Physical Environments Conducive To Creativity and Collaboration Within the Work Environment

Thesis

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Abstract

Relationships between work environments and physical spaces are understudied. Components within the physical environment could have an influence on the work environment in regard to how the workers perceive group collaboration and creative output. Common changes to the physical space such as “introducing open plan offices, cubicles, and ergonomic furniture have led to increased worker performance, satisfaction, and improved communication and teamwork” (Dul et al., 2011, p. 2). Even with these basic modifications to physical space within the work environment, questions remain unanswered.

How does physical space within a work environment influence our creativity? How do physical environments contribute to our work styles and how we communicate with others within the workplace? The open office floor plan is quickly becoming the norm, but is this the only way designers should plan a workplace? Can private areas improve the fostering of creativity? Do surrounding materials within a designed environment such as the floor, wall, and ceiling finishes, even the lighting, have an influence on creativity and collaboration?

With the increase of design thinking strategies and the addition of “innovation teams” within businesses, the demand for the physical workspace to enhance these
strategies and structures is growing. Knowledge workers, also known as “the creative class” by Richard Florida, “are the source of original and potentially useful ideas and solutions for a firm’s renewal of products, services, and processes” (Dul et al., 2011, p. 1). It is the designer’s responsibility to understand what components within the physical environment can be perceived as conducive to creative thinking and what perceived components might promote collaborative work styles. With this understanding, we can implement these components within the planning and design programming phases to create spaces that support creativity and promote collaboration.

By taking an in depth look at a variety of creative service providers and the preferences and way people work within these spaces, perceptions have been identified for stimulating creativity and collaboration through the means of the physical environment can begin to be understood. With the constant change in design, this knowledge will aid in formulating a conceptual framework for physical components that may be perceived to enhance creativity and collaboration within the work environment. With the constant change of work styles, today’s technology, and the increase in the integration of “innovation teams” to foster new ideas, there is value in the understanding of how companies can contribute to physical spaces through implementing components perceived to represent creativity and promote collaboration through the designed environment.
Dedication

This document is dedicated to my family, friends, and mentors.

Thank you for all of your support and encouragement.
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I would like to extend my thanks and appreciation to the following people, for their guidance and support, throughout my graduate experience.

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Chapter 1: Introduction

1.1 Background Information

Design thinking and innovation have become popular buzzwords in the field of business. The aspiration to be innovative and creative among organizations is on the incline. The most achievable type of innovation is known as *incremental innovation*, the generation of new concepts or solutions derived from existing forms or technologies (Kaplan & Norton, 2006). As organizations continue to promote design thinking and innovation, they look to the physical space to offer a variety of work settings for the employees.

This study focuses on physical components of interior environments that are perceived to generate creativity and collaboration in order to inspire and facilitate the sought after design thinking and innovation efforts organizations desire. The interior environment can be defined as *the circumstances, objects, or conditions by which one is surrounded, occurring within the limited boundaries* (Merriam-Webster, 2012). Examples of these physical components are lighting, furniture, color, etc. When considering what physical components have the potential to enhance perceptions of creativity or work group collaboration, the following questions arise:

- How do physical environments influence our creativity and ability to collaborate within the workplace?
How do physical environments contribute to our work styles?

- The open office floor plan has become the norm, but is this the only way designers should plan a workplace?
- Can private areas be just as good for fostering creativity?
- Do surrounding materials within the designed environment such as the floor, wall, and ceiling finishes, even the lighting, have an influence on creativity and collaboration?

As the work environment is discussed in this research, similar terms used to describe the work environment can have cross over with one another. It can be misunderstood that these terms have the same meaning, however, these terms are different. For example, *space and environment*, these terms are sometimes misunderstood as synonyms. For a common understanding in the terminology utilized for this research, please refer to the following definitions below:

*Note: Terms defined by wiki.com were not available in the Merriam Webster Dictionary. The definitions provided by wiki.com are suitable and accurate for the context of this study.*

**Terminology:**

**Creativity** - The production of novel, appropriate ideas in any realm of human activity, from science, to the arts, to education, to business, to everyday life (Amabile, 1997).
Big-C creativity - Eminent creativity, is the creative direction that is the highest sought after. (Beghetto & Kaufman, 2009).

Pro-C creativity - Refers to the development and “effortful progression beyond Little-C, but that has not yet attained Big-C status” (Beghetto & Kaufman, 2009).

Little-C creativity - Is everyday creativity that may make a solid contribution (Beghetto & Kaufman, 2007).

Mini-C creativity - This segment of creativity results from an initial learning process that one may go through in schooling (Beghetto & Kaufman, 2007).

Collaboration- To work jointly with others or together especially in an intellectual endeavor (www.merriam-webster.com).

Collective creativity - “When all the people in a group contribute simultaneously to a big picture or mental model that emerges from a shared mind and body space” (Sanders, 2010).

Design thinking - Design thinking is a process for practical, creative resolution of problems or issues that looks for an improved future result (www.wiki.com).

Environment- The aggregate of social and cultural conditions that influence the life of an individual or community (www.merriam-webster.com).

Physical environment – Comprised of all the different factors of nature, including
trees, lakes, the ocean etc., includes both your outdoor and indoor surroundings, and can influence a person’s health (www.wiki.com).

**Social environment** - Refers to the physical or social setting in which people live or in which something happens or develops. It may be the culture that the individual was educated or lives in, or the people and institutions with whom they interact (www.wiki.com).

**Work environment** - Work environment, in the literal sense, means your surroundings at your place of occupation; e.g. inside, outside, at a desk, in a cubicle, etc. The term has also come to mean a sort of mental state while on the job; e.g. positive, negative, friendly, etc (www.wiki.com).

**Space** - A boundless three-dimensional extent in which objects and events occur and have relative position and direction (www.merriam-webster.com).

**Interior design** - Is a multi-faceted profession in which creative and technical solutions are applied within a structure to achieve a built interior environment (www.ncidq.org).

**Innovation** - The creation of better or more effective products, processes, services, technologies, or ideas that are accepted by markets, governments, and society (www.wiki.com).
**Individual creativity** - The phenomenon whereby a person creates something new (a product, solution, artwork, literary work, joke, etc.) that has some kind of value. What counts as "new" may be in reference to the individual creator, or to the society or domain within which the novelty occurs (www.wiki.com).

**Third place** - The "anchor" of community life that facilitates and fosters broader and more creative communication. This third place could be a café, coffee shop, pub, etc. (Oldenberg 1991).

**Introvert** - A shy person. A person characterized by concern primarily with his or her own thoughts and feelings (www.dictionary.com).

**Extrovert** - One whose personality is characterized by extroversion; broadly: a gregarious and unreserved person (www.merriam-webster.com).

**KEYS assessment** - “The KEYS Assessment consists of 78 items that constitute eight scales addressing different aspects of the work environment, plus two scales assessing the work outcomes of creativity and productivity” (Amabile, 1997)

**Organizational culture** - “The organizational culture is the sum of values, leadership styles, procedures, goals, and many other characteristics that make an organization unique…it is the undercurrent
Intrinsic motivation - “The driving force that is fundamental to the active nature of human beings” (Goodman, 2011).

Extrinsic motivation - “External sources of influence on an individual’s motivation and is subdivided into socialization and rewards” (Goodman, 2011).

Groupthink – Coined by the psychologist Irving Janis, is a psychological phenomenon that occurs within groups of people. It is the mode of thinking that happens when the desire for harmony in a decision-making group overrides a realistic appraisal of alternatives (http://en.wikipedia.org/wiki/Groupthink).

Component - A part or element of a larger whole. Constituting part of a larger whole: constituent (www.google.com; define: component).

Element- A part of aspect of something, one that is essential or characteristic (www.google.com; define: element).

With today’s professionals conducting work in both physical and virtual spaces, there is an even greater need for the physical environment to play a role in strengthening team collaboration and fostering creativity. While knowledge and research on creative exploration and collaboration efforts continue to be developed, many of these
investigations neglect the components of the physical environment. “...A resource that is misunderstood when it comes to creativity is physical space. It is almost conventional wisdom that creative teams need open, comfortable offices. Such an atmosphere won’t hurt creativity, and it may even help” (Amabile, 1998, p. 82). If components of the physical environment are related to improving the workplace, specific components can be identified to help perceive creativity and collaboration with further exploration. This further exploration will consist of participatory activities with professionals. These activities will identify what physical components within the work environment creative professionals perceive as creativity and collaborative.

With the increase of design thinking strategies and addition of innovation teams within businesses, the demand for the physical workspace to enhance these strategies and structures is growing. It is the designer’s responsibility to understand what components offer perceptions of thinking creatively and willingness to collaboration. With this understanding, these components can be implemented within the design planning phases to design environments that support creativity and collaboration.

This study will take a close look into the work environments of a variety of creative service providers. The knowledge gained from the study will aid in formulating a framework of physical components within the work environment that offer positive perceptions of creativity and collaboration. This understanding will allow for designers and businesses alike to keep up with the demand for a more creative and collaborative workplace.
1.2 Thesis Overview

To continue the discussion of creativity and collaboration within the workplace through the designed environment, it is important to first provide the basic definitions for creativity and collaboration in the context of the study. Creativity researcher Theresa Amabile defines creativity as: *the production of novel, appropriate ideas in any realm of human activity, from science, to the arts, to education, to business, to everyday life* (Amabile, 1997). The Merriam-Webster Dictionary defines collaboration as: *to work jointly with others or together especially in an intellectual endeavor*. These two terms will be defined and discussed in more detail in chapters three and four. Please refer to the terminology on page 14 provided for commonly referred to terms. These definitions are to assist in the understanding of the terms for the context of this study.

The following chapters outline this research process for encouraging creativity and supporting collaboration through the physical environment:

*Chapter Two:*  
Chapter two provides a description of the overall subject researched and defines the scope of research for the focus of this study. The focus of this study is presented in a diagram to illustrate how the elements and components within the physical environment are only a sector within the work environment as a whole.

*Chapter Three:*  
Chapter three defines creativity in more detail for the context of this study and how it has been defined previously in research. This chapter will discuss the “4 C
model of creativity,” and methods for assessing creativity, as well as the role of motivation in stimulating creativity. The framework of the “4 C model of creativity” is used to aid in the explanation of the different directions of creativity. The directions of creativity are divided into four segments: Big-C, Pro-C, little-C, and mini-C. These segments range from distinguished rare creativity (Big-C) to everyday common creativity (mini-C). These different directions of creativity need to be considered when considering potential factors within the physical environment for generating creativity and collaboration. Another important tool that is integrated into this study is the KEYS Assessment. The KEYS assessment looks at the perceptions of creativity within the work environment. This tool is comprised of different scales that look at components that either stimulate or obstruct creativity within the work environment. These scales will be integrated into the primary research activities in chapter six.

Chapter Four:

Chapter four outlines the idea of collaboration among team members within the work environment. Organizational culture types, as well as meeting types, are defined and discussed to provide insights on how these theories can work together to aid in a better understanding of how collaboration works. This chapter provides an overview of the organizational culture types commonly found within the workplace. This information is presented through the Competing Values Framework. The Competing Values Framework is about understanding disagreeing values within organizations and integrating them successfully so that
the organization is open to collaboration and growth. In this chapter, the organizational culture types are matched to a meeting type that will have the most positive influence on team member collaboration.

*Chapter Five:*

Chapter five explores the differences and similarities among various types of office space design, including open versus private workspaces, the virtual work environment, as well as taking a closer look at the personality traits of the workers themselves. Introverted and extroverted personality traits will be considered in relationship to these open versus private workspaces.

*Chapter Six:*

Chapter six focuses on the perceptions of components within the physical environment in regards to creativity and collaboration within the workplace. This investigation will be conducted through a study consisting of four activities utilizing both a participatory and observational approach. The participants for these activities are creative professionals with a varying amount of work experience. The first two activities consist of a participatory image and word association exercise. The 3rd activity is a questionnaire, followed by the 4th observational activity. The 4-part study and the selection of the participants will be explained in detail along with the analysis and outcome of each activity.

*Chapter Seven:*

Chapter seven compares and contrasts key findings from literature with the new findings from the primary research. The conclusion will be offered in the form of
a conceptual framework for perceived components conducive to creativity and collaboration within the physical work environment. Possible topics for future work will be discussed in this chapter as well.

1.3 Summary

This thesis will be a documentation of research conducted as part of the Master of Fine Arts program in the Department of Design at The Ohio State University. It includes the following steps:

1. A contextual review and understanding of existing research related to creativity and collaboration within the work environment.

2. A look at the variety of common work environment styles currently being utilized today.

3. An investigation of components and elements within the physical environment that may be conducive to stimulating creativity and collaboration within the workplace.

4. A conceptual framework diagram to illustrate what components and elements, if any, influence a more creative and collaborative work environment.
Chapter 2: Scope of Research

When asking questions pertaining to creativity and collaboration within the work environment, it is important to understand that the work environment encompasses many aspects. In regard to fostering creativity and collaboration, the scope of this research will hone in on a small area within the realm of the work environment, the physical components of the work environment. The majority of existing research touches upon factors on a broader level within the work environment, such as office hierarchy, workplace politics, and other managerial styles. The term ‘environment’ (refer to pg. 15), is used very broadly in this existing research. The link to the stimulation of creativity and collaboration through the physical components of the environment remains unclear.

These physical components discussed throughout this study can be defined as a grouping of tangible or visible elements within the physical space. Physical components pay a role in defining the work environment. This could ensue in the form of an open office layout, types of furniture, or types of meeting areas. For example, an article taken from the California Management Review (1997), titled “Creativity as Investment,” discusses the workplace environment at the design firm IDEO. “IDEO has no organization charts, no titles, not even permanent offices. Employees’ file cabinets and book cases are on wheels so they can easily move to another office more convenient for the project team” (Sternberg et al., 1997, p. 19). While this article mentions aspects of the social
environment, the discussion of their flexible furniture begins to point out the importance of the physical items and their direct influence on the workers.

However, before narrowing in on the focus area of this study, it is important to first understand what constitutes a work environment. A work environment is determined by a company’s structure and typically is described as the physical workplace that supports or restricts the occupants activities and behavior. A work environment could be comprised of multi-office organizations, or even globally connected virtual office spaces. A work environment as a whole can be described as the physical and virtual workplaces that support all behavior. Within a shell of the workplace, is the company itself and how it is structured. Its structure can be based on a company’s mission or beliefs, and the kind of organizational culture type it supports. There are different kinds of organizational culture types that help to define the composition of a particular company. For example, a company with a very traditional structure may have a more controlling organizational culture type with strict policies and formal procedures. In chapter 4, organizational culture types will be explained in more detail. Another important concept is to understand the social-environmental factors of a work environment. These factors are known to influence both creativity and collaboration. These include the amount of encouragement, or support or lack of support from peers or mentors, provided privileges, trust and freedom. “The social-environment can influence both the level and frequency of creative behavior” (Amabile, 1997, p. 42). In addition to social organization, a work environment is comprised of work teams, collaboration, collectiveness, and the entire effort of a group. Work teams are comprised of the
individual workers themselves. They represent different personality types, hold different experiences, and have different styles of carrying out their work. Throughout a work environment are the physical components within the environment. These physical components serve as carriers of visual messages that instill perceptions of creativity and collaboration, establishing a sense of materiality. These physical components include the furniture, accessories, lighting, they provide privacy, views to the outdoors, and many other small elements that contribute to the overall construct of the environment. These components are the area of focus for this research. Figure 1 helps to illustrate this area of focus in relation to the physical work environment as a whole.

Figure 1 Scope of Research
Chapter 3: Defining Creativity

This chapter defines creativity for the context of this study as well as explores key elements of creativity and the research previously reported on about this subject matter to aid in a better understanding for how to fuel creativity within the physical environment. “The physical environment almost certainly affects the creativity of individuals and groups, but maybe less directly and strongly than some of the other factors” (Dul et al., 2011, p. 4). Understanding these key elements of creativity can contribute to the investigation of any possible relationship to the physical components of the work environment.

Existing research has a common approach to defining creativity as “the production of novel, appropriate ideas in any realm of human activity, from science, to the arts, to education, to business, to everyday life” (Amabile, 1997, p. 40). Current research continues to further the definition of creativity as not only an end product or idea, but also the process of getting to that product or idea, “the process of engagement in creative acts” (Drazin et al., 1999, p. 287). This study will focus on individual and collective creativity. Both individual and collective scales of creativity often occur within the workplace. Anyone can experience creativity, however, some may experience different types of creativity, depending upon their expertise or creative thinking styles, as well as motivation. Figure 2 illustrates the relationships between expertise, creative
thinking skills, and the role of intrinsic or extrinsic motivation. See Figure 2.

![Amabile's Three Components of Creativity](image)

**Figure 2** Amabile’s Three Components of Creativity (Amabile, 1998, p. 78).

Both intrinsic and extrinsic factors can drive motivation. Existing research suggests that creative output can be directly affected depending on these motivational factors. “A number of studies have shown that a primarily intrinsic motivation will be more conducive to creativity than a primarily extrinsic motivation” (Amabile, 1997, pg. 44). Creative output can also be assessed; existing assessments have a focus towards individual creativity. For the context of this research, one assessment in particular will be discussed; the KEYS assessment. This assessment is more specific to the work environment. More details on this assessment will be explained later on in this chapter. Understanding the facets that make up creativity will assist in this study to identify physical components within the physical environment that are perceived to stimulate
creativity as well as collaboration.

3.1 Individual and Collective Creativity

Creativity can occur both individually and collectively. Past creative myths have lead us to believe that only individual creativity exists, that “creativity is a burst of inspiration from a lone genius; that a person working alone is always more creative than a group; and that social conventions and expectations always interfere with creativity” (Sawyer, 2006, p. 259). While creativity can happen individually, there is no magical ‘creative genius’ that envelops one; the result of creativity is through deliberate practice and hard work. Through research, psychologists have learned that “instead of a single moment of insight, most created products result from hard work peppered with mini-insights…creativity is almost never a solitary activity but that it’s fundamentally social and collaborative” (Sawyer, 2006, p. 259).

There is still something to be said for portions of the creative process being implemented individually.

“Individuals and groups participate in creative processes in an iterative fashion. Individuals develop ideas, present them to the group, learn from the group, work out issues in solitude, and then return to the group to further modify and enhance their ideas. The iterative, interactive nature of group creativity requires that individuals first choose to engage in individual-level creativity. We make the assumption that individuals act homogeneously within groups as they engage in creative behavior “ (Drazin et al., 1999 p. 291).
Because the desire for group collaboration within the workplace continues to increase, organizations need to be aware of and understand that during this collaborative work, both individual and collective creativity is happening simultaneously. Interior space design is an important factor in this understanding because the planning and function of collaborative spaces can be tailored for flexibility for both individual and collective creativity.

3.2 Directions of Creativity

Whether we experience creativity individually or collectively, we can all be creative. Some of us are more creative than others, but this depends on expertise, experience, thinking styles, and perseverance. We may experience different creative directions during different moments that occur in our lives. For the context of this study, we will look at the “Four C model of creativity” by Ronald Beghetto and James Kaufman to categorize the creative directions one can experience at an individual level within the workplace.

This four C model of creativity was compiled by intensely studying existing research papers containing the word “creativity.” After analyzing this research, Beghetto and Kaufman organized the findings into a conceptual model of the directions of creativity. The Four C’s that Beghetto and Kaufman refer to are Big-C, Pro-C, Little-C, and Mini-C creativity. See Figure 3.
The definitions provided of each direction illustrate a better understanding of the varying directions of creativity. *Big –C* creativity, or eminent creativity, is the creative direction that is the highest sought. In research, the example of well-known creators such as the artist Monet is used. These types of artists or creators make creative contributions in the way where they are able to change a significant segment of the population because of the permanence of their creative works. The next direction of the Four C model is *Pro –C* creativity, *Pro –C* refers to the development and “effortful progression beyond little-C, but that has not yet attained Big-C status” (Beghetto & Kaufman, 2009, p.5). One who attains professional-level expertise and experience in their career field can achieve Pro-C status. The next direction would be a ranking below Pro-C creativity; this is *little –C* creativity. This little –C creativity is “everyday creativity that may make a solid contribution” (Beghetto & Kaufman, 2007, p. 74). An example of little –C creativity
would be a handmade gift that one would make for a friend. *little-C* creativity is fairly simple to achieve, although some level of experience or training is required. The last direction of creativity is *mini-C* creativity, this segment of creativity results from an initial learning process that one may go through in schooling. For example, students typically experience *mini-C* creativity when they are exposed to a technique or concept in school for the first time. This technique may be very well known to experienced professionals, but it would be the first time the students have seen the technique or concept.

These directions of creativity will be considered when we question what components of our physical environment are perceived to play a role in influencing creativity and collaboration in the workplace. Should the components of the workspace be thought of differently for directions of eminent creativity versus directions of everyday creativity? This will attempt to be uncovered in chapter 6, when the primary research study is addressed.

### 3.3 The Role of Motivation

Research has informed us that motivation plays a role in creativity. Motivation is defined as “the drive to fulfill a need” (Goodman, 2011, p. 374). In research conducted on academic motivation, Maslow is quoted by stating, “Motivation entails the conditions responsible for variations in intensity, quality, and direction of ongoing behavior. Motivation may be driven by either intrinsic or extrinsic factors or the interplay of both” (Goodman, 2011, p. 374). The two factors of intrinsic and extrinsic motivation that
Maslow refers to are very important to understand motivation in the workplace setting. Intrinsic motivation can be defined as “the driving force that is fundamental to the active nature of human beings” (Goodman, 2011, p. 374). Extrinsic motivation can be defined as the “external sources of influence on an individual’s motivation and is subdivided into socialization and rewards” (Goodman, 2011, p. 375). Since motivation can affect creative output in two ways, intrinsically as well as extrinsically, this description of the role of motivation applied to the academic setting is also appropriate to the role of motivation in the work environment. Intrinsic motivation can be encouraged through one’s internal driven passion and desire to reap the benefit of doing a job well done. Extrinsic factors of motivation can be through monetary or other rewards, as well as support of family members or co-workers, or other pressures of the social environment. “Deciding how much time and money to give to a team or project is a judgment call that can either support or kill creativity” (Amabile, 1998, p. 82). Because every worker works differently, organizations may initially believe that distributing extrinsic factors for motivation will garner more benefits over intrinsic factors. However, research has shown that intrinsic motivation can be stimulated among workers through the following changes described by creativity researcher Teresa Amabile;

“Intrinsic motivation can be increased considerably by even subtle changes in an organization's environment. That is not to say that managers should give up on improving expertise and creative-thinking skills. But when it comes to pulling levers, they should know that those that affect intrinsic motivation will yield more immediate results. There are organizational practices that have an
affect on creativity, these can be categorized into the six following sections; 
\textit{challenge, freedom, resources, work-group features, supervisory encouragement, and organizational support}. These categories have emerged from the question: 
What are the links between work environment and creativity?” 

The line between intrinsic motivation and extrinsic motivation is a little blurry; some extrinsic factors could transform into becoming intrinsic for some workers and vice versa. For example, if a worker already holds a passion for the project that they are working on, they most likely have a more intrinsic drive motivating them. If the same worker is later offered a promotion or monetary reward to finish the project, then the worker will have extrinsic motivators that could affect their motivation also. It is therefore important to consider and be aware of both types of motivation could affect individual and or collective creativity.

Amabile discusses the work environment in the sense of organizational workplace structure. These above categories have some relevancy to the physical environment as well, however, as discussed in chapter 2, it is important to note that the usage of the term ‘work environment’ differs from the terminology ‘physical environment.’ Again, the ‘work environment’ encompasses more than physical components. The social environmental factors mentioned earlier help make up the ‘work environment.’ The physical environment is made up of the tangible space in which the worker performs daily work tasks.

3.4 Assessing Creativity

Similar to the I.Q., or the Intelligent Quotient assessments, creativity assessments have also been conducted by psychologists due to the increased interests relating to
creativity. Many of these assessments typically assess individual creativity, however in more recent research, the KEYS assessment (Amabile, 1995) has become popular for assessing the perceptions of the work environment for climates for creativity. When interpreting the climates for creativity within the work environment, Amabile describes the work environment as “a result of the personalities, styles, policies, and interactions of a great many people, from top management to individual employees in work groups” (Amabile, 1997, p. 54). To measure creativity within a work environment, The KEYS assessment considers organizational motivation, resources for the workers, and management practices. The KEYS assessment “consists of 78 items that constitute eight scales addressing different aspects of the work environment, plus two scales assessing the work outcomes of creativity and productivity” (Amabile, 1997, p. 48). The KEYS scales “discriminate between high-creativity projects and low-creativity projects; certain scales discriminate more strongly and consistently than others” (Amabile, 1996, p. 1154). In a KEYS sample report, Amabile defines “projects” as “the major work that you do, whatever that may be” (Amabile, 2009, p. 4). See Figure 4.
In *Figure 4*, Amabile illustrates the overall concept of the KEYS assessment scales. This conceptual model incorporates the perceptions and relationships of the scales of the work environment and the creativity being assessed. “The scales predicted to be positively related to creativity are referred to as ‘stimulant scales’ and those predicted to be negatively related are referred to as ‘obstacle scales’” (Amabile, 1996, p. 1159). The ‘stimulant scales’ are; *Organizational Encouragement, Supervisory Encouragement*, and *Work Group Support*. The ‘obstacle scales’ include *Pressure* and *Organizational Impediments to Creativity*. Figure 4 Amabile’s Conceptual Model For Assessing The Perceptions of the Work Environment for Creativity (Amabile, 1996, p.1159).
Encouragement, Work Group Supports, Freedom, Sufficient Resources, and Challenging Work. The ‘Obstacle scales’ are: Workload Pressure and Organizational Impediments. The scales of this conceptual model are divided into the conceptual categories of “Work Environment Factors to Influence Creativity.” These conceptual categories include: Encouragement of Creativity, Autonomy of Freedom, Resources, Pressures, and Organizational Impediments to Creativity (Amabile, 1996, p. 1158 - 1162). Within these conceptual categories are psychological mechanisms explained through the “hypothesized effect on creative behavior” (Amabile, 1996, p. 1158). These conceptual categories cover a variety of factors within the work environment, and could apply to small, medium, or large project types. While this model looks at available resources within the work environment, this model does not hold a category for the assessment of possible physical components within the designed environment that may or may not be conducive to creativity. The scales for assessing the climates for creativity in this KEYS assessment will be integrated into the research study in activity 1 in chapter 6. See Figure 5 for the items that constitute the stimulant and obstacle scales.
<table>
<thead>
<tr>
<th>STIMULANT SCALES</th>
<th>SUPERVISORY ENCOURAGEMENT</th>
<th>WORK GROUP SUPPORTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORGANIZATIONAL ENCOURAGEMENT</td>
<td>Clear Expectations</td>
<td>Good Team</td>
</tr>
<tr>
<td>Solve Problems</td>
<td>Plans</td>
<td>Trust</td>
</tr>
<tr>
<td>New Ideas</td>
<td>Sets Goals</td>
<td>Challenge Ideas</td>
</tr>
<tr>
<td>Mechanism For Ideas</td>
<td>Communicates</td>
<td>Open To Ideas</td>
</tr>
<tr>
<td>Take Risks</td>
<td>Interpersonal Skills</td>
<td>Help Each Other</td>
</tr>
<tr>
<td>Expect Creative Work</td>
<td>Confidence</td>
<td>Blend Of Skills</td>
</tr>
<tr>
<td>Management Enthusiastic</td>
<td>Values Contributions</td>
<td>Committed</td>
</tr>
<tr>
<td>Judged Fairly</td>
<td>Work Model</td>
<td>Open Communication</td>
</tr>
<tr>
<td>Express Ideas</td>
<td>Open To Ideas</td>
<td></td>
</tr>
<tr>
<td>Failure Acceptable</td>
<td>Supports Group</td>
<td></td>
</tr>
<tr>
<td>Fair Evaluation</td>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Recognize Creativity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reward Creativity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open Atmosphere</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Of Ideas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FREEDOM</th>
<th>SUFFICIENT RESOURCES</th>
<th>CHALLENGING WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carry Out Projects</td>
<td>Facilities Available</td>
<td>Important Projects</td>
</tr>
<tr>
<td>Pressure</td>
<td>Resources</td>
<td>Challenging Tasks</td>
</tr>
<tr>
<td>Decide What Projects</td>
<td>Budget</td>
<td>Best In Me</td>
</tr>
<tr>
<td>Sense Of Control</td>
<td>Data</td>
<td>Organizational Need</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OBSTACLE SCALES</th>
<th>LACK OF ORGANIZATIONAL IMPEDIMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>REALISTIC WORKLOAD PRESSURE</td>
<td>Political Problems</td>
</tr>
<tr>
<td>Too Much Work</td>
<td>Destructive Competition</td>
</tr>
<tr>
<td>Sufficient Time</td>
<td>Protecting Territory</td>
</tr>
<tr>
<td>Distractions</td>
<td>Hinder MY Projects</td>
</tr>
<tr>
<td>Expectations</td>
<td>Critical Of New Ideas</td>
</tr>
<tr>
<td>Time Pressure</td>
<td>Destructive Criticism</td>
</tr>
<tr>
<td></td>
<td>Negative Criticism</td>
</tr>
<tr>
<td></td>
<td>Pressure</td>
</tr>
<tr>
<td></td>
<td>Risk Taking</td>
</tr>
<tr>
<td></td>
<td>Emphasis On Past</td>
</tr>
<tr>
<td></td>
<td>Formal Procedures</td>
</tr>
<tr>
<td></td>
<td>Strictly Controlled</td>
</tr>
</tbody>
</table>

Figure 5 Stimulant and Obstacle Scales of the KEYS Assessment
The KEYS scales will provide insights to possible relationships between the resources within the work environment mentioned in these KEYS scales and to the physical components within the interior environments shown in the images.

3.5 Summary

In summary, creativity can be understood as not only a novel and appropriately useful idea or creation in the realm of art, design, science, education, business, and everyday life, but creativity is also about the process of getting to that idea. The facets of creativity are comprised of; the types of creativity, both individual and collective, the four directions of creativity, the role of motivation, and how creativity can be assessed. When looking at how components of the physical environment can affect creativity and collaboration within the workplace, facets of creativity must be considered.
Chapter 4: Defining Collaboration

With a better understanding of creativity, the definition and context of collaboration for this research will now be further defined. Based on what is currently known about collective creativity and the need and desire for organizations to become more innovative and forward thinking, collaboration becomes a key factor in this area of focus. “Research indicates that when team members have high levels of interpersonal communication, support, and clarity of purpose, team members tend to be very creative and innovative” (Barczak, 2010, p. 335). Collective creativity and collaboration could be looked at as similar concepts; however, collective creativity is the creation of new and useful thoughts or ideas within a collective setting, while collaboration is the communication with others to combine thoughts and ideas. “Collective creativity occurs when all the people in a group contribute simultaneously to a big picture or mental model that emerges from a shared mind and body space” (Sanders, 2010, p. 3). The creation of new or useful ideas, which helps make up collective creativity, may or may not always happen in a collaborative setting, therefore it is important that collective creativity and collaboration are thought of separately.

In many organizations today, collaboration makes up a large part of the organizational culture within the workplace. This collaborative culture values “teamwork, communication, respect and empowerment, and leverages the knowledge of
individuals resulting in organizational learning...encourages total involvement of team members because of the mutual respect, care and support of each other” (Barczak, 2010, p. 334). This chapter outlines work styles, organizational strategies and team structures currently being used to establish collaboration within the workplace.

4.1 Settings for Collaboration Within the Workplace

The setting for collaboration that usually comes to mind is the corporate conference room. This conference room typically reinforces the feeling of formality through a large table with executive style chairs. Because of the formality of the conference room, it may not be used as much as other areas in the workplace, or it may only seem inviting to a select group of workers. When an organization wishes to foster collaboration, it needs to provide a versatile physical environment that allows any form of communication ranging from an impromptu meeting to a formal, or possibly virtual conference. The conference room should not be thought of as the only space for collaboration. For some work styles, this formal conference room may work well, however, this formal conference room may lack the versatility that other work styles need when communicating and sharing ideas. According to a Haworth office white paper titled “Collaborative Spaces,” the furniture manufacturer’s knowledge and research team explains, “In order to create collaborative spaces that work, the activities performed, the length of time spent in the space, and the number of participants will vary according to the collaboration style. The environment should be aligned to best meet the specific needs of the workers and groups involved” (“Haworth,” 2010, p. 4).
In order to encourage collaboration, the organization must first understand the types of workers and learn to match the most appropriate collaboration setting to the organization’s working style. The different working styles are a result of the organizational culture types that contribute to the make up of the organization or company. “The organizational culture is the sum of values, leadership styles, procedures, goals, and many other characteristics that make an organization unique…it is the undercurrent that guides worker behavior at an unconscious level” (“Haworth,” 2010, p. 2). A tool to help describe organizational culture types is the Competing Values Framework. “The Competing Values Framework is about understanding how to appreciate conflicting values and integrate them successfully so that the organization is open to collaboration and growth” (http://www.competingvalues.com). The Competing Values Framework is comprised of four primary organizational culture types consisting of Collaborate, Create, Control, and Compete (http://www.competingvalues.com). Within a single organization there can be more than one organizational culture type. These four organizational culture types within the Competing Values Framework can be defined as follows:

**Collaborate:** Values tend to be open, friendly, and sharing. These organizations value teamwork, participation, and consensus.

**Create:** Values are dynamic, entrepreneurial, and creative. These organizations embrace innovation, risk-taking, and being on the leading edge.

**Control:** Values are more structured and formal. Success means efficiency, dependable delivery, standardization, smooth scheduling, risk management, and low cost.

**Compete:** Values are results-driven, competitive, and goal oriented, unified by an emphasis on winning and reputation. (“Haworth,” 2010, p. 2).
For each organizational culture type, a primary meeting type can be matched. In the Haworth white paper “Collaborative Spaces” the research team matches the four competing value types to four meeting categories. These meeting types are described as social, strategic thinking, presentation, and tactical execution. It is important to note that these four meeting types are derived from researcher Daniel Mittleman’s *Matrix of Meeting Types* (Mittleman, 2009, p. 288). Figure 6 depicts the *Competing Values Framework™* in the center with the primary meeting types matched to the appropriate organizational culture type. See Figure 6.

Figure 6 Relationships of Meeting Types to Organizational Culture Types Using the Competing Values Framework. (“Haworth,” 2010, p.3).
The matrix diagram in Figure 7 illustrates the four meeting types as well as the relationships to the organizational culture types. Each meeting type to organizational culture type relationship is described as traits within the cell of the matrix. These traits represent the most ideal collaboration setting for each relationship; this content is taken from the Haworth white paper “Collaborative Spaces” written by the Haworth Research and design team (“Haworth,” 2010, p. 5-6).

![Figure 7. Primary Meeting Type + Organizational Culture Type Trait Relationship.](image-url)
The criteria for the collaboration settings are tailored to fit each meeting type in relationship to the most appropriate organizational culture type. For example, the first culture type, collaborate, works best with social meeting type techniques. This social meeting type environment should have physical components within its space that consider the criteria listed in Figure 7. Hence, an appropriate collaboration setting for the collaborate organizational culture type utilizing the social meeting type would consist of flexible seating, impromptu meeting spaces, and a more lounge style feel for the overall collaboration setting.

In addition to the meeting types, today’s office furniture manufacturers are demonstrating a large interest in how people work together. There are a variety of product offerings to support the need for these different collaboration and meeting styles. Work surfaces and seating have become lighter and more mobile to allow for flexibility in creating these collaborative settings when needed. Also, with mobile devices becoming more common work tools, these furniture systems are becoming standardized with power and data capabilities. Presentation items such as the white board are also evolving as new technologies are introduced. There are now devices that can capture hand written notes by camera, print the notes or upload the notes to the Internet to be shared with others. By developing these tools and strategies for easy collaboration options within the workspace, these various types of meetings can occur more frequently, thus making workplace collaboration an inherent part of the workspace.
4.2 Summary

In summary, it can be understood that in order to design a workspace that fosters collaboration among its workers, the designer must understand the organizational culture types of the workplace. It is also important for the designer to be aware of the possibility that more than one culture type can occur in the same organization. After gaining this understanding, the designer can then match the organizational culture types to the appropriate meeting type and outfit the workspace with the proper components for collaboration. For all meeting types, the collaboration settings should be flexible and adaptable to the workspace. In addition to the formal private conference room, these collaboration settings should be informal, inviting at all times, and functional for the work that will take shape in the spaces. By making these settings more available to all workers and all work styles types, the organizations will be able to meet their desire for enhanced collaboration in the workspace.
Chapter 5: Space Layout and Design Components

This chapter introduces the types of space as well as design components within the physical work environment. The physical work environments studied range from the traditional private offices, to today’s open office, to working remotely through a virtual office. The positives and negatives of these workspace types will be discussed in regards to the stimulation of creativity and collaboration. Another influential factor when it comes to the type of workspace is the role of personality traits in relation to open versus private space layouts. Other design elements such as artificial lighting, natural lighting, temperature control, and acoustics will also be an area of discussion in this chapter. For the purpose of this research, the term ‘physical environment’ will be used in the context as it was outlined in chapter 2. The physical environment consists of the physical conditions that surround and influence a person (www.wiki.com). The physical environment within a workplace is made up of not only the tangible items, but human behaviors as well. “Behavior transcends architecture” (Goeller, 2012, personal communication). Once the organization is understood in terms of organizational culture type, meeting type, and the creativity styles of the workers, the designer can apply awareness of these social environmental factors plus possible physical components of the environment into creating a workplace that is perceptive to creativity and collaboration. This approach based on the awareness of the factors within the social environment, will
result in a more refined and functional design solution because the behavior and work styles are matched to the composition of the physical components of the environment.

5.1 The Private Office

The executive conference room, as mentioned in chapter 3, is a component that could potentially be found in a more traditional private office. Components like the formal conference room for meetings are quickly becoming a way of the past. As open office layouts are becoming the norm, the private office is sometimes perceived in a negative way. The typical corner office with a window was traditionally reserved for the boss. This separation through the physical space is a way to symbolize the office’s hierarchy. “Historically, personal offices have occurred at all levels of the management hierarchy, providing private places to work, but also underwriting the status of their occupants” (Raymond & Cunliffe, 1997, p.61). While this visual symbolism of office hierarchy is shifting into equal space planning, which has some benefits, completely phasing out the private office is not always the best solution. With an open office layout comes noise and acoustical privacy issues. A private office or quiet zone can be a solution to these acoustic problems. Temporary access to a private office or quiet zone can be offered to all workers as needed. By doing this, the office does not belong to any one individual permanently, but it is a flexible space for workers to utilize when under stress, distractions, or other pressures. Based upon the research gathered in chapter 2 regarding individual creativity and collective creativity, these two types of individual and collective creativity happen together in a cyclical manner during collaboration. Thus,
having this private workspace is also important for the variety of workers that make up a workplace. Therefore the private spaces are very important when considering the individual moments in creativity.

### 5.2 The Open Office Landscape

By the late 20\textsuperscript{th} century, the traditional workplace structure began to change. “New approaches to workplace structure were being implemented that promoted company-wide decision making and accountability” (Kopec, 2006, p.236). A shift in office furniture manufacturing played a large part of this modern day workplace change. Difficult work demanded the shift from cubicle clusters to a more democratic layout\textsuperscript{1}, this “encouraged people to work in self-governing teams” (Kopec, 2006, p.236). The standard office cubicle began to see changes. Originally cubicles divided up an equal portion of workspace footprint to the employees. The traditional cubicle offered privacy because of the partition height. The negative to the cubicle approach was that it made the office space very repetitive with the cube form, making the space feel claustrophobic. The partition height also blocked sightlines and views for day lighting and communicating with co-workers. Cubicles are a “host to distracting stimuli such as noise, odors, numerous other activities, and the inability to control lighting and temperature” (Kopec, 2006, p.236). Cubicles are moving in a more positive direction by becoming smaller in square footage and shorter in height. The smaller square footage allows for more workers to fit within the same building footprint, resulting in a financial savings for the company. The shorter partition height reduces the physical barriers

\textsuperscript{1} The terminology \textit{democratic layout} is to be used in the context of the open configuration of the office work place. (Goeller, 2012, personal communication).
between workers. “The minimization of physical barriers will increase communication and collaborative efforts. The open office space is quite flexible when organizations need to restructure or move work teams” (Kopec, 2006, p.240). However, a completely open office with no privacy zones caters to an increase of interruptions and privacy violations (Kopec, 2006). Open offices can greatly impact how organizations collaborate within their workspace, however it is still important to maintain some components for privacy when needed. For example, by introducing breakout areas, small informal private seating arrangements, within the open office space, the privacy problem can be avoided. These breakout areas can also be used for informal meetings, as well as alternative workspaces for workers who may not be in the office everyday.

5.3 The Virtual Office

With mobile devices becoming a staple tool for the work force, constant connectivity creates a need for people to be able to work in multiples places. The concept of a virtual office makes everyday global communication more common and accessible. In addition to having technology developments, the workers that consist of today’s multi-generational work force are accustomed to more freedom of choice through increased flexibility with their work schedules, attire, and settings to carry out tasks. “People will still come to work in what we think of as a traditional company office. We also need in between and more productive spaces for people to work at their home and in third places” (Florida 2011, pg. 35). The term third-place, derived from Ray Oldenburg’s The Great Good Place, can be defined as the "anchor" of community life
that facilitates and fosters broader and more creative communication (Oldenberg 1991). The first place may be home, the second place may be the workplace, and the third place could be a coffee shop, local café, bookstore, etc. A virtual office can be created remotely at any place of choice, however, companies are integrating these third-place concepts into the design of more workplaces to create a more comfortable and relaxed atmosphere for people to stay at work. The creation of the third-place is implemented into the office environment by utilizing design to mimic the components found within a third-place. For example, a coffee shop may have a variety of seating options, dim lighting, and the buzz of white noise.

Another design concept for workers required to travel for their particular employer, is the satellite office, or sometimes referred to as ‘hoteling.’ The satellite office is a temporary touch-down space. These shared desks are “used by shift workers, those dropping by the office for a short while (such as the sales force), and free-range workers who are probably part of a team” (Raymond & Cunliffe, 1997, pg. 60-61). A disadvantage to shared desks is the lack of personalization of one’s workspace, however, this concept is very economical.

5.4 Role of Personality Types In Office Space Design

With the increase in popularity for the open office, and the always in transit work force, private spaces are slowly being phased out in many organizations. The desire for group teams and collaborative work efforts can overshadow the individual space and freedom needed for creativity. This collaborative group effort movement, referred to as
“Groupthink,” is a terminology created by psychologist Irving Janis to theorize the way in which large corporations make group decisions. See Terminology. This shift towards a Groupthink mindset could affect the worker’s productivity depending on their personality type (Cain, 2012). When thinking about physical space design to influence creativity and collaboration, it is important to understand that everyone works differently. Introverts and Extroverts should be able to work comfortably in their own work style within the same work environment. “Research suggests that people are more creative when they enjoy privacy and freedom from interruption… introversion fosters creativity by concentrating the mind on the tasks in hand, and preventing the dissipation of energy on social and sexual matters unrelated to work” (Cain, 2012, p. 1). This information is important to consider when thinking about the individual and collective creativity process. The same worker may be able to collaborate and produce ideas collectively with a group, however, that worker may also need individual reflection time. These private spaces are not only important for the reflection of one’s ideas, but also because the day to day interruptions of the open work office, can pose some distractions when a worker could be under pressure.

5.5 Other Design Components Within the Physical Environment

Based on the understanding of open office landscapes, private offices, virtual office spaces, and personality types, other components that aid in the foundation of the physical environment can be brought into question when exploring the influences of creativity and collaboration. Some of these elements include;
Day lighting and views to outside - What does the worker look at everyday and how does it make them feel?

Temperature control – Does the worker have the ability to control the temperature to fit their comfort?

Acoustics / noise control – Does the worker have the freedom to isolate themselves away from distractions?

Color – How do colors within the physical environment make the worker feel?

Ceiling heights – Is the work style of the worker affected by the volume of their physical environment?

Furniture types – How does the worker interact with and use the furnishings around them to influence their work?

These components in question will be further explored through the primary research study in chapter 6.

5.6 Summary

This exploration of possible physical components within the work environment that may be perceived as creative and collaborative will benefit by the inclusion and understanding of the components and the make up of the office landscape. The following areas should be considered for this understanding:

1. Consideration of the space planning options for open office layouts while maintaining private spaces.

2. Virtual office spaces offer more flexibility among work styles and work schedules.
3. Introverted and Extroverted personality types have different work styles.

4. Other components within the physical environment that may also play a role in positive perceptions of creativity and collaboration.
Chapter 6: Primary Research

To help answer questions about which components of the physical environment may perceive creativity and collaboration, further exploration is discussed in this chapter. Although findings from other literature suggest social environmental factors, as well as motivation and productivity, play a role in creativity and collaboration, this literature does not discuss the potential influence from components within the physical environment. This research study attempts to uncover these components. Current-working professionals with a range of work experiences at a variety of creative service providers will be asked to participate in activities to identify their perceptions of physical components towards creativity and collaboration. By examining working professionals and their work environments in person, interactions, work styles, and the work environments can be recorded instantaneously. The benefit to this primary research is that the participants have various backgrounds and experiences that are expressed during the study activities. A four-part study looks at which components of the physical environment may be perceived with creativity and collaboration within the workplace. This study consists of two participatory activities, a questionnaire, and observation of the work place environment.
6.1 Selecting the Participants

The participants were selected from a variety of creative service providers within the vicinity of Columbus, Ohio. Selecting local participants near the university area made the observation portion of the study more feasible. Five creative service providers were targeted for this study because of the range of offerings they provided. These creative service providers were contacted via e-mail or telephone by the investigator. Size of the service provider was considered to allow for a variety in small, medium, and large work environments. For this study, large refers to 50 or more employees, medium refers to 20 – 49 employees, and small refers to less than 20 employees. The participants themselves also varied with years of experience in their profession. Depending on availability within each service provider, anywhere from one to three participants were involved from each creative service provider. In total, ten participants were available across all five creative service providers. Please see Figure 8 for the creative service provider and participant information.

<table>
<thead>
<tr>
<th>CREATIVE SERVICE PROVIDERS</th>
<th>SIZE AND TYPE OF SERVICE PROVIDED</th>
<th>PARTICIPANT ID AND EXPERIENCE LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Names removed for confidentiality.</em></td>
<td>Medium – Digital web and social media consultancy.</td>
<td>A1 6 years</td>
</tr>
<tr>
<td>A Group</td>
<td>Medium – Architectural and design firm.</td>
<td>A2 4 months</td>
</tr>
<tr>
<td>B Group</td>
<td>Small – Marketing firm.</td>
<td>C1 15 years</td>
</tr>
<tr>
<td>C Group</td>
<td>Medium to Large – Design research firm.</td>
<td>D1 7 years</td>
</tr>
<tr>
<td>D Group</td>
<td>Medium – Architecture and design firm.</td>
<td>E1 13 years</td>
</tr>
<tr>
<td>E Group</td>
<td><em>Names removed for confidentiality.</em></td>
<td>E2 10 years</td>
</tr>
</tbody>
</table>

Figure 8 Creative Service Provider and Participant Information
6.2 Developing the Participatory Research Activities

In order to begin to see components are supportive of creativity and collaboration within the physical work environment, it seems logical that the insight of those who work within creative service providing organizations can provide guidance towards the identification of these physical components within the environment. To aid in the communication of thoughts and ideas in regards to creativity and collaboration, two participatory activities consisting of both images and words were created. Participatory activities allow for a visual and tactile approach to enhance the participants’ engagement and in this case consisted of image and word association tasks. The specific images utilized in the activities were chosen based on a similar pilot study that was conducted by the investigator in a creativity and design seminar course. The words and phrases in Activity One are composed of the titles of the eight scales of the KEYS Assessment, as well as the 78 items discussed throughout each of the eight scales. The word categories for Activity Two include words relating to creativity, collaboration, and the work environment. These words were chosen by finding common words used frequently in a literature review of secondary research readings. At the conclusion of each activity, the participants are given the opportunity to explain their choices. These explanations have been audio recorded and transcribed. The transcripts for Activity One and Activity Two are located in the appendix. Following Activity Two is a brief questionnaire. The participants completed this questionnaire on paper and were asked to return it at the end
of the research session. The questionnaire content was more personal to the participant’s specific work environment. It was hoped that the questionnaire responses would help to inform some of the findings from the participatory activities. The questionnaires are also located in the appendix. After the questionnaire portion of the study was complete, an observational tour of the workplace was conducted with the consent of the participants. The observation focused on the physical work environment as well as the activity of the workers and their surrounding physical components. The observations were documented via camera, sketches, and notations. All activities within this study were conducted during one meeting time. Please see Figure 9 below for a listing and description of the four activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Participatory Activity 1</em>: Pair the word and phrase labels to the work environment image on the image sheet that best fits the specific word or phrase. More than one label can be associated with an image. Share and explain your choices upon completion.</td>
<td>30-40 min.</td>
</tr>
<tr>
<td>2</td>
<td><em>Participatory Activity 2</em>: Sort the image cards and choose 1 – 2 images that best represent the word categories. Select 1 – 2 images per word. Share and explain your choices upon completion.</td>
<td>15-20 min.</td>
</tr>
<tr>
<td>3</td>
<td><em>Questionnaire</em>: Following activity two is a brief questionnaire. Complete this questionnaire on paper and return it at the end of the research session.</td>
<td>10 min.</td>
</tr>
<tr>
<td>4</td>
<td><em>Observation + tour by the researcher</em>: An observation of the physical work environment, the activity of the workers in their surrounding physical components. Document observations via notes, photography, and sketches.</td>
<td>30 – 60 min.</td>
</tr>
</tbody>
</table>

*Figure 9 Study Structure*
6.2.1 The First Participatory Activity

In the first participatory activity, the participants received a large format sheet of paper with forty-two color 2” x 4” images printed onto the paper. These images consisted of a variety of physical environments ranging from traditional to modern design styling. Along with this image sheet, the participants received an 8 ½” x 11” label sheet with a total of 86 words and phrases. These words and phrases were based upon the KEYS Assessment. Before receiving the instructions, the definitions for both creativity and collaboration were read aloud to the participants so that they would have a common understanding of the context to this study. These definitions were kept basic, creativity; novel ideas that are useful, and collaboration; working together to achieve a goal. Each participant was instructed to pair the word and phrase labels to the image of the physical environment that they feel best fit the particular word or phrase. More than one label was allowed to be associated with an image. Participants were also allowed to draw on this paper and make any desired notations. They could also connect more than one image to a word or phrase label. Not all of the word and phrase labels had to be utilized, nor did every image on the paper. Each participant was given about twenty to twenty-five minutes to complete this activity. Upon completion of this activity, the participants gave oral explanations about their choices. See Figure 10 thru Figure 15 for image and word / phrase label images.
Figure 10 Activity One Interior Environment Images page 1 of 5
Figure 11 Activity One Interior Environment Images page 2 of 5
Figure 12 Activity One Interior Environment Images page 3 of 5
<table>
<thead>
<tr>
<th>Managerial Encouragement</th>
<th>Sufficient Resources</th>
<th>Express Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear expectations</td>
<td>Realistic Workload Pressure</td>
<td>Failure Acceptable</td>
</tr>
<tr>
<td>Plans</td>
<td>Creativity</td>
<td>Fair Evaluation</td>
</tr>
<tr>
<td>Sets goals</td>
<td>Productivity</td>
<td>Recognize Creativity</td>
</tr>
<tr>
<td>Good Team</td>
<td>Challenge Ideas</td>
<td>Reward Creativity</td>
</tr>
<tr>
<td>Trust</td>
<td>Open to ideas</td>
<td>Open Atmosphere</td>
</tr>
<tr>
<td>Flow of Ideas</td>
<td>Shared Vision</td>
<td>Political Problems</td>
</tr>
<tr>
<td>Destructive Competition</td>
<td>Protecting Territory</td>
<td>Hinder My projects</td>
</tr>
<tr>
<td>Critical of New ideas</td>
<td>Destructive Criticism</td>
<td>Negative Criticism</td>
</tr>
<tr>
<td>Pressure</td>
<td>Risk Taking</td>
<td>Emphasis on Past</td>
</tr>
<tr>
<td>Formal Procedures</td>
<td>Strictly Controlled</td>
<td>Facilities Available</td>
</tr>
<tr>
<td>Resources</td>
<td>Budget</td>
<td>Data</td>
</tr>
<tr>
<td>Materials</td>
<td>Information</td>
<td>Too Much work</td>
</tr>
<tr>
<td>Sufficient Time</td>
<td>Distractions</td>
<td>Expectations</td>
</tr>
<tr>
<td>Time Pressure</td>
<td>Area is innovative</td>
<td>My own Creativity</td>
</tr>
<tr>
<td>Great Creativity</td>
<td>Group Creativity</td>
<td>I am Creative</td>
</tr>
<tr>
<td>Organization if Effective</td>
<td>Area is Productive</td>
<td>Area is Effective</td>
</tr>
<tr>
<td>Organization is Productive</td>
<td>Organization is Efficient</td>
<td>Area is Efficient</td>
</tr>
<tr>
<td>Freedom</td>
<td>Communicates</td>
<td>Help each other</td>
</tr>
<tr>
<td>Carry out projects</td>
<td>Interpersonal skills</td>
<td>Blend of skills</td>
</tr>
<tr>
<td>Pressure</td>
<td>Confidence</td>
<td>Committed</td>
</tr>
<tr>
<td>Decide what projects</td>
<td>Values contributions</td>
<td>Open Communication</td>
</tr>
<tr>
<td>Sense of control</td>
<td>Work model</td>
<td>Solve Problems</td>
</tr>
<tr>
<td>Challenging Work</td>
<td>Open to ideas</td>
<td>New Ideas</td>
</tr>
<tr>
<td>Important projects</td>
<td>Supports group</td>
<td>Mechanism for Ideas</td>
</tr>
<tr>
<td>Challenging tasks</td>
<td>Feedback</td>
<td>Take Risks</td>
</tr>
<tr>
<td>Best in Me</td>
<td>Work Group Supports</td>
<td>Expect Creative Work</td>
</tr>
<tr>
<td>Organization need</td>
<td>Organizational Encouragement</td>
<td>Management Enthusiastic</td>
</tr>
<tr>
<td>Challenging work</td>
<td>Lack of Organizational Impediments</td>
<td>Judged Fairly</td>
</tr>
</tbody>
</table>

*Figure 15 Activity One, Word / Phrase Labels*
6.2.2 The Second Participatory Activity

The second participatory activity consisted of an image card sort task similar to the word association task in activity one. Each participant was given a large sheet of paper with the following words:

<table>
<thead>
<tr>
<th>Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
</tr>
<tr>
<td>Collaboration</td>
</tr>
<tr>
<td>Productive</td>
</tr>
<tr>
<td>Stifling</td>
</tr>
<tr>
<td>Stale</td>
</tr>
<tr>
<td>Oppressive</td>
</tr>
<tr>
<td>Creativity</td>
</tr>
<tr>
<td>Work</td>
</tr>
<tr>
<td>Playful</td>
</tr>
<tr>
<td>Cluttered</td>
</tr>
</tbody>
</table>

These words were based on frequent use throughout a variety of readings related to creativity and workplace collaboration. These words represent a range from positive to negative descriptions for a variety of work environments.

The participant also received an envelope of forty-five, 3” x 3” colored image cards. However, unlike the physical environment images in activity one, these image cards consisted of visuals of materials or elements within the physical environment. Some of these images were a zoomed in focus of images that appeared in activity one. The zoomed in images take the components or materials out of the context from the original physical environments in activity one. The definitions were repeated for creativity and collaboration again before beginning part two. The participants were asked to select one to two of the image cards that best represent each of the provided
words on the paper in front of them. Ten to fifteen minutes were given to complete this activity. Please see *Figure 16 thru Figure 18* for image card choices.
Figure 16 Activity Two Image Cards page 1 of 4
Figure 17 Activity Two Image Cards page 2 of 4
6.2.3 The Third Activity: Questionnaire

After the two participatory activities were completed, the participants were issued a questionnaire. The questionnaire consisted of 8 open-ended questions regarding to the physical space within their work environment, as well as psychosocial elements in the workplace. The following questions made up the questionnaire for part three:

*Name of work place:*
*Years of experience:*
*Gender:*

*Where is your favorite space at your workplace? Why is it your favorite?*

*Where is your least favorite space at your workplace? Why is it your least favorite?*

*If you could change anything about the physical environment in your place of work, what would it be and why?*

*Please give an example of a recent challenge or obstacle you faced at your workplace:*

*How did you overcome this challenge?*

*Did you approach this challenge independently or collaboratively?*

*What resources if any, within your workplace did you use to help overcome the challenge?*

*Would you classify yourself as an Introvert or an Extrovert?*

The responses from the questionnaire provide added insight to the analysis of the first two activities. The completed questionnaires are located in the appendix.
6.2.4 The Fourth Activity: Observation of the Workplace

Activity four of the study consisted of observation time by the investigator with the participant’s consent. This observation focused on the physical components within the workplace, as well as how the workers interacted with the work environment. The observation was approximately 30 minutes to an hour depending upon the participant’s time schedule. The observation was documented in the form of note taking, sketching, and photography. To keep the observations consistent among the creative service providers, the investigator constructed an observational guideline. Documentation of observations is located in the appendix.

6.3 Analysis of the Primary Research

Data from all four activities in the study were analyzed. Patterns, similarities, and differences across the ten participants for each part of the study have been identified. Connections have been made across data collected from the two participatory activities. The responses to the questionnaires in activity three of the study provided insights to activities one, two, as well as four. The findings from the analysis of each part of the study help address the questions regarding what physical components within the environment can foster creativity and collaboration within the workplace.

6.3.1 Analysis of the First Participatory Activity

Analysis of data from the first participatory activity provided a variety of insights. This data was organized by grouping all of the selections by all of the participants on a master image sheet. Each participant was assigned a color code. This allowed for the
grouping of words and phrases used on the same image more than once by multiple participants. *Figure 21a thru Figure 21g* shows the data collection master image sheet. *Figure 20* below is the color code legend of all participants.

*Figure 20 Color Coded Participant Legend*
Figure 21a Activity 1 Data Collection page 1 of 7
Figure 21b Activity 1 Data Collection page 2 of 7
Figure 21c Activity 1 Data Collection page 3 of 7
Figure 21d Activity 1 Data Collection page 4 of 7
Figure 21e Activity 1 Data Collection page 5 of 7
Figure 21f Activity 1 Data Collection page 6 of 7
Figure 21g Activity 1 Data Collection page 7 of 7
The most popular image and word associations chosen more than three times across all ten participants are shown below in Figure 22.

Figure 22 Activity I Image + Word Associations Chosen More Than Three Times
In Figure 22, showing the popular picks, it is apparent that the work environments with negative connotations such as the cluttered desk with piles of paper, and the repetitive cubicle layout stood out to the participants. These two images will be discussed first because the majority of the participants chose to pair words to these images first at the start of the study.

Image # 8, the environment with the classical cubicle layout, had three or more participants pair the following phrases to this image:

- Formal Procedures
- Critical of New Ideas
- Pressure
- Data

The explanations for this image selection were mainly directed to the formal procedure feeling of this cubicle environment. Participant A3 said “…the cube farm atmosphere would be stifling and hard to stay motivated with carbon copies of you everywhere.” Participant D1 expressed that “they are not focused on anything but just getting information, this kind of environment tends to be not something that provides collaboration space, and it could mean competition because they don’t know who is working next to them, …time pressure, and space pressure. Relates a lot to formal procedures.”
Image #35, the very messy desk with high piles of paper was also a popular pick with three or more participants pairing the following phrases with it:

Challenging Work
Organizational Need
Too Much Work
Hinder My Projects
Distractions

While the majority of participants selected the phrases “distracting” and “too much work” for this environment, one participant did present a different outlook on this environment. Participant D2 states there is “an amazing beauty to have creativity with yourself, and freedom to pile your ideas and surround yourself with your thoughts – failure is acceptable, if you’re allowed to work independently, and your bosses trust you to come up with something, even if you fail, you work through it.” The remaining images from the ‘popular picks grouping’ are listed below along with the word and phrase pairings used by 3 or more participants:

Image #20, the environment with an open center and private pods:

Area is innovative

Participant B1 created categories to group her image choices into. These categories were titled: open, closed, semi-enclosed, center collaboration, rooms, collaborative, and cluttered. Image #20 was grouped under center collaboration. “This area is effective because you can have larger group meetings in the
center and then go back to individual spaces to do more work, it encourages group creativity.”

*Image #24*, the two people utilizing the white boards with post-its, and colored bench seating:

_Help each other_

Participant A3 shared his reasoning for why he was attracted to this image, “… white boards and pop colors, I come up with the best ideas in a room of a group of people with white boards…playing off of things we say to get things going.”

*Image #11*, the gym environment:

_Sets Goals_

Participant E2 compared this image of the gym environment to everyday work and making the time to accomplish tasks.

“Within a work environment you are challenged and tasked with multiple things in a day, to be able to set goals for yourself, like your own health and fitness.”

*Image #31*, colored circular seating sectional arrangement:

_Reward Creativity_

_Freedom_

This environment is inviting for collaboration because of the circular seating style, but also evokes a fun and creative feeling because of its colorfulness. Participant C1
elaborates on this environment by explaining that there is “something about circular seating arrangements that create conversation to me. When you go there, there is no way that you will not merge conversations because of seating, an interesting place to sit, and it’s colorful!”

*Image #34, table with workers meeting with one another:*

*Work Group Supports*
*Good Team*
*Help Each Other*

For image #34, it should be noted that this image received more attention than image #40. Image #40 is a similar worktable however; no people are shown in the image. When asked about the selection choice for this particular image, participant D1 says, “Being able to talk to someone fosters group creativity and supports the work group…talking to each other, laughing, and working together well (with) a shared vision. They look confident and relaxed. I liked the attitude, you need to have something that fosters emotional response.”

*Image #14, a traditional library reading room:*

*Resources*
*Information*

Participant D1 continues to discuss the selection choice for image #14 by describing that “it is good to be in a place where you can access a lot of information or digital information, and have time to look for information and have it on hand when you are working. You don’t know everything in
the world when you are working, you have questions, you can share information with others and they can share it with you.”

After grouping the popular picks together, the data was then looked at more closely by directing focus to the image and word pairings containing the words creative or creativity, as well as image and word pairings containing the words communication or ideas. The words communication and ideas were used to represent collaboration. The actual word collaboration is not a part of the KEYS scale items, thus words closely related to collaboration were chosen for looking at this area of data. After looking at the images and word associations for both creativity and communication / ideas separately, the data was looked at together for associations in regards to both creativity and communication / ideas. Figure 23 shows the grouping of all images and word associations in regards to creativity. The image and word associations in the box represent the choices both related to creativity, as well as a popular pick by 3 or more participants. See Figure 23.
Figure 23 Image + Word Association from Activity 1 – CREATIVITY
Participants paired 19 out of the 42 images with words containing *creative* or *creativity*. From those 19 images, 6 images are included in the popular picks category, where 3 or more participants made similar image to word associations to that image. The following image numbers are the popular picked images with word associations of *creativity* or *creative*:

*Image #11*, the gym environment

I am Creative

*Image #20*, the environment with an open center and private pods

Reward Creativity
Creativity
Group Creativity
I am Creative

*Image #24*, the two people utilizing the white boards with post-its, and colored bench seating

Great Creativity
Recognize Creativity
Group Creativity
I am Creative
Expect Creative Work

*Image #31*, colored circular seating sectional arrangement

Expect Creative Work
Great Creativity
Creativity
Recognize Creativity
Reward Creativity
Group Creativity
Image # 34, table with workers meeting with one another

Group Creativity
Creativity

Image # 35, the very messy desk with high piles of papers

Creativity

Figure 24 shows the grouping of all images and word associations in regards to collaboration. The image and word associations in the box represent the choices both related to collaboration, as well as popular picks by 3 or more participants. See Figure 24.
Images associated with any labels using the words communication and or ideas from the 'Popular Picks'.
Participants paired 17 out of the 42 images with words containing *communication*, and or *ideas*. From those 17 images, 6 images are included in the popular picks category, where 3 or more participants made similar image to word associations to that image. The following image numbers are the popular picked images with word associations of *communication* and or *ideas*:

*Image #8*, the classical cubicle layout:

*Critical of New Ideas*

*Image #14*, a traditional library reading room:

*Center Collaborative Space* \(^2\)

*Image #20*, the environment with an open center and private pods:

*New Ideas*

*Mechanism For Ideas*

*Center Collaborative Space* \(^3\)

*Image #24*, the two people utilizing the white boards with post–its, and colored bench seating:

*Express Ideas*

*Challenge Ideas*

---

\(^2\) Participant B1 organized the images into groups. Image #14 was assigned to a group titled ‘Center Collaborative Space.’ This word was not apart of the provided phrase labels, however, this grouping name is related to the subject area of focus, collaboration.

\(^3\) Participant B1 organized the images into groups. Image #20 was assigned to a group titled ‘Center Collaborative Space.’ This word was not apart of the provided phrase labels, however, this grouping name is related to the subject area of focus, collaboration.
Open to Ideas
Flow of Ideas
Critical of New Ideas

Image 31, colored circular seating sectional arrangement:

Open to Ideas
Express Ideas
Mechanism for Ideas
Open Communication

Image 34, table with workers meeting with one another:

Communicates
Open Communication
Collaborative
Express Ideas
Flow of Ideas
Challenge Ideas

Seven images had both words and phrases associated with the creativity picks and the collaboration picks. See Figure 25 for the image environments selected for both creativity and collaboration.

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4 Participant B1 organized the images into groups. Image #34 was assigned to a group titled ‘Collaborative.’ This word was not apart of the provided phrase labels, however, this grouping name is related to the subject area of focus, collaboration.
Figure 25 Image + Word Association from Activity 1

CREATIVITY & COLLABORATION
Four out of these seven images are also included in the popular picks. These popular picked images containing both word groupings for creativity and collaboration are the following images:

- **Image #20** - open center and private pods

- **Image #24** - white boards

- **Image #31** - colored circular seating

- **Image #34** - workers meeting together
Based upon the explanations from the participants, these four images contain the following similar characteristics:

- Energetic colors used throughout the environment to organize spaces
- Flexible furniture arrangements
- Open sight lines to co-workers
- Both private and open meeting areas

These four images will be referenced when making further connections regarding components within the physical environment that may be conducive to creativity and collaboration within the workplace.

Only one image was not selected at all by any participants. This was image #36. The participants did not mention this image when explaining their selections.

6.3.2 Analysis of Data from the Second Participatory Activity

The data collected from the second participatory activity were organized by the words and how many times particular images were selected for each word. The numbering on the images in Figure 26 & Figure 27 represent the number of times the images were selected for that word across all participants. Images with no numbers were only selected once for that word. The data were then sorted by the top selected image per word and grouped with all other words associated with the image. See Figure 28.
Figure 26 Activity 2 Image + Word Card Sort, pg.1
Figure 27 Activity 2 Image + Word Card Sort, pg. 2
Figure 28: Most Frequently Selected Image + Word Associations from Activity 2
The participants’ explanations provided many insights to the reasoning behind their choices. Because the images were taken out of the context of their original interior environment, many participants expressed the challenge with looking at just an image of a material. Some insights relating to the frequent image to word associations are listed below:

**STIFLING:**
*Image V - Acoustic ceiling tile:*
“Standard ceiling tile over my head… feels like they’re crushing me.” – Participant C1

**OPPRESSIVE:**
*Image U - Fluorescent lights:*
“Fluorescent lights…It’s like a jail” – Participant E2

**WORK:**
*Image S - chalkboard with lots of markings:*
“A chalkboard with a lot of math looks like something I would never understand. What I do in my work doesn’t seem like work, its fun and creativity.” – Participant E3

**PRIVATE:**
*Image L – window into wilderness:*
“secluded and quiet” – Participant E1
“Cabin window, go there to be alone, you’re not trying to do work in that place.”
-Participant A3

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5 Additional details from transcripts can be found in the Appendix.
MOTIVATION:
Image RR – the gym:
“People working out, it takes motivation to do that.” – Participant E1
“You can be able to enjoy (working out) if you get your work done, motivates you to finish quickly.” – Participant A1

CREATIVITY:
Image KK – colored seating:
“I like the color, you can sit in groups, come up with ideas”– Participant A1
“colorful lounge space”– Participant A3

PLAYFUL:
Image KK – colored round seating:
“looks like candy.” – Participant C1
“fun environment to work in.” – Participant E3

CLUTTERED:
Image QQ – messy piled desk
“cluttered and so many things going on at the same time, not a good environment to work in, you don’t have space for anything.” – Participant D1

COLLABORATION:
Image HH – people meeting at white boards
“Image of marker board…encourages collaboration, out in open to write something, so people become more vocal about things.” – Participant B1
STALE:
*Image U - Fluorescent lights:*
“Fluorescent lighting, not good lighting, things don’t look real, I don’t like it.”
-Participant D1

PRODUCTIVE:
*Image II – tall office space with exposed ductwork:*
“Open office with high ceiling, this would be an environment where I would be productive.” – Participant A2
“High ceiling office where ever you could get some stuff done…I feel like I am more productive when I do not feel claustrophobic.” –Participant A3

There are apparent connections to the first activity and this second activity with the images selected for the words collaboration, cluttered, playful, and creativity. The image HH, with the people communicating at the white boards, was also a popular pick in activity 1. However in the first activity, more components of the environment were made visible, such as the benches and colors used through the space. Also, for playful and creativity, image KK was the frequent selection. Image KK, a grouping of circular colored seating was described as colorful and fun many times across the different participants.
In activity two, only two image cards were not used, image card $GG$ and $I$:

The participants did not mention the reasoning for not selecting these images during their explanations.

### 6.3.3 Analysis of the Questionnaire

The questionnaire contained questions that were more personal to the participants. The participants had time to complete the eight open-ended questions after completing the first two activities. This questionnaire asked about their preferred spaces within their workplace as well as what they would change if they could, and as well as challenges that they have been confronted with while at work. This questionnaire also asked the participants to classify themselves as either an *introvert* or an *extrovert*.

Across all ten participants, 5 chose *introvert*, 4 chose *extrovert*, and one chose both *introvert* and *extrovert*. Also one participant selected *introvert*, but also stated that they “make a great fake *extrovert.*” Out of all questions asked, the most common responses
relating to favorite workspaces, things they could change, and how they overcame challenges, can be summarized into the following points:

1. Participants prefer spaces where they can gather and or see other co-workers.
2. Participants prefer control over the personalization of their workspace.
3. Participants enjoy views to the outside, however some wish they had more views or better views.
4. Participants responded to wanting more natural day lighting, describing rooms without views or natural lighting as stale and claustrophobic.
5. Participants also responded about better noise control, the background noises within an open office was often described as distracting and hard to focus and be productive.

6.3.4 Analysis of The Observations

For the observational portion of the study, to ensure for a consistent observation across all work environments, the investigator followed the guideline form on page 66. Items taken into consideration when observing were the size of the space; number of employees, dress code, consistency of the designed environment across public views to private ‘back of house’ work views, as well as how people gathered and conversed. For the number of employees, a range in size was desired for this study. The employee count across all five work environments is as followed:

- A Group: 25 employees
- B Group: 150 employees
- C Group: 8 employees
- D Group: 42 employees

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6 Participant questionnaires are listed in the appendix for further reference.
7 Guideline notes and documentation for all work environments are located in the appendix.
E Group: 45 employees

Across all five work environments, the dress was typically business casual with a ‘dress for your day’ rule. For example, if you have an important meeting, dress up, if you are working at your desk, you can dress more casually. The small to medium sized organizations seemed to have more control over the consistency of the way their space looked across the public entry areas to the workspaces. The larger work environments seemed to have more ‘gray areas.’ These gray areas (i.e., when a person is not using the space, such as an empty desk) become an open spot for miscellaneous work materials. For meeting and gathering options, the smaller sized environments have more informal breakaway spaces. The larger environments have more formal meeting areas due to the type of clientele they work with. However, consistently across all of the work environments, many workers held brief meetings in circulation spaces while standing, or at their desks.

Individual summaries for each creative service provider are listed below:
A Group: Digital web and social media consultancy with 25 employees

Key observations:

Architecture:
- Exposed building materials (i.e. duct work, brick, pipes)
- High ceilings

Color Scheme:
- Neutral wall color, however many colorful objects within the space

Lighting:
- Directional track lighting for artificial lighting
- Lots of natural day lighting on the east and south side of the building

Circulation:
- Three floors, the first and second floor are connected, however the third floor is separated.
- The first floor is work space with a bar area
- The second floor is work space with a kitchenette

Meeting Spaces:
- The third floor is conference and causal meeting space with a small refreshment area
- People meet standing over on another’s desk

Acoustics:
- Noisy, no private areas, the third floor could be used as a private area if meetings are not occurring.

Unique Elements:
- A climbing wall on the first floor mainly for decorative use
**B Group: Architectural and design firm with 150 employees**

Key observations:
- **Architecture:**
  - Exposed building materials (i.e. duct work, pipes)
- **Color Scheme:**
  - Very neutral, not much color, the only colors found on the walls are orange and white
- **Lighting:**
  - Florescent lighting
  - Plenty of natural day lighting for work spaces on the first and second floors
  - The views to the outdoors are; trees, water, open space
- **Circulation:**
  - The desk layout is very repetitive, long rows of desks, no circular shaped layouts
  - Most of the furniture is stationary
  - All levels, basement, first, and second floors connect via large stair case and mezzanine with views to the lobby
- **Meeting Spaces:**
  - A large conference area with seating to accommodate all employees
  - A meeting space in the main lobby entrance for design critiques
  - No informal meeting spaces near desks
  - Some private rooms away from desk areas

**B Group: Second floor workspace**

**C Group: A small sized marketing firm with 8 employees**

Key observations:
- **Architecture:**
  - Exposed building materials (i.e. duct work, pipes)
- **Color Scheme:**
  - Colors are within the company’s brand identity
- **Lighting:**
  - Soft artificial lighting
  - Plenty of natural day lighting for work spaces on the first and second floors
  - Outside views to the surrounding neighborhood
- **Circulation:**
  - The entire space is very open, many sightlines from one area
  - The space is on 2 levels, it is very connected at all times
- **Meeting Spaces:**
  - A large conference area with seating to accommodate employees and clients, the company’s vision and mission statement is displayed on the walls
  - Mostly open, but there are some private areas, as well as a meeting room with a door

**C Group: Work area & Entry hall**
**D Group: A medium to large design research firm with 44 employees**

Key observations:

Architecture:
- Exposed building materials (i.e. duct work, pipes) in the entry, ceiling tile in office areas

Color Scheme:
- A variety of neutral colors, warm and cool

Lighting:
- Natural day lighting for work areas in the private offices located around the perimeter of the office
- Open views of the downtown city skyline

Circulation:
- The space was divided among open and closed areas, this made it hard to see other employees
- The employees with more managerial positions have more private work spaces
- This space is broken up into many areas, even though it is only one level

Meeting Spaces:
- A conference table and an informal seating area is located in the center of the work environment
- A kitchen gathering space is available, but not visible from the majority of the office

**E Group: A medium to large architectural and design firm with 45 employees**

Key observations:

Architecture:
- A mix of exposed building materials (i.e. duct work, pipes), and smooth ceilings

Color Scheme:
- Mostly neutral / white colors, the only bright color is the logo color

Lighting:
- A balance between florescent and incandescent lighting
- Plenty of natural daylight
- Open views to the outdoors

Circulation:
- The work areas are located in one space, everyone can see each other, even the principals of the firm
- All work areas are open, no private offices
- This space is on one level and it is very open

Meeting Spaces:
- There are a few private meeting rooms of different sizes
- The kitchen gathering space visible from the reception, but not from the employee area
F Group: A large retail design firm with 50 employees

Key observations:

Architecture:
- A mix of exposed building materials (i.e. duct work, pipes) and smooth ceilings

Color Scheme:
- Mostly neutral wall paint, but many colors on the walls in the form of materials and ideas pinned up

Lighting:
- A balance between fluorescent and task lighting
- Plenty of natural day light, large windows
- Open views to the downtown

Circulation:
- The work areas are open, however divided between floor levels by job responsibilities
- Most work areas are open, however private offices with doors for ownership roles (privacy for client phone conversation)
- There are a few small kitchen spaces
- This space is on three levels, however, it is open

Meeting Spaces:
- There are a many “war rooms” for group meetings

Thermal Comfort:
- Some difficulties with 3rd floor use because of temperature control

8 F Group did not participate in the participatory activities or the questionnaire.
6.4 Summary

From the participatory activities, the common responses in the questionnaire, and observations of the multiple work environments, the following can be summarized:

1. Artificial lighting evoke feelings of oppressiveness, or staleness, therefore desired natural day lighting can benefit in terms of creativity and motivation.

2. Colorful and uncommon seating arrangements influence the desire to collaborate in groups and communicate with co-workers.

3. Open volume of space, especially ceiling heights have an influence on the feeling of positive work productivity.

4. Private and individual work space features such as closed doors when needed, or more secluded spaces are desired to get away from the typical open office background noises and distractions.

5. Freedom with the personalization of the individual workspace is desired.

6. The flexibility to move within the work environment is also desired.

7. Unorganized spaces are perceived as cluttered, distracting, but sometimes as individual and private. (1 out of 10).
Chapter 7: Conclusion

The understanding of creativity, collaboration, the various settings of the workplace environment, combined with the perceptions of creativity and collaboration according to creative professionals, can provide designers guidance on how components within the physical environment can be perceived to fuel creativity and encourage collaboration. This chapter will highlight the key findings from the literature review as well as the new findings derived from the primary research. These findings will be displayed in the form of a framework to illustrate what physical components within the work environment can influence these perceptions of creativity and collaboration. It should be noted that these perceptions are the perceptions of creative professionals within the creative service providing field who participated in the primary research study. From this study, new questions and opportunities for future research have been discovered; these will also be discussed in this chapter.

7.1 Key Findings From Literature

The key findings from literature that have a strong influence on the perception of both creativity and collaboration within the workplace can be better understood when organized in the following categories; Creativity, Collaboration, and Office Design.

Creativity:

Previous research concretely defines creativity as not only an end result, but also the process of creating itself. When understanding how creativity occurs
within the workplace, both individual and collective creativity can be considered. While individual and collective creativity happen separately, these two types of creativity can happen in an iterative manner. Whether individual or collective, both of these types of creativity occur within the work environment. When integrating physical components that creative professionals perceive to stimulate creativity, the various directions of individual creativity should be understood. The work environment should have versatility so everyday creativity can occur, as well as rare acts of eminent creativity. For example, the work environment may need to accommodate flexibility in the workers’ desks for workers to experience everyday creativity, while eminent creativity could possibly occur in larger spaces for special projects that may not occur everyday, or that have a long development span. Creativity can be inspired by motivation either intrinsically by personal drive and perseverance, or extrinsically through rewards.

**Collaboration:**

Workplace collaboration can be improved when the organizational culture types within the structure of the company are understood. Once these organizational culture types are defined, the most suitable meeting type can be matched to the organizational culture type. From this point, a collaboration space can be implemented to fit within and enhance these work styles. Creativity can also occur in these collaboration spaces. This is important to understand when designing a collaboration space. Components that aid in the perception of creativity can begin to be infused into these collaborative work place environments. For example, tools for communication among workers such as
white boards, or pin up walls, these ‘vertical surfaces’ carry perceptions that make workers feel creative as they collaborate.

**Office Design:**

The design of the office space should not only include components that contribute to creativity, and collaboration, but it should also be a flexible space to cater to the personality types of workers themselves. Both open and private workspaces should be apparent in a workplace design plan to achieve optimum productivity, as well as opportunities for new ideas and work group communication. The integration of both open and private workspaces into the work environment can provide the following:

- buffers for noise distractions
- open views
- Additional natural daylight
- better circulation of air temperature
- freedom for workers to choose their preferred work space

### 7.2 New Findings From Primary Research

The primary research findings add support to the argument that the physical environment is perceived to influence creativity and collaboration, according to the creative professionals involved in the study. Significant findings can be organized into the following categories: Lighting, Ceilings, Wall Space, Views to Co-workers, Acoustics, Quiet Space, Color, and Flexible Furniture.

**Lighting:**

Participants associated the words stale and stifling with poor fluorescent lighting, lack of views to the outdoors, and lack of natural daylight.

Participants were attracted to decorative lighting arrangements grouped together
and hung at different heights. These lighting arrangements were perceived as playful and creative.

Ceilings:

Participants also perceived acoustic ceiling tiles and stamped textured ceilings as stale and stifling. Participants associated the word productivity with exposed ceilings with higher ceilings heights. Participant A3 stated “(I like) high ceiling offices …I feel like I am more productive when I do not feel claustrophobic.”

Wall Space:

For the most preferred types of collaboration spaces, as well as spaces where participants felt the most creative with co-workers, participants expressed the importance of wall space for writing or pinning up ideas for all to see. Participants in the D Group referred to the walls as ‘vertical surfaces,’ at their office. In the work environment, the D Group, are encouraged to pin up and surround themselves with their inspirations and ideas.

Views to Co-workers:

Many participants referenced image #8, the interior environment with the crowded rows of cubicles. Participants stated that because of this enclosed type of environment, the cubicles would feel stifling. Participant D1 stated that, it would be “hard to stay motivated with carbon copies of you everywhere.” If the motivation is not there for a worker to accomplish work, the worker may not have the desire to be creative, or work in groups. Participants desire open views to co-workers, as well as seating that promotes face-to-face meeting space.
Acoustics:

Benefits to the open office environment are high visibility among co-workers and the ability to share ideas quickly. However, interruptions, distractions, and other noise, can interfere with the ability for the workers to focus. Many of the participants who worked in an open office type of setting commented on the acoustic properties of the open space and the sound being too distracting.

Quiet Space:

Participants desired the option of a quiet workspace they could utilize when it became difficult to focus. This option could allow the workers to be able to remove themselves from a busy environment to focus on important and urgent tasks. The image #20 with the bright green ‘bee hive’ looking pods was a popular pick among participants. This image is a good example of how designers could implement a private type of space that could act as a shield from outside noise, as well as portray the feeling of enclosure without actually creating a room with four walls and a door. This quiet workspace should be available for all employees to utilize.

Color:

Many participants were attracted to colorful images because they felt ‘energy’ from them. These participants stated that colors were “fun and made them feel creative.” It is important to note that the colors presented in the images in activities one and two were either highly saturated or somewhat bland. Images that demonstrated highly saturated colors were the images with colorful seating
arrangements, and images with colorful desk spaces, as well as the colorful white board walls. Also, participants gravitated towards a bright green color in more than three of the images presented in activity one. This could be an area for further research that will be discussed later. During the observational portion of the study, it was apparent that some of the companies used color on the walls and floor to organize the layout of the space.

Flexible Furniture:

The participants in B Group and E Group also expressed their preference for flexibility in furniture. The importance of mobile file cabinets, mobility with desk spaces, as well as flexible seating within the meeting spaces were all mentioned by these participants.

This observational and in person study provided many insights on the important physical components that made workers feel more creative and more willing to collaborate with their co-workers.

7.3 Components for Creativity & Collaboration in the Physical Work Environment

The information discovered from this research can be organized into a framework to better illustrate how physical components and certain elements can aid in the perception of creativity and collaboration within the work environment. These components are organized into their respective categories of individual creativity, collective creativity, and collaboration. See Figure 29.
The framework illustrated in Figure 29, shows the construct of the work environment. The social environment plays a large role in the composition of a work environment. Factors of the social environment, such as workplace trust, encouragement, support, motivation, and freedom influence many aspects of the work environment. Individual creativity, collective creativity, and collaboration are shown as three separate
yet overlapping categories. These three categories are strongly influenced by the social environment. Based on the key findings from literature, as well as the common responses from the primary research activities, specific physical components and elements can begin to be associated with each of the three categories. In Figure 29, the components are listed larger in bold, and the elements that contribute to the components are listed below. The physical components and elements are selected based on their perceptions of creativity and collaboration. Moments of overlap are shown in the diagram where the physical components and elements are listed across both squares to depict that some physical components and elements can be applied to more than one of the three categories.

According to the creative professionals in the primary study, collective creativity, which is also influenced by the social environment, is comprised of physical components and elements. These collective creativity components have an influence on collaboration as well as individual creativity. These overlapping physical components and elements consist of:

*Individual and Collective Creativity Overlapping Components and Elements:*

- **adequate space:**
  - work surface space
  - space for personal items
  - space for meetings
- **lighting:**
  - task lighting
  - natural lighting
- **open views:**
  - views to outdoors
  - sun
  - sky
- **color**
  - energetic colors
Collaboration and Collective Creativity Overlapping Components and Elements:

- **vertical work surfaces:**
  - white board / chalk board
  - tackable wall
- **virtual connectivity:**
  - technology
  - meeting space
  - acoustics
- **flexible furniture:**
  - mobile lounge seating
  - adequate work surfaces
  - circular seating to allow for face-to-face communication
- **meeting spaces:**
  - sit-to-stand meeting spaces
  - informal lounge or ‘third place’ spaces
  - variety of sizes
  - available for all workers to use
- **open views:**
  - reduced physical barriers between co-workers
  - views to outdoors
- **lighting:**
  - ambient lighting
  - natural lighting

These are the most common physical components and elements from the primary and secondary research findings that can be tied to perceptions of both individual and collective creativity as well as collaboration. There are also physical components and elements that do not overlap with collective creativity. Such physical components and elements include:

*Individual Creativity Components and Elements:*

- **temperature**
  - access to control settings for comfort
- **closed spaces**
  - rooms with doors
  - work surface with privacy screen
  - space divider / partition
- **personalization of space**
  - personal artifacts
  - individual configuration of work space
- **noise control**
By incorporating each category of these physical components and elements into the
design space-planning phase, the physical work environment will begin to take on traits
that evoke the perception of creativity and collaboration, and perhaps promote and
enhance creativity and collaboration in the work environment.

With the findings from the literature and the completion of the primary research
study, the initial questions can begin to be answered:

- *How do physical environments influence our creativity and ability to collaborate within the workplace?*

Physical environments influence creativity and collaboration through perceived
understandings of specific physical components and elements within the
workplace. It is based on these perceptions that individuals can begin to identify
which components and elements make them feel more creative and more willing
to collaborate. The primary research has demonstrated that individuals, in this
study the creative professionals, perceive physical components, as well as specific
elements, to play a role in the influence of creativity and collaboration within the
workplace. In the study, through the participatory activities, the individuals could
express which components and elements were perceived to obstruct creativity and
collaboration, and which components and elements were perceived to stimulate
creativity and encourage group collaboration. For example, lighting was
identified among the participants as a physical component that connected to creativity and collaboration. However, an element such as fluorescent lighting, was perceived to be stale and stifling, as obstruction to creativity and collaboration. Lighting is merely an example of one physical component that was perceived to affect creativity and collaboration. Other physical components are mentioned in the framework as physical components and elements to stimulate creativity and collaboration within the work environment.

- How do physical environments contribute to our work styles?

Physical environments can be tailored to fit the different ways in which people work. It is important to offer freedom of choice within the physical work environment; this freedom, a social-environmental factor must be established within the workplace for the physical components to be effective in the contribution towards different work styles. The physical environment can contribute to the different work styles through the offering of variety in open and private workspaces, flexible furniture layout, as well as the freedom for workers to personalize their workspace. Participants in the primary research study expressed the desire to be able to move their personal workspace to be closer to their co-workers on specific project teams. This desire stems from their perception that the close proximity to their co-workers on a specific project would allow for ease in team collaboration.

Different types of organizations offering other services may have alternate viewpoints on the ability to move the personal workspace. Also, because many of the creative service providers seemed to have open office layouts, the participants
stressed the importance of having a closed office space available for all workers to use. This closed office would cater to the more introverted work styles, and provide an outlet for workers who need to get away from interruptions or distractions that frequently occur in the open office setting. The freedom to personalize the workspace was also an important way the physical environment contributed to the work styles of creative professionals. These professionals stressed the importance of surrounding themselves with their ideas and inspirations. With personal items always visible, the creative professionals perceived these items to help spur their creativity, as well as promote collaboration among other coworkers. Participants explained that if ideas were visible to all, workers would be more likely to share thoughts and collaborate with one another. This example is limited to the work styles of the creative professionals working in the creative service providing industry.

- The open office floor plan has become the norm, but is this the only way designers should plan a workplace?

While the open office floor plan offers benefits in open sight lines to co-workers, and more accessible communication, the need for private workspaces is still apparent. The primary research has reinforced the need for a place for introverts to work, an outlet for workers to focus under pressure, as well as an alternative to the distractions and interruptions that come with the concept of an open office floor plan. The workers should also have the freedom to utilize these private spaces at anytime.
Can private areas be just as good for fostering creativity?

Some workers prefer to work in a private area, as mentioned above, as this could be more fitting to their personality traits. Also, depending upon the factors of the social environment, workers may feel more comfortable working in private. Research from literature has also shown the importance of private workspaces for generating individual creativity (Cain, 2012). Even in terms of collective creativity, literature explains how collective creativity and individual creativity occur as an iterative process (Drazin et al., 1999). Workers need the opportunity to work privately, undisturbed, to develop new thoughts and ideas. Also, depending upon social-environmental factors, some workers may feel certain pressures, or be self-conscious, when expected to create in an open and exposed environment. The participants’ responses from the primary research has clarified that not only are private areas beneficial for noise and distraction control, but they should be included in all work environments to aid in the production of creativity.

Do surrounding materials within the designed environment such as the floor, wall, and ceiling finishes, even the lighting, have an influence on creativity and collaboration?

Based on the primary research study, it is evident that the surrounding materials within the designed environment contribute to the perceptions of what makes the creative professionals feel more creative and willing to collaborate with others. Specific physical components such as lighting have a strong influence on how creativity and collaboration is perceived within the work environment. The types of lighting consisting of elements of artificial lighting, such as fluorescent
lighting, have negative perceptions toward the ability to affect creativity and collaboration. The types of lighting consisting of elements of natural day lighting or decorative ambient lighting displayed in groupings or at different levels, have more positive perceptions towards the feeling of creativity or willingness to collaborate. Physical components consisting of the ceiling material elements had more negative perceptions from the creative professionals. The participants described acoustic ceiling tiles as stale, stifling, and claustrophobic. While some of the physical components related to the volume of space, such as the ceiling height, was perceived as producing a feeling towards creativity and collaboration, a few participants described the feeling of being productive in their workplace. As for the actual floor and wall finishes, nothing specific was identified. Additionally participants were attracted to the images provided in the study where the walls were used as vertical surfaces to showcase ideas. Participants also perceived components of furniture containing bright colors to be fun, creative, and playful.

7.4 Topics for Future Work

While this study begins to answer questions about which physical components are perceived to stimulate creativity and collaboration within the physical work environment, this is just the surface. This subject area is very broad and is comprised of many potential directions for new knowledge to be discovered. Future research could explore working professionals outside of the creative service providing industry. Research could also continue to explore specific components in further detail. For example, a few
participants from the study mentioned how the high ceiling height made them feel more productive; therefore connections between the ceiling heights and productivity could be explored. Also, the subject of color and its connection to creativity and collaboration holds many opportunities for further research. Many of the popular selected images in activity one contained environments with bright, high-saturated colors. Participants used the word ‘energy’ when speaking of images containing these highly saturated colors. More specifically, a bright green color appeared in these images. Future exploration could be conducted on color ranging from questioning the saturation of color to questioning specific colors themselves. One question is: Do specific colors lead individuals to make perceptions about feeling more creative or willing to collaborate with others? Another possible area for future research is the relationship of the worker’s perception of creativity and collaboration to their current work environment. Is the worker happy with his or her job and work environment? If so, do they perceive the physical components found in their workplace as creative or collaborative? If the worker is unhappy in his or her work environment, does this change their perceptions? These are only a few options for future areas of research.

7.5 Summary

From the findings of both the literature review and the primary research study, it is evident that the physical environment can play a role in fostering creativity and collaboration within the workplace, based on the perceptions of the creative professionals involved in the primary research study. With the demand for an open office environment, and creative and innovation teams, designers and office planners can take on more
responsibility by implementing the necessary components perceived to stimulate this creativity and collaboration within the physical workspace. Because of the overlap of individual creativity, collective creativity, and collaboration within the workplace, physical components from each area should be integrated into the designed work environment. It is also important to understand that perceptions for physical components that stimulate creativity and collaboration within the work environment are influenced by social-environmental factors. While the designer may not have control over the structure of an organization, or their specific social-environmental factors, the designer can plan for physical components and elements to be integrated into the work environment to support the organizational culture type of the specific organization. By following the framework in figure 23, the designer can ensure that physical components and elements are integrated across the categories of individual creativity, collective creativity, and collaboration. The framework serves as a foundation for the designer to build upon. The physical components and elements serve as a guide to point designers in the direction of evoking perceptions of creativity and collaboration while not imposing limits on the designer’s ideas. For example, if a designer needs to create a space that the workers will perceive as collaborative, the framework (figure 23), lists physical components such as lighting, with elements that are inclusive of that component. The component, lighting, includes elements such as ambient lighting and natural lighting. Depending on the organization the designer may be designing for, this element of ambient lighting is open to many creative solutions for the designer to implement. The ambient lighting could be uniquely displayed; it could cast interesting shadows, etc. What is important is that the element of ambient lighting could serve as the foundation for an interesting visual that
will attract the workers to the light source, or area with ambient light, and from there
begin collaboration by sharing thoughts and ideas among fellow co-workers. This is just
one example of how this study can contribute to an enriched understanding of the
relationships between the physicality and materiality of the workplace and perceptions of
creativity and collaboration. With the implementation of these physical components and
elements, the designer can create a foundation to evoke feelings and perceptions of
creativity and collaboration.
Bibliography


Goeller, H. (2012) *Personal Communications.* The Ohio State University, Columbus, OH


Appendix
Appendix A Activity 1 Results

Activity 1: Participant A1

Activity 1: Participant A2
Activity 1: Participant A3

Activity 1: Participant B1
Activity 1: Participant C1

Activity 1: Participant D1
Activity 1: Participant D2

Activity 1: Participant E1
Activity 1: Participant E2

Activity 1: Participant E3
Appendix B Activity 2 Results

Activity 2: Participant A1

Activity 2: Participant A2
Activity 2: Participant A3

Activity 2: Participant B1
Activity 2: Participant C1

Activity 2: Participant D1
Activity 2: Participant D2

Activity 2: Participant E1
Activity 2: Participant E2

Activity 2: Participant E3
Appendix C Activity 3 Results

Activity 3: Participant A1

part 3 1 questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below. Again, remember that you are not being tested and there are no right or wrong answers. All information will be kept confidential.

Name of workplace: Democratic (15 out of 25)
Years of Experience: 6
Gender: Female

Where is your favorite space at your workplace? Why is it your favorite?

3rd Floor of the office. The chairs are comfortable, it's quiet and I can look out the window.

Where is your least favorite space at your workplace? Why is it your least favorite?

The corners on the third floor. They are not comfortable so I never can relax and focus.

If you could change anything about the physical environment in your place of work, what would it be and why?

The view from the windows is poor. They look out onto garages.

Please give an example of a recent challenge or obstacle you faced at your workplace:

People did not have tools done on time.

How did you overcome this challenge?

I talked to the person above the tasks, brought in the owner and came up with a plan of action.

Did you approach this challenge independently or collaboratively?

Collaboratively.

What resources if any, within your workplace did you use to help overcome the challenge?

Communication for days, off, peer pressure.

Would you classify yourself as an Introvert or and Extrovert? (circle one)

Introvert

Thank you for your participation!
Activity 3: Participant A2

part 3 | questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below. Again, remember that you are not being tested and there are no right or wrong answers. All information will be kept confidential.

Name of workplace: ________________
Years of experience: ________________
Gender: ________________

Where is your favorite space at your workplace? Why is it your favorite?
3rd floor meeting room. Cool layout & design. It’s open & inviting.

Where is your least favorite space at your workplace? Why is it your least favorite?
My desk. Unexciting, not a lot going on.

If you could change anything about the physical environment in your place of work, what would it be and why?
Windows that open on 1st floor. More plants.

Please give an example of a recent challenge or obstacle you faced at your workplace:
Developing & implementing systems using PHP or JavaScript programming languages. I’m not too familiar with.

How did you overcome this challenge?
Research on my own, but mostly getting help from others with more experience than me.

Did you approach this challenge independently or collaboratively?
Tried independently at first, but made most progress when working collaboratively.

What resources if any within your workplace did you use to help overcome the challenge?
Other developers, laptop, internet, software.

Would you classify yourself as an introvert or extrovert? (circle one)

Thank you for your participation.

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Activity 3: Participant A3

part 3 1 questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below.

Again, remember that you are not being tested and there are no right or wrong answers.

All information will be kept confidential.

Name of workplace: Diverse

Years of Experience: 7

Gender: Male

Where is your favorite space at your workplace? Why is it your favorite?

Lounge with a couch, chair, & television. It was nice to be able to get out from behind your desk every once in a while & relax/relax or to have the lounge as an informal meeting space.

Where is your least favorite space at your workplace? Why is it your least favorite?

External stairwells; they are loud as anything the ever heard.

If you could change anything about the physical environment in your place of work, what would it be and why?

Probably larger windows; I like plenty of light, everything about our space except that; we that the 1st floor windows do not open.

Please give an example of a recent challenge or obstacle you faced at your workplace:

Being assigned a task in which I didn’t know the solution.

How did you overcome this challenge?

I reached the knowledge of another coworker.

Did you approach this challenge independently or collaboratively?

Initially it was independent, but collaboration helped me to make past some roadblocks.

What resources if any, within your workplace did you use to help overcome the challenge?

Mainly just coworkers’ brain power. But also my computer...

Would you classify yourself as an Introvert or Extrovert? (Circle one)

Thank you for your participation!
Activity 3: Participant B1

Name of work place: NBBJ
Years of Experience: 7 years
Gender: F

1. Lobby- it encourages the informal gathering. The space looks out into the Quarry Lake and we have an immediate access to the patio… and it’s most open (two stories).
2. Small conference room without any windows- it’s cluster phobic… room without view to the outside is awful!
3. I wish that some of our work stations were much more flexible- we can customize it by adding our personal things such as photos, plants, lamps, etc… but having desks we can pick up and move around would be nice.
4. The desk I sit encourages team collaboration. There’s no privacy given I see people next to me and across from me… being productive and getting things done could be of a challenge due to the nature of the set up.
5. Put a headset on and tried to ignore the background noise. J
6. Independent
7. n/a
8. Introvert
Activity 3: Participant C1

part 3 | questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below. Again, remember that you are not being tested and there are no right or wrong answers. All information will be kept confidential.

Name of work place: **MLCK**
Years of Experience: 15
Gender: _M_

Where is your favorite space at your workplace? Why is it your favorite?

**THE FISHBOUL - IT'S OUR BRAINSTORMING SPACE. IT'S OPEN TO THE OUTSIDE WORLD, YET ENCLOSED IN OUR BUILDING.**

Where is your least favorite space at your workplace? Why is it your least favorite?

**THE FORMAL CONFERENCE ROOM, WE CALL IT OUR "BRAND MANIFESTO" ROOM. IT FEELS TO STALE / ECHOY FOR ME. FOR LACK OF A BETTER WORD, TOO FORMAL.**

If you could change anything about the physical environment in your place of work, what would it be and why?

Actually, I wish the space felt more "finished." I feel we let the architecture speak to loudly and haven't designed the interiors fully.

Please give an example of a recent challenge or obstacle you faced at your workplace:

**FOR A RECENT PRESENTATION, WE WERE FACED WITH THE CHALLENGE OF SHOWING OUR WORK ON 50 PIECES OF BLACK-MOUNT BOARD. NO ONE LIKED THE IDEA OF USING SO MANY RESOURCES FOR ONE PROJECT. MAINLY BECAUSE WE WANTED TO PRESENT IN OUR SOFT SITTING AREA, SO WE CLEAROUT THE FORMAL CONFERENCE ROOM, MOVED IN ALL SOFT SITTING AND WERE ABLE TO PRESENT ON OUR TV. AND KNEW A TREE WAS WASTED.**

Did you approach this challenge independently or collaborative?

We thought it through together as team.

What resources if any, within your workplace did you use to help overcome the challenge?

(See above)

Would you classify yourself as an Introvert or an Extrovert? (circle one)

Thank you for your participation!
Activity 3: Participant D1

part 3 I questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below. Again, remember that you are not being tested and there are no right or wrong answers. All information will be kept confidential.

Name of work place: LEKTANT
Years of Experience: 3Y (LEXTANT = 8 MO)
Gender: E

Where is your favorite space at your workplace? Why is it your favorite?
KITCHEN. OPEN, ACCESSIBLE, HAS BIG WINDOWS, GOOD LIGHTING.

Where is your least favorite space at your workplace? Why is it your least favorite?
PODS. NO WINDOWS, YOU CAN'T REALLY SEE WHAT IS GOING ON AROUND YOU.

If you could change anything about the physical environment in your place of work, what would it be and why?
MORE NATURAL LIGHT, MORE WAYS OF SEEING THE REST OF THE SPACE.

Please give an example of a recent challenge or obstacle you faced at your workplace: LEARNING NEW METHODS/GOALS

How did you overcome this challenge?
WITH THE HELP OF TEAM MATES, OR OTHER PEOPLE.
FOCUSING ON MY WORK.

Did you approach this challenge independently or collaboratively?

What resources if any, within your workplace did you use to help overcome the challenge?
MEETING ROOMS. THE POD IS NOT PERFECT BUT IT HAS ENOUGH SPACE TO GATHER PEOPLE.

Would you classify yourself as an Introvert or Extrovert? (circle one)

Thank you for your participation!
Activity 3: Participant D2

part 3 I questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below. Again, remember that you are not being tested and there are no right or wrong answers. All information will be kept confidential.

Name of work place: **LEXANT**
Years of Experience: **2 YEARS**
Gender: **FEMALE**

Where is your favorite space at your workplace? Why is it your favorite?

MY DESK! IT’S MY SPACE & I MADE IT THAT WAY.

Where is your least favorite space at your workplace? Why is it your least favorite?

ANY ROUND SMALL TABLE, HARD TO SIT AT.

If you could change anything about the physical environment in your place of work, what would it be and why?

MORE SMALL PODS! MORE WALL SPACE TO HANG UP STUFF

Please give an example of a recent challenge or obstacle you faced at your workplace:

MY ROUND TABLE

How did you overcome this challenge?

MOVED

Did you approach this challenge independently or collaboratively?

What resources if any, within your workplace did you use to help overcome the challenge?

Would you classify yourself as an Introvert or Extrovert? (Circle one)

**BOTH**

Thank you for your participation!
part 3 | questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below. Again, remember that you are not being tested and there are no right or wrong answers. All information will be kept confidential.

Name of work place: HA ARCHITECTS - GRANDVIEW YARD

Years of Experience: 13

Gender: M

Where is your favorite space at your workplace? Why is it your favorite?

MY DESK. IT'S OPEN AND I CAN TALK TO EVERYONE.

Where is your least favorite space at your workplace? Why is it your least favorite?

THE CAFÉ'S KITCHEN BECAUSE IT'S ALWAYS DIRTY / MESSEY

If you could change anything about the physical environment in your place of work, what would it be and why?

I WISH WE HAD A TERRACE / DECK... OUTSIDE AREA. NEED TO BE IN THE OPEN AIR/SUN SOMETIMES.

Please give an example of a recent challenge or obstacle you faced at your workplace:

BAD ENSMS BEING OVERLY VALUE-ENGINEERING.

How did you overcome this challenge?

I DID WHAT I WAS TOLD. "SHHH..."

Did you approach this challenge independently or collaboratively?

BOTH. NORMALLY TOUGH.

What resources if any, within your workplace did you use to help overcome the challenge?

PEOPLE, AND THE POSITIVE ATMOSPHERE THEY CREATE.

Would you classify yourself as an Introvert or an Extrovert? (circle one)

I MAKE A GREAT FAKE EXTROVERT THOUGH.

Thank you for your participation!

YUP.
Activity 3: Participant E2

part 3 | questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below. Again, remember that you are not being tested and there are no right or wrong answers. All information will be kept confidential.

Name of workplace:
Years of Experience:
Gender:

Where is your favorite space at your workplace? Why is it your favorite?

Where is your least favorite space at your workplace? Why is it your least favorite?

If you could change anything about the physical environment in your place of work, what would it be and why?

Please give an example of a recent challenge or obstacle you faced at your workplace:

How did you overcome this challenge?

Did you approach this challenge independently or collaboratively?

What resources if any, within your workplace did you use to help overcome the challenge?

Would you classify yourself as an Introvert or Extrovert? (circle one)

Thank you for your participation.
Activity 3: Participant E3

part 3 | questionnaire

Thank you for participating in parts 1 & 2 of this research study. Please fill out the short questionnaire below. Again, remember that you are not being tested and there are no right or wrong answers. All information will be kept confidential.

Name of work place: M+A ARCHITECTS
Years of Experience: 12
Gender: M

Where is your favorite space at your workplace? Why is it your favorite?

DESIGN CENTER, IT’S WHERE I FEEL MOST CREATIVE, OPEN TO IDEAS

Where is your least favorite space at your workplace? Why is it your least favorite?

PRINT ROOM, NOT A FRIEND OF PRINTERS & PRINTERS

If you could change anything about the physical environment in your place of work, what would it be and why?

A LITTLE MORE SHARING IN MY AREA FOR INSPIRATIONAL ARCHITECTURAL BOOKS

Please give an example of a recent challenge or obstacle you faced at your workplace: CURRENT WORKLOAD

How did you overcome this challenge?

WENT Direct TO PARTNER

Did you approach this challenge independently or collaboratively?

COLLABORATIVE

What resources, if any, within your workplace did you use to help overcome the challenge?

COLLABORATIVE

Would you classify yourself as an introvert or extrovert (circle one)

Thank you for your participation!
Appendix D Activity 4 Results

Activity 4: A Group

part 4 I observation

Roughly how many employees work in this space?

25 - 26

Is there a dress code? What are people wearing?

NO - casual -- SOME business attire

Do people personalize their personal work spaces?

YES

Does each worker have a personal workspace?

YES

What does it feel and look like when you first arrive into the space?

comfortable - QUIET

Do certain areas of the space seem to have more focus and attention paid to them?

SOME, but no "welcome area/ reception desk"

What is the circulation/flow within the space?

kind of clumpy - levels 1 & 2 are connected, but third floor is separate

What is the natural daylight like?

West & north ends of building have windows

What is the artificial lighting like?

track lighting - halogen - directional

What kind of elements make up the floor plan?

Rock wall, bar, spiral stair, kitchen, desks, open area on 3rd floor (no mag or

QUAN office - no private offices

Is the space consistent in each and every area?

YES, for the most part.

What types of gathering spaces, if any, does the space offer?

SOO FLOW, BUT NO REAL SPACES FOR THIS

How are people communicating/meeting?

standing over desks - 3rd - not good

Are there any items that seem out of place? If so, why?

a counter on floor 1 / extra from customers

Are there any items within the space that surprise me?

roll bar

Do people seem happy?

YES

Does the environment feel tense?

NO

Do people seem comfortable and relaxed?

YES, mostly

Do people seem stressed?

NO, not too much stress

Does the air quality feel fresh?

YES, open duct work, good circulation
Activity 4: B Group

part 4 I observation

Roughly how many employees work in this space?

Is there a dress code? What are people wearing?

Do people personalize their personal work spaces?

Does each worker have a personal workspace?

What does it feel like when you first arrive into the space?

Do certain areas of the space seem to have more focus and attention paid to them?

What is the circulation / flow within the space?

What is the natural daylighting like?

What is the artificial lighting like?

What kinds of elements make up the floor plan?

Would this office space be classified under "open offices," "private offices," or in between?

Is the space consistent in each and every area?

How are people communicating / meeting?

Are there any items that seem out of place? If so, why?

Are there any items within the space that surprise me?

Do people seem happy?

Does the environment feel tense?

Do people seem comfortable and relaxed?

Do people seem stressed?

Does the air quality feel fresh?

Every Thursday spicy "red hot" food truck comes, Pilates Mon-Thurs & Gym.
Activity 4: C Group

**Part 4 Observation**

Roughly how many employees work in this space?

7 + interns + flexible w/ schedules.

Is there a dress code? What are people wearing?

No - casual -

Do people personalize their personal work spaces?

Yes - freedom to put whatever you want up around you

Does each worker have a personal workspace?

Yes

What does it feel and look like when you first arrive into the space?

Interesting, feels creative, but relaxed, a comfortable, homey feel.

Do certain areas of space seem to receive more focus and attention paid to them?

Yes, some areas were unfinished awkward looking spaces.

What is the circulation / flow within the space?

A little chaotic, big multi-levels, but very open, not dead space.

What is the natural daylighting like?

Lots of open, interesting sight lines with large pieces of glazing.

What is the artificial lighting like?

Cling - some fluorescent

What kinds of elements make up the floor plan?

Varied in use, spaces, formal / informal - this is unique

Would this office space be classified under "open office," "private office," or "in between?"

In between - lots of good sight lines to co-workers, the int.

Is the space consistent in each and every area?

Yes, but John said "the architecture is complete, but freelays..."

What types of gathering spaces, if any, does the space offer?

Meeting space as "window display" - intensity was not sure if this space was used, but it is a meeting space...

How are people communicating / meeting?

Shared office - at the table 3 out of 7

Are there any items that seem out of place? If so, why?

No

Are there any items within the space that surprise me?

Yes

Do people seem happy?

Yes

Does the environment feel tense?

Not at all

Do people seem comfortable and relaxed?

Yes

Do people seem stressed?

Yes

Does the air quality feel fresh?

Yes
Activity 4: D Group

part 4 | observation

Roughly how many employees work in this space?

42 + 2 interns.

Is there a dress code? What are people wearing?

Casual, trendy → style → Trans - nice.

Do people personalize their personal workspaces?

Some, what. But nothing seemed over the top.

Does each worker have a personal workspace?

Some workers have more permanence w/ their desks. Others move a lot.

What does it feel and look like when you first arrive into the space?

Open, quiet. Very Separated from work areas. "Fish bowl" up front.

Do certain areas of the space seem to have more focus and attention paid to them?

No, although the space is split up, every area is thought of.

Still, split up even though on one floor.

What is the circulation / flow within the space?

What is the natural daylighting like?

Main large windows main entry.

What is the artificial lighting like?

Fluorescent.

What kinds of surfaces make up the floor plan?

Open.

Would this office space be classified under "open office," "private office," or in between?

More private office. BIG things are compartmentalized.

Is the space consistent in each and every area?

Yes, some what.

What types of gathering spaces, if any, does the space offer?

Main, utilized the back and large area.

How are people communicating / meeting?

Staring by each others offices to communicate.

Are there any items that seem out of place? If so, why?

I don't think there is anything to mention.

Are there any items within the space that surprise me?

Not really.

Do people seem happy?

Yes - very.

Does the environment feel tense?

Not really.

Do people seem comfortable and relaxed?

Yes.

Do people seem stressed?


Does the air quality feel fresher?

Not sure - window cannot be opened.
Activity 4: E Group

part 4 | observation

Roughly how many employees work in this space?

**45**

Is there a dress code? What are people wearing?

**NOT REALLY — "DOES FOR YOUR DAY"**

Do people personalize their personal workspace?

**SURE WHAT — BUT STILL FEELS CORPORATE**

Does each worker have a personal workspace?

**YES**

What does it feel and look like when you first arrive into the space?

**VERY NICE — "DESIGNED FOR CLIENTELE" BUT YOU CAN STILL SEE WORKERS.**

Do certain areas of the space seem to have more focus and attention paid to them?

**NO — PRETTY EVENLY DISTRIBUTED WITH BREAK/IMAGE.**

What is the circulation/flow within the space?

**OPEN, BUT CAFE AREA IS NOT VISIBLE TO WORKERS.**

What is the natural daylighting like?

**ABUNDANCE — VERY GOOD LIGHTING / DAY LIGHTING**

What is the artificial lighting like?

**FLUORESCENT — BUT DIMS WHEN NATURAL LIGHT OUTPUT IS HIGH.**

What kinds of elements make up the floor plan?

**A GOOD MIX OF OPEN / PRIVATE SPACES — CAFE IS OPEN BUT IN BETWEEN LEADERSHIP / DIALOGUE OPEN.**

Would this office space be classified under "open office," "private office," or inbetween?

**IN BETWEEN. LEADERSHIP / DIALOGUE OPEN.**

Is the space consistent in each and every area?

**YES — NICE OR DESIGNED.**

What types of gathering spaces, if any, does the space offer?

**PRIVATE KISSES SPACE, BUT NO REAL ‘LARGE’ SPACE.**

How are people communicating/meeting?

**DO NOT SEE MUCH FACE TO FACE TIME — AV PIPES.**

Are there any items that seem out of place? If so, why?

**NO**

Are there any items within the space that surprise me?

**NOT REALLY**

Do people seem happy?

**YES**

Does the environment feel tense?

**NOT REALLY**

Do people seem comfortable and relaxed?

**YES**

Do people seem stressed?

**BUSY — VERY BUSY**

Does the air quality feel fresh?

**YES**