>Open computer areas for customers to use when they are not in training sessions</td>
</tr>
<tr>
<td></td>
<td>Organized computer laboratories with table layouts that allow the customers to easily view the instructor</td>
</tr>
<tr>
<td>Design Solutions</td>
<td>Public and individual spaces were defined through desk/table groupings, controlled traffic patterns and privacy screens</td>
</tr>
<tr>
<td></td>
<td>Ceiling height changes were used to denote area changes and aid in creating intimate areas</td>
</tr>
<tr>
<td></td>
<td>Boundaries were made through flooring and material changes as well as using interior transparent glass walls</td>
</tr>
<tr>
<td></td>
<td>Permanent work spaces were created for every user</td>
</tr>
<tr>
<td></td>
<td>Multiple meeting and conference rooms, lounge spaces, and other spaces requested by customers and employees were created for use</td>
</tr>
</tbody>
</table>
The design criteria stated in the review of literature suggest that the design of the work area should promote the presence of public and private spaces. The design meets this requirement by creating a sense of individual working spaces at work areas that are adjacent but not connected to one another. Multiple ceiling heights were used throughout the office, but special attention was given to their use in the Youth and Seniors open office area (figure 5.8). Lower acoustical ceiling systems, at 10 feet above finish floor (AFF), were used to give the area a sense of intimacy that reinforces a feeling of individual work spaces for the employees. This technique was also used in the closed offices, conference rooms, and meeting rooms where the ceiling height is 11 feet AFF. These closed areas have acoustical ceiling systems (Figure 5.20), at 11 feet AFF, and the large open areas have exposed ceiling at 13 feet AFF.

![Figure 5.8: Youth & Seniors Area Ceiling Illustration](image)

A sense of individual work spaces is further promoted with the use of individual desks that have attached panels. These panels define individual working spaces while not prohibiting views to the exterior. These work areas are combined with tangent (Figure 5.9) and crescent shaped (Figure 5.11) tables used as shared desk for two workers.
These tangent and crescent shaped desks are present to promote co-working situations and group activity. These tables were chosen for this space over traditional office systems because their convertibility and versatility. These tables can be raised or lowered easily by the user, they can be converted to traditional office systems with few additional parts and they can be relocated easily within the office. These work surfaces can also be specified as individual tables, as specified in this design, for employees who do not require a lot of space to work or in offices where the employees are not permanent workers as in the case of the Youth and Seniors employees. The work tables are also used as a medium to achieve a feeling of shared working conditions required by the first design.
criteria of the review of literature (chapter 2) that states that there should be a presence of both public and private spaces available for this age group. In addition, employees are encouraged to walk while within the office and socialize with one another because of the central location of file rooms, copy rooms, waste baskets, recycle centers and conference rooms (figure 5.2). The proximity of these commonly used items relates to the design criterion in the chapter 2 that promotes fitness within the office.

To meet the next design criteria in table 5.2, which states that there should be a presence of non-rigid boundaries, three design techniques were used; the use of flooring changes, the use of furniture changes and the use of interior transparent glass. Flooring changes further assist in delineating space without having physical boundaries. Clean material and color changes in the flooring chosen between the corridor and the office area as well as in the Youth and Seniors office area and the adjacent office area (figure 5.12), for example, help to define traffic areas visually while providing a tactile change. This combination of visual and tactile change is important for older employees whose visual acuity is lowered or impaired. Whereas, furniture shape and color change is intended for a clear boundary transition between the Youth and Seniors open office area and the full-time employee open office area (figure 5.13).

![Figure 5.12: Floor Transition](image1)

![Figure 5.13: Furniture for Full-time Employees](image2)
Interior transparent glass was used between the open office area and the closed offices (figure 5.14) for a multitude of practical purposes. The glass allows light transfer between the spaces, provides visual monitoring of the open office area, but more importantly, creates physical divisions between the spaces without visually dividing the spaces. Using the glass with operable privacy blinds built inside the panes of glass, creates acoustical and visual privacy required by the supervisors to conduct private meetings. Interior transparent glass, in the form of transom windows, was also used in the wall between the open office area and the conference room (figure 5.15 and figure 5.16) which further assists in dividing the spaces physically without visually closing the spaces. These methods help to add a sense of fluidity to the office environment and soften the boundaries needed to divide spaces.

Figure 5.14: Interior Transparent Glass (1)  Figure 5.15: Interior Transparent Glass (2)
Design options for the transom window, particularly between the Youth and Seniors office area and the conference room, could be varied. For the design of this office, and because of the height of the window (at 8 feet above the finished floor), the transom windows were designed with contemporary seamless pieces of glass held in place with clear caulking. However, the purposes of these windows are to allow light to penetrate into these rooms and to create non-rigid boundaries within the office. Therefore, glass panes designed with etching or with various levels of opacity that allow light to infiltrate both spaces would all prove appropriate for use in the office.

5.4 Exterior Views and Natural Light in the Youth and Senior Office Area

Redesigning the Youth and Seniors office area was done with the consideration of the inclusion of exterior views and natural light into the space. This consideration was given because of criteria derived from the literature review, interviews and observations. The following section presents solutions to the design criteria, beginning with table 5.3. This table restates the criteria
expressed in table 5.1 regarding exterior views and natural light and adds the design solutions developed to meet the criteria.

**Table 5.3: Exterior Views and Natural Light**

<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Exterior Views &amp; Natural Light</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Question</strong></td>
<td>Are exterior views and the inclusion of sunlight within the office environment significant to the overall wellbeing of older employees?</td>
</tr>
<tr>
<td><strong>Criteria from Literature Review</strong></td>
<td>Exterior views and natural light for all employees</td>
</tr>
<tr>
<td><strong>Criteria from Interviews and Observations</strong></td>
<td>Exterior views for each employee or exterior views in common areas</td>
</tr>
<tr>
<td></td>
<td>More exterior light used to illuminate most areas of the office</td>
</tr>
<tr>
<td><strong>Design Solutions</strong></td>
<td>Work stations are situated so that the natural light is not blocked by walls or workstations</td>
</tr>
<tr>
<td></td>
<td>Furnishings that do not block the windows were used, thus allowing exterior views for all the employees and customers using the space.</td>
</tr>
</tbody>
</table>

Views to natural daylight are present for all employees through a series of exterior and interior glass (figure 5.17). Two windows along the north wall afford each employee in the open office area a view to the exterior and the inclusion of natural light into the space. In an attempt to maximize the exterior view for every employee, low office panels (42 inches tall) were used for each workstation (figure 5.18), further allowing daylight to infiltrate into the farthest portion of the office area (figure 5.19). Each work station is positioned to minimize the glare from natural light upon computer screens and working surfaces while maximizing the exterior views and the access to day light (figure 5.18, figure 5.19). The interior transparent glass between the closed offices and the open office area allows employees who are in a closed office access to the exterior by providing a seamless view to the open office area and the windows.
Figure 5.17: Youth & Seniors Area Partial Section
Figure 5.18: Youth & Seniors Area Elevation
Figure 5.19: Youth & Seniors Area Floor Plan with Daylight
5.5 Artificial Lighting for the Youth and Seniors Office Area

The inclusion of artificial lighting is discussed in the following section in regards to its purpose within the office and various types of fixtures used. The section begins with table 5.4 which reiterates the concerns regarding artificial lighting stated in table 5.1, with the addition of the design solutions used in the design.

*Table 5.4: Artificial Light*

<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Artificial Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Question</td>
<td>What is an appropriate balance of task and ambient lighting for older employees?</td>
</tr>
<tr>
<td>Criteria from</td>
<td>Flexible types of illuminating sources</td>
</tr>
<tr>
<td>Literature Review</td>
<td>Controllable light sources at each employee station</td>
</tr>
<tr>
<td>Criteria from</td>
<td>More overhead, artificial light in combination with task lighting used throughout the office</td>
</tr>
<tr>
<td>Interviews and</td>
<td>Two types of ambient lighting were used that cannot be controlled by the employees or customers</td>
</tr>
<tr>
<td>Observations</td>
<td>Task lighting was specified for customer and employee desks so that each user can control the amount of light needed to complete tasks</td>
</tr>
</tbody>
</table>

In addition to introducing daylight into the office space, task lighting fixture and ambient lighting was used as flexible means of illumination. Diffused pendant fixtures were chosen for use over the open office area combined with 2 feet x 4 feet indirect pendant fixtures (figure 2.21) projected onto the ceiling along the periphery of the Youth and Seniors Office Area (figure 5.20).
Figure 5.20: Youth & Senior Office Area Reflected Ceiling Plan
The diffused pendent fixtures have three 26 watt quad compact fluorescent lamps, housed in an etched white opal glass case (figure 5.22).

These fixtures will supply the area with enough ambient light while functioning to minimize glare by projecting light through the etched glass covering. The 14 specified pendant fixtures at 10 feet above the finished floor, are estimated to provide 40–60 footcandles of illumination to each work surface. This footcandle amount is close to the illumination range recommended by the Illumination Engineering Society. This combination of lighting systems was chosen in order
to reduce glare from artificial light upon the work stations while maximizing the use of natural light.

A commercial grade Armstrong SoundScapes brand acoustic ceiling system (figure 5.8, figure 5.21) at 11 feet AFF was also employed to reduce the amount of noise produced by this large open office area and to create a sense of intimacy within the space. With a ceiling height in 13 feet in the open office area, the ceiling system gives implied ceiling heights in the open office area of 10 feet and to 11 feet. Each acoustical “cloud” provides a minimum of 1.00 Sabins/sf of acoustical sound absorption. This system used in the Youth and Seniors office area further visually separates cooperative and private working areas.

Lower ceiling heights of 10 feet with 2ft x 4ft acoustical ceiling tiles are also present in closed offices, conference rooms, and meeting rooms in order to create a sense of privacy and ownership in these rooms. Having this lower ceiling height in the adjoining areas to the open office areas also provides a 3 foot plenum space to house the HVAC system needed to provide consistent temperatures to the entire office. The ceiling height design helps to reduce eyestrain by controlling the amount of light needed for working through the use of the ambient lights. By using diffused overhead lighting systems, the presence of glare on computer screens and other work surfaces is greatly reduced while still illuminating the office area.

5.6 Job Accommodation Principles Expressed as Furniture Choices

The purpose of this section is to present the various types of furniture specified to fulfill job accommodating principles. These products are representations of a multitude of products available to meet the design criteria and the design aesthetic. These products will be chosen to address the design issues presented in table 5.5. Table 5.5 restates the design question regarding job accommodating principles and derived criteria but includes the design solutions developed to meet the criteria.
Table 5.5: Job Accommodating Principles Table

<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Job Accommodating Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Question</td>
<td>How can design elements of ergonomics and job accommodation work together to create an office space that is conducive to employees ages 55 and over?</td>
</tr>
</tbody>
</table>
| Criteria from Literature Review | Technology that allow for natural body positioning when working at it;  
The use of ergonomically sound items like split keyboards and anti-glare paper or screen for computer screens;  
Having an efficient air conditioning system to minimize unwanted body heat;  
The use of design features that promote fitness. |
| Criteria from Interviews and Observations | Office equipment and chairs that minimize discomfort and allow ease of use  
Consistently mild temperatures throughout the office |
| Design Solutions | Specified desk and chairs for the office that rise and lower, provide the proper back and lumbar support, and further adjust to multiple types of bodies.  
Introduced elements that reduce glare, eye strain, awkward head and neck positioning, and promote neutral body positioning, such as computer monitor arms.  
Suggested the inclusion of a comprehensive HVAC system in the office |

Appropriate furniture and technology choices are critical in providing an office environment that accommodates an aging workforce while being flexible enough to work for the younger employees who also use the office space. Therefore, the design of the workstations (figure 5.23) used in Organization Community Improvement can be raised or lowered, and has surface cutouts (figure 5.24), allowing for natural body positioning when working. The furniture was chosen for this office from numerous available sources that meet the developed design criteria.
Each employee station is composed of a Knoll brand work table (figure 5.25) from the Upstart® collection, as described by Knoll:

- Adjusts vertically when mounted on gliders to be either lowered to 27-3/4 inches or raised to 32-3/4 inches from the ground, and when mounted on casters to be lowered to 27 3/4” and raised to 31 3/4”
- Has mounted gliders that allow the station to be easily moved throughout the space by any user including those with minimal strength or with disabilities
- Has height adjustable gliders for proper ergonomic alignment that when combined with the adjustable table can be either lowered to 27-3/4 inches or raised to 32-3/4 inches from the ground
- Has independent tables that create work areas for groups or for individual workers

Features of the Herman Miller brand ergonomically sound Mirra® chair (figure 5.26) specified at each work station includes, as described by Herman Miller:

- A seat with adjustable height and depth to promote correct ergonomic positioning of the body and reduced pressure on the employee’s thighs
o Chair arms whose height, width and angle are adjustable to promote circulation within the arms and reduce musculoskeletal injury
o Lumbar support and depth that are both adjustable as well as independent from the chair to allow free movement and maximum back support.

Figure 5.24: Furniture Surface Cutout
Figure 5.25: Upstart® Work Table
The Humanscale Corporation has developed a computer monitor “arm” and a task lighting fixture that has been specified within the design for Organization Community Improvement. The computer monitor arm, named M7®, is described by Humanscale (figure 5.27):

- Rotates 360 degrees around its base for flexible use
- Vertically adjusts 160 degrees to allow for proper body posture when working at the computer station
- Has a lateral angle range of 200 degrees to allow the user to adjust the angle and depth of the computer monitor to reduce glare from overhead lighting systems and to reduce eye strain.

The Element® task lamp developed by Humanscale is a task lamp, as described by Humanscale, has a (figure 5.28):

- 135 degree front-to-back head tilt that allows the user to direct illumination onto a surface without light being shown on the computer monitor
- 90 degree side-to-side head rotation further allowing the user to place illumination on a surface without body misalignment
- 360 degree swivel at its base to allow the user to adjust the direction of the lamp

Other key items that promote proper body positioning and alignment specified within this design include a split key-board (figure 5.29) and anti-glare “paper” or screen sealed on each monitor in order to reduce eye strain. These items are not only environmentally friendly but they also work together to allow the user to properly sit at their workstation without body strain or misalignment. Although these products fit into the design aesthetic of this product, some items are above the modest budget of Organization Community Improvement and would therefore act as examples of what qualities more affordable pieces should contain.

These workstations can be used and manipulated by a worker of any age and ability with minimal effort to create ergonomic accommodation for workers above the traditional retirement age. These accommodations become important for this age group because of the natural physical changes that the body endures throughout the aging process, one such process being the curving of the shoulders and head (Figure 5.30).
In addition to the furniture chosen for the office, there should be a comprehensive and effective heating, ventilation and air conditioning (HVAC) system for more comfortable temperature and ventilation throughout the office. This system will also reduce uncomfortable body heat while employees perform their tasks.

5.7 Material Choices

This section discusses the materials and finishes used in the Youth and Senior open office area. The materials for this space were chosen with the consideration of how they would affect the older employees who use the space and how these materials would meet the standards expressed in the design criteria. Table 5.6 states the design question and criteria in table 5.1 with the addition of the design solutions used in the design. Material selections are also the result of traffic area and work zone considerations described in section 5.2.
Table 5.6: Materials Chart

<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Materials and Finishes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Question</td>
<td>What are the materials and finishes within the office that best accommodate older employees?</td>
</tr>
<tr>
<td>Criteria from Literature Review</td>
<td>Address contrast sensitivity lose, dark adaption decrease, decline in color sensitivity, and problems with glare</td>
</tr>
<tr>
<td>Criteria from Interviews and Observations</td>
<td>Improve materials on the work surfaces employees and customers use</td>
</tr>
<tr>
<td>Design Solutions</td>
<td>Specified materials and finishes that reduce glare, eyestrain, and help to distinguish writing surfaces from reading materials</td>
</tr>
</tbody>
</table>

The wood flooring specified within the design of the Youth and Seniors area (figure 5.31), was chosen because of its light color and the light contrast within the shading of each wood plank. This reduced contrast is important for aging eyes that have difficulty in distinguishing between motif change as a variation in pattern and a change in height. The same type of flooring was also chosen in a different stain color (figure 5.32) for the adjacent office area. The contrast in color, while identifying a different space, gives the adjacent area its own style distinction and a smooth tactile transition. The wood flooring was chosen because it minimizes tripping hazards for employees while providing a visual and tactile change when crossing over to the corridor carpet. The carpet chosen for the corridor (figure 5.33) and the office spaces (figure 5.34) is a tightly woven loop carpet with small patterns. This carpet, while commercial grade and durable, is tightly woven and minimizes the chance of falling.
Several factors were considered when choosing a material and color for the desk surface. The first factor considered was the amount of light that would reflect from the surface and possibly cause a problem with glare. Therefore, a light grey laminate, called Micro Sand, with a slight texture was chosen for the surface with the goal of allowing light to diffuse off the surface of the laminate material and decrease glare. The second consideration was the ability of the user to differentiate between items on the surface, like paper, and the desk surface. This is an important consideration for older employees who cannot easily distinguish slight color changes. This challenge was overcome with the chosen color for the surface and a slight texture which allows for a minimal tactile change between the writing surface and objects upon the surface.
Choosing a material for the seating (figure 5.35) in the office area was influenced by the design criterion that highlights the body temperature of the employee as an important design consideration. A mesh like material was chosen for the task chairs used in the space as an attempt to reduce unwanted body heat that occurs in the form of hot spots. This material was also chosen for the variety of colors available which will aid in creating a visual separation between the Youth and Seniors office area and the adjoining employee office area.

Figure 5.35: Chair Fabric Chosen for Youth & Seniors Area

5.8 Summary

In this chapter, an appropriate design solution for the organization was explored followed by details regarding furniture and material choices in an attempt to overcome the design problems. The design solution addressed the eight design criteria highlighted in the Chapter 2: the presence of public and private spaces, the presence of non-rigid boundaries, views to natural light for all employees, flexible furniture that raises, lowers, and has work surface cutouts, technology that allow for natural body positioning when working at it, the use of ergonomically sound items like split keyboards and anti-glare paper for computer screens, having an advanced air conditioning system to minimize unwanted body heat, and the use of design features that promote fitness. It then combined these
criteria with requests from the employees and customers of Organization Community Improvement. This combination created an appropriate interior for employees over the traditional retirement age that focused on how employees are grouped in the office, how artificial and exterior lights are used in the office, what job accommodation principles can be used, and what finishings, furniture, and materials should be used in the office as well. In order to further qualify the findings, various examples of lighting combinations in the office, transition details between areas, and seating relationships were diagrammed and explained. Material choices were clarified in regards to their contribution to meeting the design criteria as well. The next chapter will provide a detailed summary of the study in addition to further research opportunities.
The purpose of this study is to create a well designed office environment that specifically accommodates young and older employees in a shared, collaborative office space. The main research question of this study is, what is an appropriate design solution for an office space that is conducive to employees over the traditional retirement age who work in a collaborative office space that is shared with younger employees. In answering this question, employees and customers of Organization Community Improvement were interviewed and observed. A theoretical example of a design solution that strives to benefit the physical condition of older employees within the office environment was then developed as a result of these findings and research. This example was developed to demonstrate a possible application of the design criteria gathered from published materials combined with the criteria from the field research.

6.1 Interviews and Research

The examination of published literature on aging, ergonomics, and office design in combination with interviews and observations were used to understand the needs of this target audience within the office environment. These methods combined provided answers to the research question by answering the seven sub-questions:

1) How can design elements of ergonomics and job accommodation work together to create an office space that is conducive to employees ages 55 and over?
2) What is an appropriate balance of task and ambient lighting for older employees?
3) Are exterior views and the inclusion of sunlight within the office environment significant to the overall wellbeing of older employees?
4) What is an appropriate balance of public and private spaces needed for employees, ages 55 and older?
5) What are the materials and finishes within the office that best accommodate older employees?
6) How can an office be designed for older employees to work in a shared and collaborative space?
7) What other features should be included in the office design to make the workplace more accommodating to older employees.

In attempting to answer these questions through research and interviews, a design was developed based on the design criteria that responded to the findings.

The balance of social interaction and individual working areas for employees over the traditional retirement age proved to be a multifaceted question. Answering this question lead to the design criteria that requires a variety of public and private spaces present within the office (Becker, 1995) for this age group. Responses from the focus groups provided the awareness that having an individual work space was most desired and was what these employees equated with having privacy. The responses highlighted that having the ability to retreat to a private place when needed was most ideal for these employees. Therefore the design of the space provided closed office spaces and closed meeting spaces around an open office space that included individual work areas and communal working areas. The importance of exterior views and the inclusion of sunlight proved important to the respondents as supported by the literature review. Access to natural light and exterior views proved essential to the overall wellbeing of the employees (Becker, 1995), and when available, improved the mood of the targeted employees within the office, as stated in the interviews. This revelation lead to the design criteria and space planning that increased the availability of exterior views for employees. The balance of task and ambient light also proved to be a key factor in the design of the office. Problems with glare, poorly placed lights, and/or insufficient amounts of
illumination proved to be design obstacles affecting the employee’s ability to work in the current office. Request for task lighting as well as observations of employees using task lights brought into the office from home helped to solidify the importance of various systems of illumination. Other systems specified in the design were systems that are designed in consideration to the end user and the manner in which they will use the space.

The literature review and field research were important in developing design criteria that answered the question of what ergonomic and job accommodation design elements work together in the office for employees 55 and over. Flexible furniture (Roper, 2007), neutral body positioning (Durham, 2008), and ergonomically sound items (Rempel, 2006; AARP, 2004) were topic results from the literature review that were reiterated by responses from the focus groups. Interviewees expressed discomfort in the office due to the inflexibility of chairs, low table heights, and the temperature within the office. These items and interview responses were combined to provide information to the researcher to create design criteria that answers the main research question through an appropriate design.

6.2 Interpretation of Design Elements

Within the design presented in the Chapter 5, six elements were presented that resulted from literature review and field research guided the design. These six elements are: the importance of the space planning in the office, the importance of employee groupings and space allotment, the need for exterior views and natural light, the need for various types of artificial light, the role in furniture in conveying job accommodation principles, and the importance of materials specified in this office area.

The importance of space planning in the design solution assists in meeting design criterion that incorporate design features promoting fitness, create public and private spaces for employee use, and allow each employee access to exterior views and daylight. Fitness was promoted in the space through centrally
locating common activities, like using the copy and file rooms, so that employees were encouraged to walk throughout the office to access these functions. Public and private spaces were created through many design features including the use of close door offices, the location of the Youth and Senior office area, and the separation of traffic patterns in the main office. For the open office area, privacy was communicated through the use of varying ceiling heights, relative location of coworkers also using the space individual and cooperative work desk and the use of non-rigid boundaries to signify space. The natural light and exterior view solutions further assist in meeting three of the previously mentioned design criteria by reducing glare, incorporating daylight and providing an exterior view to all employees in the space. Providing employees with the opportunity to control their own lighting needs with the use of task lighting fixtures and two types of ambient lighting fixtures provided a solution to equipping the office space with appropriate levels of artificial light. Furniture plays the most dominant role in meeting the design criteria by being flexible, ergonomically sound, allowing for natural body positioning while at work, and all principles of job accommodation. These furniture choices were are also coupled with a comprehensive HVAC system to help reduce discomfort and hot spots that occur in the body.

Ceiling heights also play a significant role in defining public and private spaces within the office. In large open office areas, like the Youth and Seniors office area, the designated ceiling height of 13 feet allows for a play on public and cooperative working areas. This ceiling height also allows the designer to add design elements, like the specified floating metal ceiling system, that creates separation between the designated cooperative and private working areas. In closed office and meeting areas, like the conference and meeting rooms, the designated ceiling heights are 10 feet. This lower ceiling height allows for a private feeling in these areas designed to provide for a sense of ownership in closed office areas. This ceiling height also provides a 3 foot plenum space to house the HVAC system needed for an office this size, thus providing the consistent temperature within the office to meet the design criteria of the users.
and the research. The material choices helped to reduce eyestrain, glare, and the inability to distinguish between surfaces and writing materials.

### 6.3 Ideas for Future Research

In completing this project, many avenues for further research and understanding were revisited. One such question to be explored is how design can improve communication between older employees and millennial workers? This idea developed from observing how little the Seniors group in Organization Community Improvement interacted with their younger coworkers. Another topic of research could be the connection between older employees and their sense of ownership within the workforce. This topic became interesting to the researcher after observing how little the permanent full-time employees ages 55 and older personalized their work space. Further research could also be done in using another office or a different type of office to understand if the challenges discovered in the Organization Community Improvement office are consistent to the 55 and over age group. These topics could further inform the interior design community of the needs of older employees within the office and how design can overcome obstacles for these employees.

### 6.4 Considerations for New Construction

While the design for Organization Community Improvement retrofitted an existing space for its office, principles from this theoretical design could also be interpreted efficiently in new construction. The use of the design criteria can be combined with additional elements not available in this office space to create a unique design for the office. One major design element available in new construction could include utilizing the floor. By placing power and data wiring into the floor to power office system furniture panels and other office elements, data and power receptacles can be made sassily accessible. Another design element possible in new construction is placing air supply vents into the floor and
air returns into the ceiling or walls. This combination allows heat and air from the HVAC system to rise, heating or cooling the space more efficiently and thus resulting in less energy to heat and cool the space.

One of the most significant advantages that new construction would have for the design would be the inclusion of larger, more significant windows into the space. The redesign of the example office required the designer to utilize the existing windows. Reusing the existing windows also proved appropriate for the organization because of their budget constraints. New construction would allow the designer to configure the type and size of the windows to not only maximize the use of the windows but also adhere to the building codes.

6.5 Conclusion

Organization Community Improvement is a notable example of the future employee hiring pool and composition globally. This research can be useful to designers, design educators, and students, all having the responsibility to design user-friendly workspaces. Designers can actively use the design criteria developed for this study in addition to customer interviews to ensure their design meets the needs of this particular age group. Design educators can incorporate the design criteria developed as design programming for student projects, just as ADA design is currently used; in an effort to create responsible design projects and age sensitive designers. Students can utilize this research within their design projects because of its intermingling of universal design, ergonomics, and job accommodation principles in an effort to design spaces with the needs of the end user in mind.

As it stands, designers have a golden opportunity to improve the lives of employees over the traditional retirement age because of their intimate relationship with interiors and the needs of their customers. The study further highlights the role that designers play in expanding the level of comfort for older workers within the office environment through not only examining published materials but also interviewing the user and translating those wants and needs
into a design. Although this age group is currently on the precipice of being a strong commodity for employers, it is strongly believed that they will change the current methods of working, retirement, and as a result, office design. Key criteria developed for this project can be applied to other building types, such as, restaurants, residences, libraries, and nursing homes.
APPENDIX A
FSU HUMAN SUBJECT APPROVAL MEMORANDUM
APPROVAL MEMORANDUM

Date: 1/7/2009

To: Taneshia West Albert

Address: --ADDRESS-- Tallahassee, Fl 32301
Dept.: INTERIOR DESIGN

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
CREATING AN OFFICE ENVIRONMENT TO INCLUDE AN AGING WORKFORCE

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped
version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 1/4/2010 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Tasuku Ohazama, Advisor
HSC No. 2008.2080
Completion Certificate

This is to certify that

Taneshia West Albert

has completed the FSU Human Subjects Training Module Online, on 9/16/2008. This course included the following:

- key historical events that impacted guidelines and legislation on human subjects protection in research.
- ethical principles and guidelines that should be followed in research with human subjects.
- the use of key ethical principles and federal regulations to protect human participants at various stages in the research process.
- a description of guidelines for the protection of special populations in research.
- a definition of informed consent and components necessary for a valid consent.
- a description of the role of the IRB in the research process.
- the roles, responsibilities, and interactions of federal agencies, institutions, and researchers in conducting research with human participants.
APPENDIX C
INTERVIEW PARTICIPANT CONSENT FORM
Taneshia West Albert

Tallahassee, FL 32301

May 12, 2009

Dear Participants,

Hello and thank you for agreeing to take part in this focus group discussion. By agreeing to participate in the focus group, you are volunteering the use of your responses to aid in the Master’s Thesis written by Taneshia West Albert. The responses given during this discussion are only for the purpose of the thesis and will not be shared with any one from Central States SER or its management team. Although your participation in the focus group can not be kept confidential within the focus group, your name and description will be held confidential and will not be included within the thesis. Just as well, your participation in the focus group will not be devolved to Central States SER or its management team.

By agreeing to participate in the focus group you are agreeing to a one (1) hour interview which will be audio-tape recorded and will include four (4) of your co-workers of equal ranking. The audio-tape recordings will be used only for the Master’s Thesis written by Taneshia West Albert, and will be destroyed upon the completion of said thesis on December 31, 2009. Your participation is voluntary. You may decide at any time to no longer participate with the focus group or to not answer any question you do not feel comfortable answering.

Please feel free to contact Taneshia West Albert via e-mail at taneshiawest@gmail.com, or her major professor Toek Ohazama via e-mail at tohazama@fsu.edu and via phone at (850) 644-1436 to answer questions regarding your rights in participating in this research thesis. You may also contact the Human Subjects Committee as Florida State University for answers to any questions you may have. They can be contacted via phone at (850) 644-7900, by fax at (850) 644-4392, or at the following mailing address:

Human Subjects Office
2010 Levy Avenue, Suite 276-C
Tallahassee, FL 32306-2743

I have read and understand this consent form

Subject: Date:

Witness: Date:

FSU Human Subjects Committee  Approved on 5-12-2009 Void After 1/4/2010

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APPENDIX D
FOCUS GROUP QUESTIONS AND RESPONSES
General Information

1. Ages (This would be observed, not asked):

2. Genders (This would be observed, not asked):

3. Heights (This would be observed, not asked):

Current Design
*First explain the difference between the general office space (the area that contains all the work spaces and rooms) and the work space (each employee’s personal area).

General Office Space Questions

4. Describe what you like most about the general office space?

First Interview (full time employee): Not much.

Second Interview (customers): no response given

Third Interview (customer): no response given

Fourth Interview (Senior Worker): Not much

5. What makes you comfortable in the general office space?

First Interview: sensitive information given

Second Interview: not much

Third Interview: not much

Fourth Interview: I am in the front space. Yes. Where I would I have space to do whatever I have space to do. And the chairs are very comfortable. But I do not work here in the office. In the back space, it is not the same.

6. What do you not like about the general office space?

First Interview: It is so cluttered. You don’t work well in clutter and you begin to create your own environment within an environment. I don’t travel outside of my personal space to have a conversation with someone because they are usually sharing a space, especially to have a personal conversation. So conversations are limited especially personal conversation. Being a supervisor, I share a space with someone I am supervising, which is crazy because we are sending e-mails to each other, and we are sharing the same space.
Second Interview: That the bathroom is inside of the space. Because when the front workers leave, it is dark and there is no key. For protection, it should be inside.

Third Interview: no response given

Fourth Interview: It is tiny and cramp. Everyone is too cramped into one area. And that you have to go outside of the office into the hall to use the restroom.

7. How do you feel about the temperature of the general office space?
   a. If not, how do you compensate for the temperature?
First Interview: My office is hot and my bent does not work, but then I can step outside of my space into another area of the office and it is cold, which means that you have to walk though out the office just to get air.

Second Interview: too hot.

Third Interview: too hot.

Fourth Interview: Hot, very hot. Then you walk into the inner room it is very cold. I got very sick being here the first week. Then I came back and got sick again. There is no heat in the hall way and in the bathroom there is no heat or hot water. So you are taking clothes off in the hot areas and putting them on in the cold areas.

8. How do you feel about the conference room?
   a. Why? Why not?
First Interview: sensitive information given

Second Interview: not applicable question

Third Interview: the windows

Fourth Interview: the windows

9. How do you feel about the break room?
   a. Why? Why not?
First Interview: I have not eaten in the break room in two months because it is usually crowded. Once you get more than 6 people in there it is crowded.

Second Interview: no, but sometimes I use it.

Third Interview: I don’t like it.

Fourth Interview: It is tiny and there are a lot of people, like the office people who sit in here.

10. Do you take your breaks in the break room?
a. Why? Why not?
First Interview: In my office.

Second Interview: no.

Third Interview: not applicable

Fourth Interview: When they bring lunch in for us, then I use it. But if there is not anyone in here, then they will come in here and eat, but I don’t bring my lunch because I don’t work in here from 9 to 5. I am her from 8 until 1:30. If no one is in here, then I will come here. But if it is occupied, then we will eat by the computers, which we don’t like to do.

11. If you could change one thing about the general office, what would you change?
First Interview: The set up. I would make it more private because you have cubicles in the middle of the office that are open. So it is not so personal when meeting with customers, you have to find an office with a door.

Second Interview: put the bathrooms inside the office.

Third Interview: no response given

Fourth Interview: there is so much, I don’t know where to start

Work Space Questions
12. Describe what you like most about your work space?
First Interview: I would say my desk until it fell apart. But, not much. So I have to create that environment. I don’t bring personal things, but I have a desk lamp, a desk lamp that I can turn on that will set the mood so that I can relax enough and work. So I have a desk lamp because the lighting is horrible, so lighting to me is everything. Whereas my coworkers are perfectly fine at their desk without a lamp.

Second Interview: not much.

Third Interview (customer): nothing.

Fourth Interview: Not much. Our work area, sometimes we just have a round table, and sometime there are two girls working, and some time there are three. And the table is too small and we always have to go look for chairs and bring them back. We are not able to spread out and we would like to. We are located in the hall way [walk way] and sometimes we bump into each other and people who are walking by and they are disabled.

13. What makes you comfortable in your work space?
First Interview: I guess how it feels. The cleanliness, like if I wipe my desk down and being organized at my desk and being more organized at my desk. Because I work better,
but the thing is I am limited. I fix the corner that I have so well that I don’t like being in any other part of the office, it is just horrible.

Second Interview: no response given

Third Interview: no response given

Fourth Interview: the chair

14. Is your desk chair comfortable?
   a. If not, what do you do to make yourself more comfortable?
First Interview: yes it is very comfortable.

Second Interview (customers): the plastic ones in the lab are not very comfortable. But the large ones like the office chairs are good.

Third Interview: not always. Because they are very old.

Fourth Interview: yes because I am in the front office.

15. Is your work surface at a comfortable height?
   a. If not, what do you do to work on this surface?
   b. Does this adjustment cause you any discomfort?
First Interview: NO. I am actually glad that it broke because I can just move things around, but it was not at first. My neck was [displaced] and back as [drooped]. And then one cored is shorter than the other so I can’t move things around.

Second Interview: yes.

Third Interview: yes

Fourth Interview: sometimes

16. Within your work space, can you easily reach the electrical outlets to plug in equipment?
First Interview: No. I have to go under my desk, and it is horrible because I am tall and my desk is low.

Second Interview: not applicable

Third Interview: no

Fourth Interview: no

17. What was the driving force behind you personalizing your work space?
First Interview: Really, because I will be more efficient and effective. Because if I am uncomfortable, then I move around in the office which keeps me from doing a lot of my work. And I started to notice in the last year how to create that environment.

Second Interview: not applicable

Third Interview: I don’t because I am only here half the day

Fourth Interview: I don’t because my space is used by other people

18. If you could change one thing about your work space, what would you change?  
First Interview: my desk, and my computer, the way it sits. Unfortunately I can’t use my keyboard because of the cord.

Second Interview: the people are too close.  
It would be good to have a big screen when the teacher is working so that everyone can see what he is doing. If we are working, we can see the professor, but some of the computers are sideways, and some are turned with their backs turned. Only the two in the front can really see the teacher. I think they should have more computers. We have a lot of students and the computer work and cannot work on the computer.

Third Interview: the light

Fourth Interview: the light

**Lighting and Sight**

Access to a View

19. Do you have a window? A view to the exterior?  
  a. Can you control the amount of light that comes through the window?  
  b. If not, does this cause impact the quality of the work space?  
First Interview: no.

Second Interview: no. it is very close and very hot.

Third Interview: no

Fourth Interview: no

  20. Of those who do not have a window view, would you like one?  
  a. Why? Why not?  
First Interview: yes

Second Interview: yes.

Third Interview: no, it is not important to me.
Fourth Interview: sure. A window is always a good thing

Lighting Comfort/Control

21. How much time do you spend working at your computer?
First Interview:

Second Interview: We come here to take computer classes and work on the computer.

Third Interview: I come here just to work on the computer in the labs

Fourth Interview: I don’t use a computer

22. Are you easily able to see your computer? If not:
   a. When do you find it difficult to see your computer?
   b. Why (or why not)?
   c. How do you currently remedy this problem?
First Interview: yes, before my desk broke.

Second Interview: yes. They have good light. We could have a little bit more, but it is good for right now.

Third Interview: yes

Fourth Interview: not applicable

23. How much time do you spend reading written materials?
First Interview: about half of the work that I do uses written materials.

Second Interview: little. The teacher explains a lot. The only time we do that is when we take notes and test.

Third Interview: a little.

Fourth Interview: I do not because I answer the phones.

24. Are you easily able to see written material? If not,
   a. Why
   b. How do you remedy this problem
First Interview: yes because I brought a desk lamp in from home.

Second Interview: yes.

Third Interview: yes. I take lots of notes.

Fourth Interview: sure
Social Interaction and Communication

25. How do you communicate with your coworkers?

   a. *If no response:* Do you feel as though you are close enough in proximity to have a conversation with your colleges without leaving your desk?
      First Interview: I usually walk to their offices or desk.
      Second Interview: not applicable
      Third Interview: they usually sit next to me so we can work on projects together.
      Fourth Interview: not applicable

26. Do you feel as though your work space lends to collaborating with your colleges?
   a. Why (and why not)?
      First Interview: no
      Second Interview: not applicable
      Third Interview: Sometimes. It depends on where we are working.
      Fourth Interview: Not applicable

* The information that is in green, are notes for the questioner during the focus group.
APPENDIX E
INTERVIEW QUESTIONS FOR THE DIRECTOR OF HUMAN RESOURCES
The following is a list of the questions asked to the Director of Human Resources of Organization Community Improvement. The transcript of this meeting is not included in this appendix because of the sensitive nature of the responses given during the interview.

**General Office Questions**

1) How long has the office been in the current building?

2) How many times has the space been expanded/moved?
   
   a. What influences the expansion of the office?

3) What are your goals for this office?

4) What are your goals this theoretical redesign?

5) What are your main concerns for your employees?

**Office Design Questions**

6) What influenced the current design/layout of the space?

7) How has the furniture accumulated for the space?

8) How many people attend the office meetings at one time?
   
   a. What is the reason for this particular number of attendances?
   
   b. (*If the number is low or half of the staff, and the reason is the size of the conference room) If there were a larger meeting space, would you hold just one office meeting with everyone in attendance?

**General Office and Office Questions**

9) Describe what you like most about the general office space?

10) What makes you comfortable in the general office space?

11) What do you not like about the general office space?

12) If you could change one thing about the general office, what would you change?

13) Describe what you like most about your office?

14) What makes you comfortable in your office?
15) Do you like the location of your office?

16) If you could change one thing about your office, what would you change?
APPENDIX F
ACCESSIBILITY CODE FIGURES
NOTE: X SHALL BE ≤ 25 in. (635 mm); Z SHALL BE ≥ X.
WHEN X < 20 in. (510 mm), THEN Y SHALL BE 48 in.
(1220 mm) MAXIMUM. WHEN X IS 20 TO 25 in. (510 mm TO 635 mm), THEN Y SHALL BE 44 in. (1120 mm) MAXIMUM.

(b)
Maximum Forward Reach Over an Obstruction

FIGURE 6
SIDE REACH
FIGURE 7
ACCESSIBLE ROUTE
FIGURE 8
PROTRUDING OBJECTS
REFERENCES


BIOGRAPHICAL SKETCH

Taneshia West Albert received a Bachelors of Arts in International Business and Spanish Language in 2005 from Dillard University in New Orleans, Louisiana. After working in account promotions, she decided to pursue a Master of Fine Arts at the Florida State University in the Department of Interior Design. She has spent the last three years studying interior design, being an advocate for environmentally responsible design, serving as a teaching assistant and technical support assistant in the Department of Interior Design. Her future career goals include being a design practitioner and a design educator. She is a native of Sacramento, California, a lifetime Girl Scouts of America member, a proud mother, and a Hurricane Katrina survivor.