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## Transparency: The Unspoken Design Element – How Levels of Visibility Affect Adult Learning and Sharing

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TRANSPARENCY: THE UNSPOKEN DESIGN ELEMENT-  
HOW LEVELS OF VISIBILITY AFFECT ADULT LEARNING AND SHARING

by

Erica M. Bartels

A THESIS

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

Major: Architecture  
Under the Supervision of Professor Mark Hinchman  
Lincoln, Nebraska

May 2013

TRANSPARENCY: THE UNSPOKEN DESIGN ELEMENT-  
HOW LEVELS OF VISIBILITY AFFECT ADULT LEARNING AND SHARING

Erica M. Bartels, M.S.

University of Nebraska, 2013

Advisor: Mark Hinchman

Adult learning and sharing environments, specifically high school, college, and workplace facilities, maintain a similar purpose in terms of meeting the needs of the institution and its users. For each of these three project types, the design team develops a plan for users that are capable of social, cognitive maturity while engaging in the creation of new knowledge or ideas. With abundant discussion available on the design variations of these spaces, such as open vs. closed delineations; individual and group work; online or unplugged, it is necessary to dig deeper into the environmental psychology at play amidst the built environment provides. The focus of this study is the element of transparency and the notion that high levels of visibility have a profound effect on the productivity and creativity of users in adult learning and sharing environments. Furthermore, planning with visibility in mind influences many design decisions and acts as a quiet linchpin in the fruition of a space. By evaluating the physical attributes of transparent spaces, particularly spatial and material compositions, and studying their users, the research aim is to discover the resulting behavioral contexts and to gather information for practical application in the design field.

## ACKNOWLEDGEMENTS

Thank you, all of the faculty, staff, and fellow students within the University of Nebraska's College of Architecture and Interior Design Program. I am grateful to have been a part of such an outstanding collection of individuals during my time as a graduate student. Specifically, I have Mark Hinchman, my advisor, to thank for his time and words of advice along with Betsy Gabb, Lindsey Bahe, and Christine Kenline who served as committee members.

To Heifer International, University of Arkansas-Little Rock, and the High Tech High organization, thank you for contributing to my research by allowing access into your facilities and releasing floor plans for reference.

I would also like to thank my family and friends that have been a source of support during graduate school. To my mother for traveling with me to San Diego for research, Tommy for giving her up for a week, and my father and Leesa for helping with the kids- you helped us more than you know. And Steve, my biggest encourager, thank you for being a fellow adventurer, ready for anything, on this journey together. Thank you, Lord, for two precious angels whose smiling faces and laughter make everything worthwhile.

## DEDICATION

To Hayden and Shelby

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## INTRODUCTION

The built environment plays a large role in the everyday life of humans as we live, learn, work, shop and play in and around man-made structures. Coupling knowledge with various life experiences, the human mind is unique and complex. Research findings of environmental psychologists suggest that adults are continually affected by the tangible and intangible elements within their surroundings. Architects and interior designers can consider several factors of the human-environment relationship in the development of interior space. For example, a wall functions to delineate space and has a visible, often hard-working surface, but how does this architectural structure relate to sightlines, supervision, or collaboration? Furthermore, in what ways do users react and how do habits develop in these planned spaces?

In this study, the design element, transparency, is examined within three case study locations: a high school, a university campus, and a workplace facility. One commonality among the groups is the notion that each location serves to foster learning and sharing between adults in collaborative as well as individual work settings. However, current research tends to focus on user outcomes within each building type separately and does not often examine the similarities between the type of activity happening within secondary education, post-secondary education, and the workplace. Moreover, the omission of connections amongst users of learning and working environments may submerge an opportunity for correlational findings that could produce telling implications regarding the design of such environments.

Here, transparency acts as a means to join a hefty sum of research findings regarding learning and working environments. For example, there is a substantial body of knowledge generated in the design/behavior research stream identifying connections between the physical work environment and worker outcomes (Cohen 2007, 291). Simultaneously, learning pedagogies are continually changing to meet technological advances and studies on collaborative learning. While some research groups argue for the importance of individual space and the need for creative confidence, others relish in revealing the power of group work and flexible, more nomadic spaces. Perhaps, however, users of learning and working environments are each affected by an underlying mechanism in which levels of visibility trigger a response and reaction to their interior space (Fig. A). The intent of this research is to investigate the use of transparency, how it relates to any social/psychological response of the user, and if productivity and creativity can be enhanced with high levels of visibility. Additionally, acoustical privacy, or lack thereof, works in accordance with visual privacy and openness. As a result, the findings provide design professionals with another dimension to consider during the development of learning and working environments. While it is an American story, the information gained might have implication across the globe.

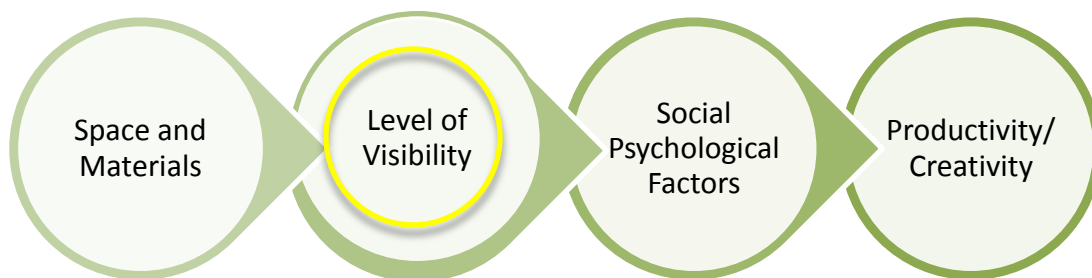


Figure A. Evolution of Design Decisions to Outcome with Respect to Transparency  
Source: Author's own image.

## **PROBLEM STATEMENT AND RESEARCH QUESTIONS**

In today's Knowledge Age, the emphasis on "human capital" is evident. Corporations, small businesses, and educational institutions alike realize the value of maintaining the production of innovative ideas that can be put to work to address specific problems or goals. The people that define a group behold the process of creating and producing new ideas and methods. For the design of learning and sharing environments, it is pertinent to consider the connection between the ever-evolving knowledge engine of adult participants in high school, college, and workplace facilities (Fig. B). Each built environment is designed to empower, train, and cultivate creative and productive people.

Secondary education consists of maturing teenagers who are transitioning from minor status toward considering career choices. In fact, many innovative high school programs claim the establishment of a workplace feel throughout the facilities. Specifically, some academic programs incorporate into their curriculum more freedom for students to explore and learn at an individual pace. Post-secondary education is home to young adults with newly gained freedom and direct control over their career-path and future. Lastly, adult learning does not halt in the workplace as continuing education and collaboration with colleagues remain strong elements in the cycle of knowledge creation.

How, then, can interior design impact production and even transform the ways in which students and colleagues work? While there are many factors to consider, this research zeroes in on the built environment's effect on user privacy, sense of control, interest in exploration of the space, feelings of comfort, and collaboration with others.

Specifically, the element of transparency is the lens with which the researcher filters the aforementioned user outcomes in this examination.

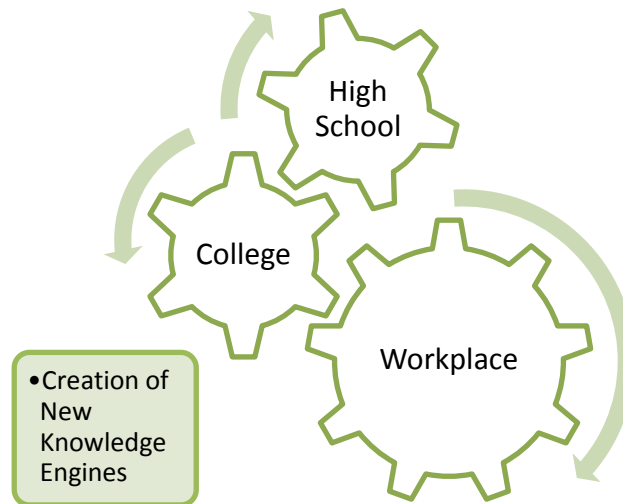


Figure B. Relationship between three learning and sharing environments.  
Source: Author's own image.

This study focuses on three control features:

- Who- Adults; users with similar cognitive and social capabilities due to age
- Why- Learn new skills and information; use skills and information to complete a task, generate ideas, adapt knowledge gained from experience to aid current task; continue education; collaborate with others; represent oneself and contribute to overall mission
- Where- Primarily commercially-designed spaces for individual and group work using a hybrid of virtual and face-to-face interactions

The variable feature has to do with “How” the space is used which ultimately affects the “Where” or overall design and specific elements within the space. From this, levels of

visibility in transparent spaces will be explored to find out what effect they might have on users and their ability to function within their environment.

There are two hypotheses for the research:

- A. The notion that there is power behind being able to see and contribute, if desired, in the happenings of others and the group at large. This generates a sense of trust and freedom in which people, as social beings, navigate toward, are more satisfied with their environment, and feel more productive and creative.
- B. The culture of an institution or group is a driving force behind what is displayed in the built environment and what is expected and accepted. When transparency and openness is celebrated, the users thrive.

The following research questions will drive the investigation at three case study locations:

1. How are space and materials used to create and disseminate visibility?
2. How does visibility relate to the social/ psychological aspects of privacy, trust, and the overall culture within a space?
3. How do the differing levels of transparency ultimately affect learning and sharing?

## CHAPTER I- LITERATURE REVIEW

### DEFINING TRANSPARENCY

*“‘Transparency,’ ‘space-time,’ ‘simultaneity,’ ‘superimposition,’ ‘ambivalence’:  
in the literature of contemporary architecture these words, and others like them, are  
often used as synonyms. We are familiar with their use and rarely seek to analyze their  
application.”* - Colin Rowe and Robert Slutzky in *Perspecta* by the Yale School of  
Architecture<sup>1</sup>

Defining transparency, the state or quality of being *transparent*, is a two-fold process. As a material condition, transparent qualities include admitting the passage of light and that which is easily seen through. As a result, transparency is also defined as easily recognized, which Rowe and Slutzky call and “intellectual imperative- our inherent demand for that which should be easily detected, perfectly evident, and free of dissimulation.”<sup>2</sup> The two definitions are often referred to as literal vs. phenomenal transparency.

The physical qualities of a transparent material, such as glass, can produce welcomed compositional ambiguity within a space. Where solid forms stop the movement of the eye for focus on the object itself, transparent materials call for a continuation of interpretation to objects beyond its division. This layering, or overlapping of planes, gives the interpreter the sense of more than optical transparency, but according to Rowe and Slutzky, a broader spatial order.

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<sup>1</sup> Colin Rowe and Robert Slutzky, “Transparency: Literal and Phenomenal,” *Perspecta* by Yale School of Architecture 8 (1963): 45.

<sup>2</sup> Ibid.

The authors compare the use of transparency at Le Corbusier's Villa Stein at Garches with Walter Gropius' Bauhaus (Figs. 1.0 and 1.1).

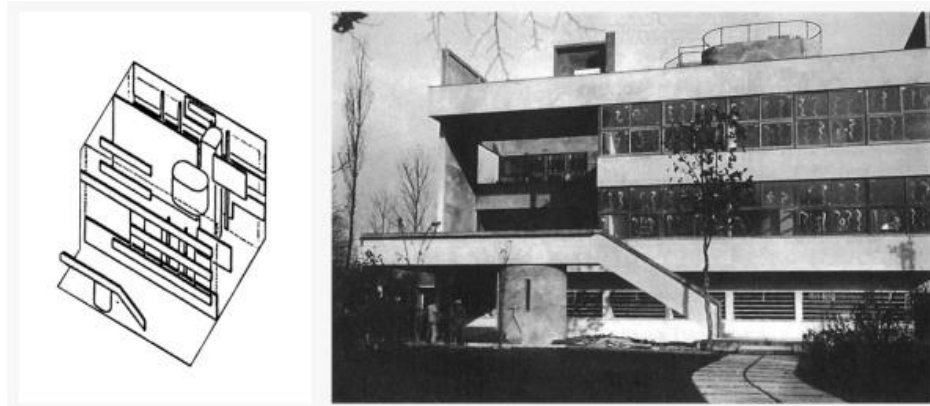


Figure 1.0 Axonometric and front exterior photograph portraying a layering of planes at Villa Stein at Garches, Le Corbusier. Source: Rowe and Slutzky, 1963.



Figure 1.1. Exterior photograph at Bauhaus building with glass fascade, Walter Gropius. Source: [www.archrecord.com](http://www.archrecord.com)

At Garches, Le Corbusier designed the left terrace area of the building as a series of planes that invite the viewer to look beyond the frontal layer and further into the interior space. The panels of glass Gropius used on the exterior of the Bauhaus building are an example of transparent materials creating a curtain wall effect, seemingly hanging from the fascia (Rowe and Slutzky 1963, 50). The interpenetration of planes to one



another, displayed at Garches, and the flow between interior and exterior space, are key elements to the creation of the transparency.

Similarly, architect Frank Lloyd Wright, employed the use of transparency to generate movement throughout his designs. For example, he described his Usonian house type (Figs.1.2 and 1.3) as “a modest, dwelling place that has no feeling at all for the ‘grand’ except as the house extends itself in the flat parallel to the ground, a companion to the horizon, loving the ground with the new sense of space, light and freedom” (Wright, 1957). Inside, Wright praised the feeling of openness in his works. In his explanation of the interior of the Solomon R. Guggenheim Museum in New York City, he claimed “an atmosphere of the unbroken wave- no meeting the eye with angular or abrupt changes of form” (Wright, 1957).



Figure 1.2. Rosenbaum House, Florence, Alabama, Frank Lloyd Wright (1939).  
Source: [www.archrecord.com](http://www.archrecord.com)

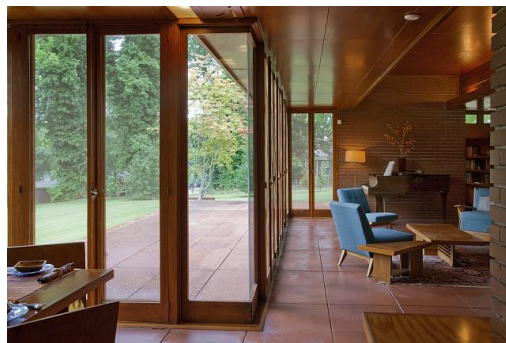


Figure 1.3. Interior photograph, Rosenbaum House, Florence, Alabama, Frank Lloyd Wright (1939). Source: [www.archrecord.com](http://www.archrecord.com)

In mid-twentieth century commercial architecture the “curtain wall” became a frequently-applied exterior feature that quickly made its way into various project types. In 1955 Eero Saarinen designed the Kresge Auditorium on the Massachusetts Institute of Technology campus in Cambridge. (Figs. 1.4 and 1.5)

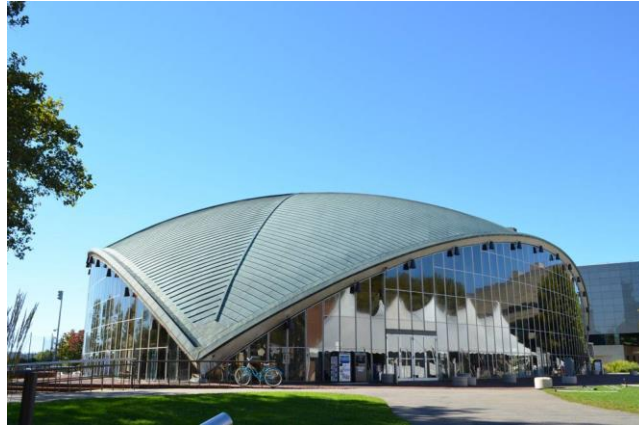


Figure 1.4. Exterior Photograph of Kresge Auditorium, MIT, Eero Saarinen (1955).  
Source: [www.monolithic.com](http://www.monolithic.com)



Figure 1.5. Interior Photograph of Kresge Auditorium, MIT, Eero Saarinen (1955).  
Source: [www.monolithic.com](http://www.monolithic.com)

While many curtain wall applications were composed of reflective surfaces on the exterior, the passage of light and view to the outside was a noticeable enhancement on the interior environment. This use of glass and steel which derived from the modern era

opened the door to new discoveries of the human-environment relationship.

Transparency plays a major role in the composition of a contemporary building from the way in which the exterior materials communicate with interior space to how the environment directs the user while inside. Vertical planes and the containment or segmentation of space are stakeholders in the creation of an architectural experience. Thoughtful consideration on not only the materials which will make up these planes, but the relationship between foreground, background and horizontal surfaces can impact how a person encounters and seeks to explore.

Going forward in this study, it is important to consider how humans learn and share. Privacy, the quality or state of being apart from company or observation<sup>3</sup>, relates directly to visibility and affects a person's feelings of freedom or control over his or her environment. Examining research findings on the ways in which humans interact as inherently social beings can provide insight as to how the element of transparency might be implemented into school and workplace design.

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<sup>3</sup> Encyclopaedia Britannica Online, s.v. "Privacy," <http://www.merriam-webster.com/dictionary/privacy> (accessed March 3, 2013).

## HOW PEOPLE LEARN AND SHARE

“Humans are viewed as goal-directed agents who actively seek information” (Bransford, et. al., 2000). The brain is a complex instrument that has been studied for centuries, dating back to the latter part of the nineteenth century when scientific methods were applied to gain information about the human mind. Until then, philosophy and theology were the driving forces behind the investigation. Today, speculation becomes science as cognitive scientists merge learning research with the disciplines of anthropology, linguistics, developmental psychology, computer science, neuroscience, philosophy, and several branches of psychology for a multidisciplinary perspective on learning (Bransford, 2000).

Cognitive science research reveals the importance of learning with understanding and the ability to transfer information and apply it to other contexts (Bransford, 2000). To this, findings support the notion that people come to learning with pre-existing knowledge- skills, beliefs, concepts- that affects what they notice about the environment and how they organize and interpret it (Bransford, 2000).

The ways in which learners share with others and seize opportunities to collaborate are tied to social nature and the use of one’s environment. Research suggests an individual needs a sense of comfort and confidence in order to achieve a goal. A person’s surroundings and territory can enable or prohibit him or her in taking control of collaboration with others. In fact, some scholars look at environmental features that relate human prehistoric past to simplistic needs and wants of present-day workers. If “a major

goal of schooling is to prepare students for flexible adaptation to new problems and settings” (Bransford, 2000), it is necessary to consider ways in which our ancestors functioned in the midst of continuous reaction to change.

Moving from the natural world, humans surrendered to a nomadic lifestyle and began living in a world constructed by fellow humans in which they started practicing environmental modification (Kopec, 2006). During this continual process, people altered their surroundings to better suit their present needs. According to author and environmental psychologist, Dak Kopec, examples include “the infill of wetlands, irrigation to make dry land yield crops, and the creation of lakes by damming rivers.” Human intervention, however, does not come without consequence, and the effect of people on the environment and the environment on people remains strong. With the assistance of modern technologies, opportunities for change abound, leaving the present-day species with questions such as, “What is best for us? What should we surround ourselves with?” These decisions greatly impact what architectural structures are born or revised and how they are used.

At the core, human beings are social and often carry a strong preference for natural environments. Each year, sunny, coastal regions receive thousands of visitors who marvel at the collision of land and sea. Similar affection is steadily given to mountainous settings, canyons, and other natural wonders. Interested in how these preferences could be applied to the modern office space, Tim Syfert and Jay Brand wrote an article published by furniture manufacturer, Haworth. In it, the authors examine several features from the savannah, such as human preference for dappled light. They

suggest high-level canopy lighting and that a combination of indirect and direct fixtures produce light and dark areas similar to the setting prehistoric humans experienced when they sat under trees (Syfert and Brand 2001, 2). In the same way, natural light and corresponding patterns change during the course of the day (Syfert and Brand 2001, 2). For this reason, natural settings add to a sense of mystery and engage a person in exploration. Additionally, the need for socialization as well as a place for privacy to the modern individual are defined as areas of “refuge” (seeking shelter) and “prospect” (hunting) in the article. These areas, the authors suggest, supplied comfort and support to early ancestors and therefore remain important today. Because humans have a deep connection to their habitat, the ability to share with others is visible in the examination of how the built environment is intertwined with user interaction.

## ENVIRONMENTAL PSYCHOLOGY AND THE BUILT ENVIRONMENT

*“First we shape our buildings, then our buildings shape us.” - Winston Churchill*

Unlike our ancestors who spent the majority of their time outdoors, the average person today spends more than eighty percent of a day indoors (Syfert and Brand 2001, 2). Environmental psychology for design focuses on the “psychosocial responses to the human condition in relation to the built environment” (Kopec, 2006). The correlation of user outcomes to physical structures has received increasing awareness among designers and architects, as environment and behavior criteria are performance measures used by the Council for Interior Design Accreditation (CIDA) board, the National Architectural Accrediting Board (NAAB), and the U.S. Green Building Council (USGBC) (Kopec, 2006).

Kopec bases his research on the human-environment relationship on four major theories (Kopec, 2006): integration, stimulation, control, and behavior-setting. The following descriptions highlight the theory behind each factor:

- **Integration (Integral) Theory**- Isidor Chein’s integral framework described five elements that work in harmony to facilitate a particular behavior:
  1. *Global environment*. Generalized characteristics of an environment.
  2. *Instigators*. Stimuli which trigger particular behaviors.
  3. *Goal objects and noxients*. Situations which cause satisfaction or produce unpleasantness.
  4. *Supports and constraints*. Environmental aspects that facilitate or restrict.

5. *Directors*. Features that tell us where to go and what to do.

- **Stimulation Theory**- Everything responds to sensory stimulation. This theory serves to explain the environment as a source of sensory information derived from sight, touch, taste, sound, and smell (Wohlwill, 1966). One important concept is the notion of threshold which suggests that each of the five senses can be overstimulated or understimulated and as a result, other factors in the setting should compensate. Other key points include:
  1. *Weber Fechner Law*- Concept that states people become accustomed to a level of stimuli and will need a greater intensity of that stimulus in order to notice a change (Kopec, 2006). This law suggests that designers can direct attention, through the use of material, color, or layout, to certain features or objects as the program requires.
  2. *Arousal perspective*- Suggests that the environment itself causes an automatic physiological response such as an increased heart rate, blood pressure, respiration, adrenaline secretion, and neural activity within the brain. However, environmental psychologists address the fact that “design cannot affect arousal directly but it can serve to modify stimulation levels that affect arousal (Kopec, 2006).”
  3. *Adaptation level theory*- States that a component or variable within an environment will have a reduced influence when a person becomes accustomed to its presence. This theory suggests that a person might, in



time, adapt to a different way of thinking and eventually change his or her thoughts due to exposure (Kopec, 2006).

4. *Attention restoration theory*- Developed by Rachel and Stephen Kaplan, this theory centers on concepts of voluntary and involuntary attention. Situations requiring mental effort cause us to engage in “directed attention”, which is voluntary, intention or goal-based attention (Kopec, 2006). When one is not able to maintain this level of focused attention, “attention deficit” comes into play in which the person needs more time to finish the activity, or needs to recover. Recovery involves “effortless attention” of which Kaplan describes as interest-based attention, such as a walk along the beach. These “restorative experiences” that are truly effortless, and do not require a person to navigate through a crowd, for example, hinge on the attention restoration theory through the idea of “functioning primarily in involuntary mode” by observing or surrounding oneself with stimuli that are involuntary interesting (Kopec, 2006).

- **Control Theory**- The notion that it is crucial to a person’s well-being to have a sense of control over his world and his place in the world. James Averil suggested that there are three types of control (Kopec, 2006):

1. *Behavioral control*. The ability to change the environmental event/setting.
2. *Cognitive control*. The ability to change the way in which we think of an environment.
3. *Decisional control*. The ability to choose a response.

Kopec summarizes, “personal control within an environment relates to both our freedom of action and the level and type of stimulation to which we are subjected; moreover, our actual or perceived influence or control over our environment directly affects our feelings within and about it.” Psychological reactance is a term used to describe a person trying to reassert control over the environment of setting when he feels his freedom is constrained. At the end of this spectrum, environmental psychologists suggest “learned helplessness” can occur when a person believes he cannot control his setting, perhaps after many failed attempts (Kopec, 2006).

- **Behavior-Setting Theory-** Developed by Roger Barker (1968), this theory states that public places or occasions evoke particular patterns of behavior, those of which must be studied in their natural context (Kopec, 2006). Furthermore, Dak Kopec describes this process as “small-scale social systems composed of people and physical objects arranged in such a way as to carry out routine actions within a specified time and place.” Barker suggests most behavior settings are public environments that contain the following three components:

1. Physical properties
2. Social components
3. Environmental settings

An important concept, known as *architectural determinism*, can occur when, for example, only the design is considered, leaving out social components or the environmental setting (Kopec, 2006). For example, if a person states his or her

preference for one church facility over another, it would be deductive to assume the architectural design is the primary influence when many additional components, such as religious denomination, proximity to one's residence, or number of friendships, could also affect his or her decision. For this reason, architectural determinism is described as "a direct and absolute relationship between the designed environment and a particular behavior" (Bell et al., 2001). However, more generally accepted is the notion that design components of an overall environment serve as learned-behavior cues according to Barker's behavior-setting theory (Kopec, 2006).

To better comprehend how individuals perceive their environments, researchers have attempted to explain the human-environment relationship from various perspectives (Kopec, 2006). Stephen and Rachel Kaplan's **Preference Framework** is based on the idea that people prefer scenes that are "engaging and involving rather than simple or boring" (Kopec, 2006). According to this framework, environmental preferences are organized into the following elements:

- 1) Coherence (making sense)
- 2) Legibility (the promise of making sense)
- 3) Complexity (involvement)
- 4) Mystery (the promise of involvement)

Expanding upon one component of the Kaplan preference framework, Kevin Lynch's **Elements of Legibility**, while initially used in the city of Boston's planning, can be

applied for general use to aid the user in making sense of a space or spaces (Kopec, 2006). These include:

- a) *Paths*- channels that people use as they travel from one area to another
- b) *Edges*- preclude travel and appear to be boundaries
- c) *Districts*- the largest elements, are regions having a particular character that people can readily identify
- d) *Nodes*- well-known points within the environment to and from which people travel; they are often places where paths converge
- e) *Landmarks*- easily seen and singular components within an environment; are used for location orientation and are often found within districts and nodes.

Environmental psychology theories, models, and perspectives offer multiple ways in which to approach or evaluate the design process (Kopec, 2006). More often than not, multiple theories are at use and overlap in the design of complex environments for complex beings. The aim of this study is to examine how high levels of visibility within specific settings might contribute to the theories behind the human-environment relationship.

## HISTORY OF SCHOOL DESIGN

*“No building type has been more sensitive to changing trends, philosophies, or even fads than the schoolhouse.”* –Ben E. Graves, *School Ways* (1993)

From the early one-room schoolhouse to today’s school campuses, an educational curriculum dictated the design of learning environments. Examining past pedagogy and related design will provide a glimpse into how, throughout history, the school environment was developed to the needs of its teachers and students.

In North American, the first schools were primarily found in residential settings. In the New England colonies, wealthy citizens hired tutors and children would often go to the homes of older unmarried or widowed women for education (Graves 1993, 21). With a focus on grammar and reading, the one-room schoolhouse of the early 1800s slowly grew from one teacher leading all grade levels, to shared teaching and expansion (Fig. 1.6).



Figure 1.6. Nineteenth-century grammar school.  
Source: Graves, Ben E. *School Ways* (1993).

From 1806-1840, the Lancastrian school system responded to the urbanization of the country by developing schools, almost military in operation, in which monitors supervised the recitation and drills of their pupils (Graves 1993, 22). These long rooms packed with students and monitors, though short-lived, paved the way for free, public, tax-supported schools (Graves 1993, 23).

The following several decades, reading and writing schools began to merge and the subjects of history, composition, and even bookkeeping contributed to the curriculum. Delivery of education continued to become more sophisticated, students were grouped into classrooms by age, and school architecture became increasingly programmatic. During this time, educational theorists such as John Dewey and William James began to question the method of space allocation for each classroom based on the number of students taught in a strict lecture setting. They proposed the idea that education “should be based on a broader concept as an integral part of the life process, of learning by doing through creative participation” (Graves, 1993). While their proposition influenced the educational process and led to smaller classroom sizes and a variety of new subjects and hands-on projects within schools, the space planning essentially continued to remain unchanged throughout the nation. Due to rapid growth, newly-constructed schools in the mid-twentieth century often lacked character and the interior environment exhibited rigidity. With frequent plans to cut spending, windows were sparse and the segmented space plans aimed to keep everything and everyone separated and contained.

The “cells-and-bells” model, consisted of several classrooms regimented next to each other and placed on long corridors that could be easily supervised. This layout is

prevalent in many existing schools as well as many currently being built (Nair, et.al. 2009, 25). Termed from the Ford Model T during the Machine Age, this classroom-based model (Fig. 1.7) follows a traditional learning paradigm that a “predetermined number of students will all learn the same thing at the same time from the same person in the same way for several hours a day” (Nair, et.al. 2009, 25).

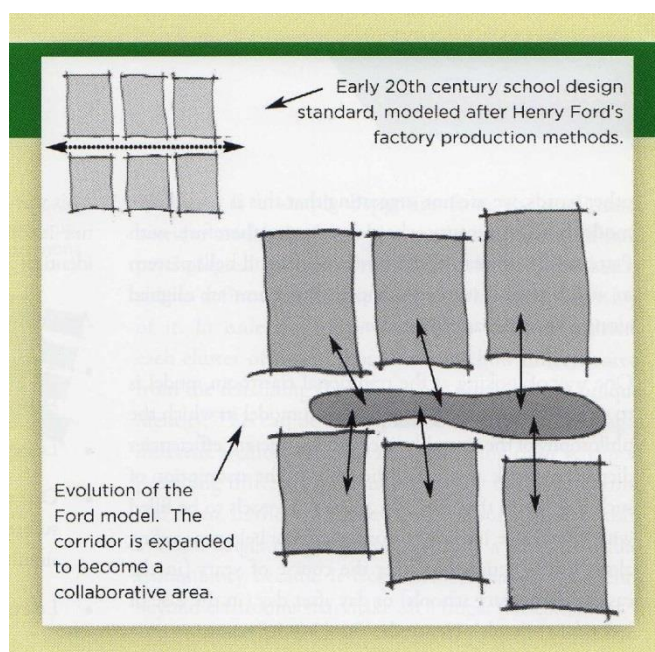


Figure 1.7. Design Patterns: Traditional Plan and Ford Model Evolution  
Source: Nair, *The Language of School Design* (2005).

Brain-based research supports the idea that learning is not linear but holistic, and multifaceted instead of unidimensional (Nair et.al. 2009, 26). Therefore, collaboration and knowledge-building can and does happen outside of standard classroom walls.

Due to technology advances impacting the latter part of the twentieth century and ever-evolving tools at our reach today, students and teachers have the benefit of flexibility in the learning environment. Corridors and other former transit areas are becoming hard-working places for such learning opportunities. Recent design concepts

for schools include classrooms being redefined to become “learning studios” or “learning suites” (Fig. 1.8). Under this new learning paradigm, environments are learner-centered, flexible, allow for social learning opportunities, and are technology-enabled (Nair, et.al. 2009, 41).

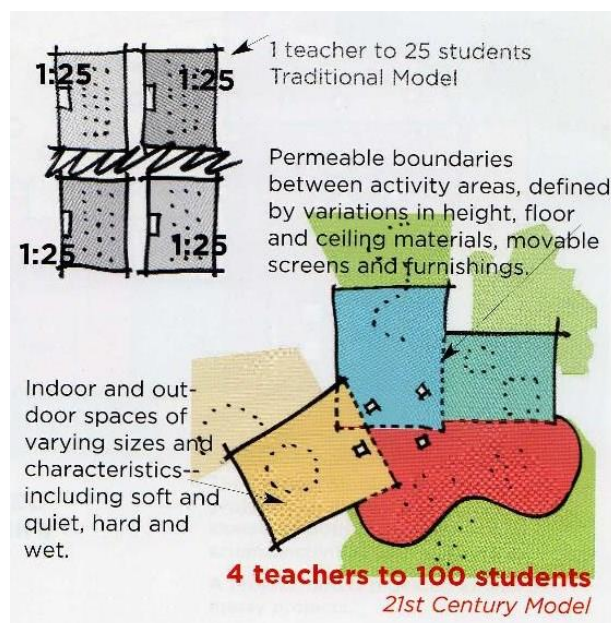


Figure 1.8. Design Pattern: From 1:25 to 4:100 flexible small learning communities.

Source: Nair, *The Language of School Design* (2005), p. 41.

Unlike school designs of the past which require direct supervision of students in contained, closed-off spaces, designs that build upon transparency can permit passive supervision and also showcase the learning purpose of the school (Nair, et.al. 2009, 41). Figure 1.9 displays an opportunity for visual transparency from a learning studio into a common area and vice versa. Consistent with Frank Lloyd Wright’s use of transparency displayed in his work, contemporary design patterns for schools aim to blend the boundaries between spaces. As a result, space planning coupled with material selection are two large components of the overall composition within a learning environment.



Decisions such as these can spring from the goal of providing a highly visible atmosphere.

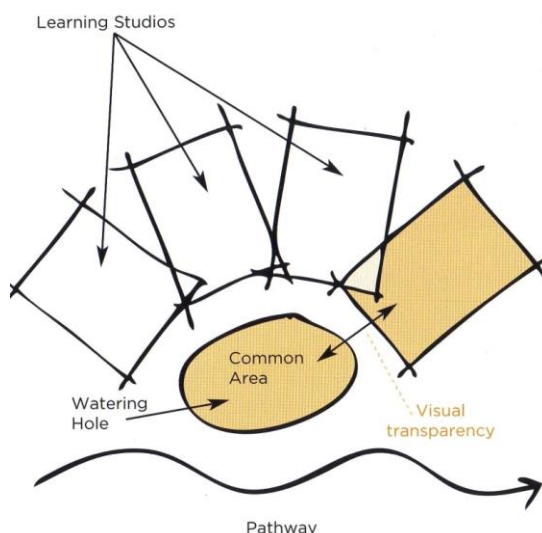


Figure 1.9 Example of visibility mechanism within a learning environment sketch.  
Source: Nair, *The Language of School Design* (2005), p. 89.

Historically, American higher education institutions followed a similar path as tertiary and secondary education in terms of curriculum and programs determining the design of a facility. The original nine colleges established in the colonies of the seventeenth and eighteenth centuries, such as Harvard (1636) and Dartmouth College (1769), were formed around the notions of acculturating the young, passing on the wisdom of the classics, and preparing people not only for service as clergymen but as public servants as well (Cohen, 2010). Over time religious doctrine as the sole determinant of curriculum in the early colleges waned, and American college life was designed as a residential system to foster learning and build character (Cohen, 2010). The architecture of the colonial colleges met the needs of the classical, lecture-based programs in which various subjects were housed in separate buildings. Students were expected to follow a curfew and live on campus where they could be accounted for.

As the nation industrialized in the latter part of the nineteenth century and throughout the first half of the twentieth century, higher education transformed due to the passage of The College Land (Morrill) Act and the Servicemen's Readjustment Act around the time of the Civil War (Cohen, 2010). Later, the GI Bill made college possible for millions of veterans. Institutions found themselves trying to stand out from the crowd following the era of mass higher education from 1945-1975 when the number of brick-and-mortar universities skyrocketed. Junior and community colleges were formed along with a variety of specialized degree programs. At colleges today, students have flexibility in choosing from a strict residential life on campus and can live off-campus, commute from another city, or enroll in online classes.

Because the majority of higher education facilities were designed and constructed several decades ago when learning paradigms differed, one contemporary question is how innovation can thrive within the traditional context of the campus (Herman Miller, 2011). While the typical undergraduate experience in American education is composed of a series of courses taken in typical spaces of classrooms or laboratories, one research summary conducted by Herman Miller researchers suggests the incorporation of a new phenomenon called "Innovation Centers." These programs would function outside of the traditional academic parameters and take students through projects in which they design, fabricate, and test a prototype. Students would work in groups and there would be no clock hours but a time frame in which a project should be complete. To this, the summary states, "The student who gravitates toward this learning experience is moving away from the traditional instruction paradigm toward a more creative, self-controlled experience

that emphasizes experimentation, encourages learning by doing, and fosters creativity” (Herman Miller, 2011). Key phrases used to describe a successful innovative center were: absence of uniformity; a sense of playfulness; the ability to provide privacy for creativity while maintaining contact with co-workers and the outside world; sufficient opportunity for both visual and tactile interaction; an environment and a culture that encourage experimentation, reward success, and are non-critical of failure; a ready refuge from day-to-day activities that distract from the creative mindset; appropriate space for demonstrations; workspaces that can be temporarily “personalized” to promote ownership of ideas; flexibility.

Whether existing higher education facilities undergo renovations and additions or new buildings are being added, the element of transparency in this line of thinking is a necessary consideration during the design of a school. Both secondary and higher education are seeing trends toward a “workplace feel” in which students become empowered to control their own work and destiny.

## HISTORY OF WORKPLACE DESIGN

*“Until recently, the design of office buildings adhered to a 19<sup>th</sup> century model of work. Workers who are asked to perform rather than to think, who are brought together in space and time so that they can be supervised, so that they have access to necessary tools, and so that there is a clear barrier between work and their other activities, occupy standardized and often uniform workspace.”- Jacqueline C. Vischer*

Completed in 1939, Frank Lloyd Wright’s design for the Johnson Wax building in Racine, Wisconsin displays the belief that workers focused on production could operate in an open plan (Makovsky 2002, 114). The “Great Workroom” (Fig. 1.10) allowed employees direct access to one another and they were supervised by those in the second story offices overlooking this production area of an accounting department, lawyers, and secretaries (Makovsky 2002, 114).



Figure 1.10. The Great Workroom, Johnson Wax Building, Frank Lloyd Wright, 1939.

Source: Makovsky, Paul. Iconic workspaces: *Metropolis* (2002).

The design of the Johnson Wax building displays two contributing factors that are still debated and discussed today: the notion of status within the workplace as visible within the layout, and the ever-prominent issue of costs to build and maintain the structure. In the mid-twentieth century, workplace models followed a “churn and burn” approach in terms of maximum productivity and direct supervision by executives or those with higher status within the company. The open plan generated during this time period, while giving rise to the idea of employee collaboration, contributed to the need to reduce occupancy costs by placing more people on the floor in large spaces. Not only did this reduce overhead, but building costs were reduced because moving furniture around was allegedly easier than tearing down and rebuilding walls when people or groups needed to be moved (Vischer 2005, 66). Also, the notion of how status relates to territory, privacy, and sense of control can be traced back to seventy years ago and iconic workplaces, such as the Johnson Wax building. For decades, status was rendered visible throughout a corporation’s environment as executives were assigned a private, closed office with a view. In turn, these coveted positions along the exterior of a building set a tone of rank that naturally resounded throughout a facility.

To answer the call for employee privacy, territory, and control, furniture manufacturers delivered the option for mobile partitions, referred to as a cubicle or workstation, which flourished beginning in the 1980s. The early designs of partitioned workspaces were bland, flooded with artificial light, and cut off employees’ views of one another. Intended to save operating costs and provide much desired privacy and sense of

space to employees, workstations left many daydreaming instead about the large, day-lit and sumptuously furnished corner office.

Presently and throughout the past decade, workplace designs have been aiming to tear down barriers, both physical and psychological, due to abundant research of environments for increased employee satisfaction and productivity. The balancing act of status, or lack of, sense of control, privacy, and comfort challenges many owners to consider the needs and wants of employees, which ultimately affect their ability to remain creative and productive. The level of freedom and ability to work to one's potential plays a major role in career-minded individuals today. Companies are considering important aspects of equality among workers, embracing sustainability, and maintaining a collective vision that employees are encouraged to support and cherish.

Now, in a highly-connected, technology-enabled world, options have expanded for the modern working individual. Several new trends address the changing way in which Americans define work:

- Idea of “distributed work”, a combination of heads down focus work, formal and informal collaboration of varying duration, and social interaction that occurs in a wide variety of setting within the building, campus or other locations (O’Neill and Wymer 2011, 1).
- Generational differences proving Generation Y prefers an engaging workplace, which provides a consistent engaging work experience that supports a wide choice of work styles and seamless flow of work, regardless of location. Also,

- Gen Y prefers spaces that offer choice, integrated work with an active feel, and distributed interaction (O'Neill, 2010).
- The notion of a third place- suggesting first place is home, and second place is an office, the third place has often become social spaces where work and collaboration happens, such as a coffee shop. This trend, while addressing new environments such as the rented office space for transients, brings to light the importance of informal work environments and the escape from a standard, predictable setting. "People look for the right blend of privacy and isolation that's needed to get work done, but at the same time we want to feel connected to the greater whole." (Steelcase, 2009).
- The shaping capability- benefits of allowing one to shape the work experience by choosing the type and location of workspace, and capability to modify workspace features (O'Neill, 2012). Deriving from furniture manufacturer Knoll's Adaptable by Design research article, components of this theory include providing a variety of available work spaces for employees<sup>4</sup>:

1. Individual spaces-

- a. Reduce overall horizon height of workstations and other furnishings to increase visual access within the space
- b. Ensure that work areas with individual workspaces can flex to accommodate unforeseen organizational changes.

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<sup>4</sup> Michael O'Neill, "Adaptable by Design: Shaping the Work Experience", Knoll Workplace Research, [www.knoll.com/research/index.jsp](http://www.knoll.com/research/index.jsp)

- c. Use private offices with floor to ceiling enclosure for roles that require the highest levels of privacy and confidential work.
  - d. Offer flexible seating and workstation components.
- 2. Group spaces-
  - a. For optimized collaborative work, the workplace needs an array of conveniently located, differently sized open and closed meeting spaces for informal and formal group work.
  - b. Consolidate support areas for storage and copy to centralized locations.
  - c. Offer enclosed huddle rooms and small open meeting spaces (2 to 4 people) located along main circulation routes.
  - d. Offer multi-purpose rooms which can support a wide range of group activities.
- 3. Social spaces-
  - a. Plan for a café which is becoming a central hub for employees, supports chance encounters, and provides overflow meeting space.

Looking at broader topics regarding the future of the workplace, the diversification of people entering the job market, the benefits of sustainable construction



and maintenance practices, and the increasing importance on creativity and innovation are all large factors in the design of working environments. Transparency works hand-in-hand with many of these components and has the potential to address many of the challenges of designing for today's diverse business men and women.

## CREATIVITY AND COLLABORATION

*“Repetitive work ruled in the past, and for the most part speed and accuracy equaled productivity. However, the quality of ideas rather than the quantity of activity has become the new path to success.”* - Jay L. Brand, Haworth.

According to David Kelley, founder of firm IDEO, a person feels and internalizes what a space tells him or her about how to work. Whether it is an educational setting or a corporate environment, he suggests that space matters because people read their physical environment like they read a human face (Doorley and Witthoft, 2012). With an emphasis on creativity and collaboration in the work environment, Kelley states that space has been a foundation for the expression of his firm’s cultural values. He boasts that the equality gained from the first days when employees all sat in a circle on the floor for meetings (Doorley and Witthoft, 2012). This testimony is an example of the small but powerful ways in which space impacts an individual as well as a group’s collaboration and creation efforts.

Aiming to understand the creative process, neuroscientists and psychologists have begun to look into aspects that might spark creativity (Zielinski 2012, 1). For example, downtime or a seemingly mindless task tends to “reset the brain” so the person can resume to creative activity refreshed, according to Jonathan Schooler, a psychology professor at the University of California, Santa Barbara. Other studies show that mood matters when it comes to creativity and watching a funny video or some other form of comedic engagement liberates anxiety and leads to innovation (Zielinski 2012, 2).

In David Kelley's talk "How to Build Your Creative Confidence" on ted.com, he quotes psychologist, Albert Bandura, saying there is often a "fear of judgment to say or do the right creative thing." Suggesting that many people have this thought run through their minds, the result can affect a person's creative confidence and willingness to share. The goal, Kelley states, is for workers to become confident, have self-efficacy, which leads to "guided mastery" of a subject or topic. In order to do this, first one must turn fear into familiarity or erase the unknown<sup>5</sup>. Along the same lines, Tim Brown spoke about "Tales of Creativity and Play" in the workplace.<sup>6</sup> Putting these ideas into practice, Brown hones in on the role that trust plays in a working environment. He states that when a worker has friendship with a colleague, it is a shortcut to play and play allows a sense of trust, which then allows a person to take creative risks. This idea of mixing divergence (playful) and convergence (serious) activities into the daily routine provides opportunity for greater trust within a group, according to Brown, and results in creative and collaborative success.

Contemporary schools of thought on learning and collaboration attribute the acts of sharing, creating, and producing to optimal learning and working environments. Psychologists, such as Bandura, and practitioners of creativity and play in the workplace suggest that the result of open environments, both physical and psychological, could increase the levels of trust and equality within a group. Therefore, by focusing on the purpose of these environments and specific goals of an institution, design decisions can be made that impact and reinforce the organization's collective mission.

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<sup>5</sup> David Kelley, "How to Build Your Creative Confidence," March 2012, [www.ted.com](http://www.ted.com)

<sup>6</sup> Tim Brown, "Tales of Creativity and Play," May 2008, [www.ted.com](http://www.ted.com)

## LITERATURE REVIEW CONCLUSIONS

The American adult today embraces the fact that the world is at the tip of his or her finger. Due to technology tools, which are visible in the changing ways in which people learn and work, one might conclude that informal, more social spaces are now preferred over traditional, formal atmospheres, when given the choice.

Cognitive science research also suggests an underlying desire for individuals to not just observe a task or accomplishment but to have “skin in the game”, so to speak. Referencing the daily activity of our prehistoric ancestors, social attributes of human beings noticeably work together to direct a person’s interactions with others. Sense of control, status, privacy, accessibility to others, and freedom become the driving factors behind the ways in which people seek out or withdraw from others. As mentioned in the article describing a coffee shop as a third place where people work, it is interesting to consider how the draw to such places might relate to being interconnected to activity or, for instance, the “hum” of the city. On the other hand, an employee might feel the need for less accessibility to others and move to a more private space to fulfill a certain task. Therefore, interior designers can strive to gain understanding about each client and organizational needs in order to implement strategies within the design to maximize user productivity.

The research of environmental psychologists underlines the notion that the feeling of control one has over his or her space is an important part of productivity. Along the same lines, findings suggests that the ability to harness freedom of choice and

opportunity for personally-defined success is a leading factor that contributes to satisfaction and confidence within an environment. Working with others is inevitable. According to recent discussions on creativity, levels of play in a working environment may provide a student or employee the freedom to express unique ideas with peers and the desire to participate in collaborative activities.

Historically, an institutional mission or program goal affects the design and function of schools and workplaces. Moving from an open-plan preference to a closed plan and back again, the past eras of school and workplace design provide many patterns for design professionals to consider. However, today's environments built for knowledge creation share the empowerment of technological tools. Freed from a fixed format, interior spaces can flex and morph to meet changing needs of the users. Unique material compositions, blurred spatial boundaries, and multipurpose areas are becoming the new normal for contemporary school and workplace design. The literature review creates many points of consideration applicable to the nature of transparency- how it is employed and how users might be affected- in schools and workplace environments.

## **CHAPTER II- METHODOLOGY**

The holistic approach to investigating the effects of transparency in adult learning and sharing environments is qualitative in nature. Three case study locations were selected: a high school campus, two buildings within a university campus, and a workplace facility, each of which was constructed in the last five years. The method of research is a two-step process including both on-site observations and in-depth interviews with occupants. Because this study embraces a social science examination of the human-environment relationship at each facility, interviews with users were chosen over general surveys in order to ask probing questions and get a deeper sense of the meaning behind feedback. These face-to-face interviews coupled with tours and timed observations- of inhabitants in action- generate the data.

### **ON-SITE OBSERVATIONS**

#### **LOCATION 1: High School Facility, Date of Visit: October 23, 2012**

The High Tech High (HTH) organization, located in San Diego County, California, develops their unique educational facilities around several design principles that yield a high-performance, workplace feel, one of which is transparency.

Upon entering the first building on campus, the Gary and Jerri-Ann Jacobs HTH, it was evident that the spaces were highly active, appeared to be lived in and used to the fullest (Figs. 2.1, 2.2). Not a soaring or grand structure, this building worked hard.



Figure 2.1 Main corridor at High Tech Bldg. 1.



Figure 2.2 “Egg drop” physics project in multi-purpose space.

These light-filled spaces were created with a combination of clerestory windows, skylights, and translucent materials on the top three-quarters of wall partitions. Work was happening inside of classrooms (Fig. 2.3) as well as in smaller meetings with the instructor in the communal space just outside of classrooms (Fig. 2.4)

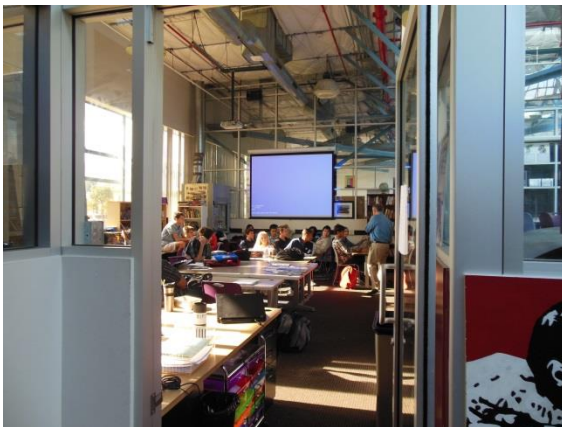


Figure 2.3 Students in classroom setting.



Figure 2.4 Students and instructor meeting in open space outside of classroom area.

In this location, a central teacher work area joined two classrooms, all enclosed in glass partitions, as to passively supervise both classrooms when one teacher was not in there, or one or both were meeting with a smaller group at a lounge area just outside (Fig. 2.5). This adds flexibility to the traditional need for 24/7 presence of teacher directly near all students at all times. The teachers know what is going on with their students beyond translucent partitions, and this design gives the students freedom to work more independently.



Figure 2.5 Teacher working in shared teacher work area which adjoins two classrooms and provides high visibility into a chosen classroom, yet supervision remains informal.

The second building on campus that was toured is the HTH International Building which houses a variety of classes geared toward liberal arts and international studies. This two-story structure boasts a volumous multi-purpose space in which student projects and cultural displays take the stage. Still an informal setting with stained concrete flooring, the majority of the solid surfaces are tactile and act as backdrops for student art (Figs. 2.6). The use of transparent surfaces, particularly for ample natural light and visual



access to collaborative work areas, was carefully considered in each application of finishes.



Figure 2.6 Multi-purpose space in Int. Bldg.



Figure 2.7 Eroded corner at classroom.

Solid walls enclosed more private learning spaces and the design team incorporated the concept of eroded corners in which hollow metal framing and glass partitions create visibility (Fig. 2.7). By making solid corners feel open and infuse light into them, the aesthetic is improved and what would be an opportunity to hide is turned into greater visual access into and out of the space.

An additional application involving transparency at this location is found at a meeting space that was built after the students and teachers moved in (Fig. 2.8). The Director of Facilities for the High Tech High organization stated the need for an acoustically private meeting area for students outside of the nearby classrooms. While the open space and available seating is still used, this transparent, but closed workspace provides another valuable option for the students. Here, useful square footage has been

put to work to answer a need of the users- one that allows visual access and has a high level of acoustical privacy.



Figure 2.8 Additional meeting space created for privacy.

The last building visited, High Tech High, Chula Vista (CV), is the location selected for timed, observational studies and interviews with its users. Similar to the two previous locations, this building boasts an abundance of natural light that, in conjunction with the variety of student work on display, results in an informal, active atmosphere. The material composition of the building inside and out is a variety of colored panels, anodized aluminum, translucent surfaces, and natural materials (Figs. 2.9, 2.10).



Figure 2.9 Exterior of HTH, CV.



Figure 2.10 Interior corridor, HTH, CV.

Two (2) thirty-minute observations were taken: The first location was within Studio 10 in the open area with the ability to look into adjacent classrooms. The second location was in the Lobby near the reception, main entrance and commons room. The floor plan (Fig. 2.11) locates these two points of observation:



Figure 2.11 Floor plan at HTH, Chula Vista, noting Observations 1 & 2.

#### OBSERVATION 1:

*Setting: Large corridor, called Studio 10, which contains an exterior door to the south side of the building. On either side of the corridor lie two sets of classrooms with separate entrances and adjoining work rooms. To the north, one of three greenhouses create a light-filled space on the corner. Lounge seating and tables/chairs are placed within this open area. Glass panels flank the entrance doors to the classrooms. Natural light floods the space.*

#### Notes:

- Three students sit at lounge seating work, huddled around a laptop at the north corner of open space, Studio 10. One female student strums on a guitar and the three girls sing a popular country song. After inquiry, the students share that they are working on a play they are writing.
- At the other end, closer to the observer location, a small group of two students sit on a sofa, also working around a laptop.
- After ten minutes, a total twenty-four students walked through the corridors, the one leading to Studio 10 and the main Gallery corridor running perpendicular, and each individual seems set on a different mission. The intermediate spaces, hallways, etc. are active and not quiet.
- At minute fifteen, the second group walks over to the first group and starts talking about and sharing information regarding their project. After three minutes, the two students return to their initial location to continue working (Fig. 2.12).

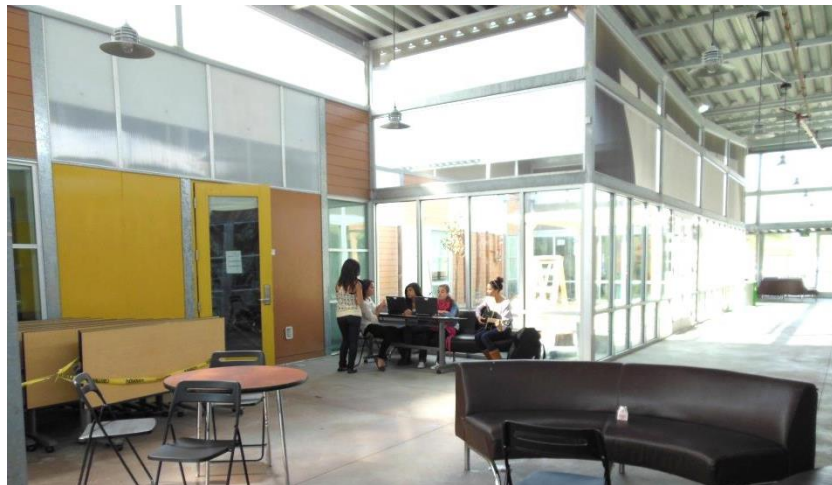


Figure 2.12. Two groups conversing during Observation 1.

- There are no bells sounding throughout the observation or visit, and no lockers visible.
- Looking inside of the classroom to the southeast on the plan, thirteen students sit at table desks designed for two-four people (if double-sided). They are primarily writing or working on laptops individually. Occasionally, a few students collaborate around one of the laptops for a few minutes.
- After twenty-four minutes, the instructor motions to the students through glass partition to return to the classroom. The two student groups gather their notepads and laptops and head inside the classroom.
- Five minutes later, after the students settle, the instructor lectures on the project at hand.
- Two students get up after speaking with the instructor and head down the corridor toward the main gallery.

#### OBSERVATION 2:

*Setting: Near the main entrance and reception desk, the lobby area is a large open room with lounge seating and tables to accommodate users. Two walls have transparent garage doors installed. One opens to an outdoor break area and the other divides the commons rooms which is a multi-purpose meeting and media space. Both spaces, the lobby and commons rooms can house a variety of activities or open onto the other. These adjacent areas seem to work hand-in-hand often.*

Notes:

- In the lobby, various students occupy small tables and lounge furniture and work either in groups or individually (Fig. 2.13).
- One student wears headphones and works alone on his laptop at a small table. He does not look up often.
- Adjacent to him, a student sits in front of her laptop at a table that can accommodate six students. She does not seem to be engaged in work, but instead looks around as if waiting on a group member.
- Across the room, sharing a small-scale sofa, one student holds a laptop in his lap while three of his classmates sit on both sides of him. They sit quietly during this collaborative session, with only the person holding the laptop talking.
- Next, a student sits alone at a small table working again on a laptop. He does not look around often and engages with the contents of his computer.
- The last group of students in the lobby during the observation is a group of five students who share a large sofa. Two students on one end work on a laptop, the other three students sit and seem to be waiting. The three students not working make faces and hand signals to a few of the students inside the adjacent classroom, to which the recipients occasionally turn from their seat at the table and gesture back. (When the researcher later asks these students whether or not they write notes to peers to communicate, one student answers that they do not, however they use the school's intranet messaging system.)



- This dual-purpose lobby area sits next to the reception and front entrance. Compared to other parts of the high school, it is noticeable that given the number of students working in a close-knit space, it is pretty quiet (despite small communication tactics), similar to a library setting. Perhaps this is because the area, being a first impression spot for guests, feels more formal, despite the design and materials used. Also, students may recognize the ability to be supervised easily by the front desk staff and are, therefore, on “best behavior” while working in the lobby area.
- In the commons room, a group of eighteen students sits around a large table while an instructor leads, who is also sitting at the table (Fig. 2.14). The students have paper and writing utensils, while the instructor has a laptop.
- During the observation, three separate students from the lobby area walk into the commons, spoke with the instructor, and return to work in the lobby.

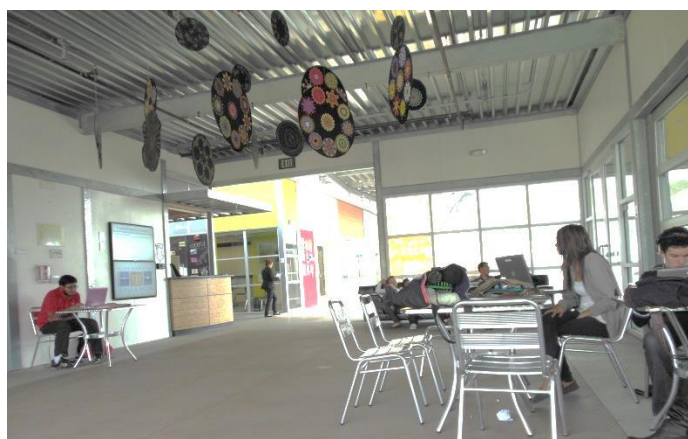


Figure 2.13. Students in Lobby during Observation 2.

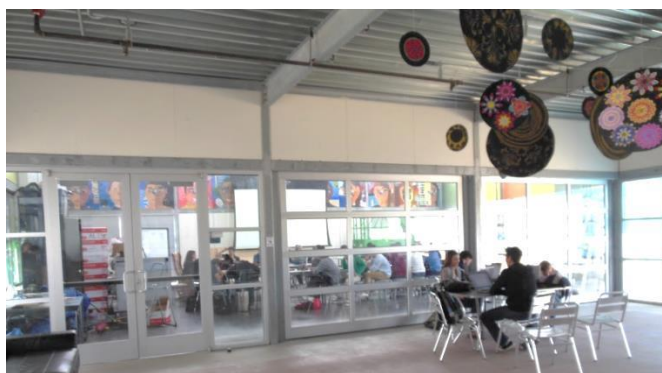


Figure 2.14. Looking into Commons room.

### Notable Features:

All of the facilities by the High Tech High organization that were visited share a common open feel, have an inviting and informal atmosphere, use copious amounts of transparent materials, and display large amounts of student art and projects. According to the director of facilities, the organization develops facilities that support its design principles of personalization, common intellectual mission, and adult-world connection. The way in which student work was displayed is notable in that it is not just untouchable awards, formal documents, or trophies hidden behind a traditional glass display case, but projects are hanging from the ceiling and student displays painted directly onto chalkboard, homasote- a cellulose-based fiber wallboard-, or even directly onto glass. In fact, one original display case now sits empty in one of the HTH buildings, waiting to be demolished and replaced with a more tactile, usable surface (Fig. 2.15).

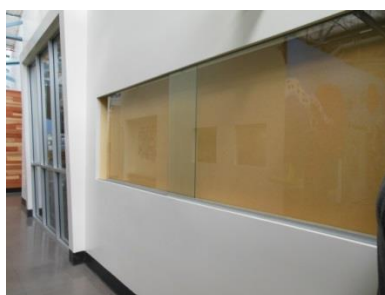


Figure 2.15. Glass-covered display case.



The abundance of student work, often team projects, underscores one of the organization's missions of project-based learning. Other program elements include team teaching, integrated curriculum, frequent student presentations, community-based internships, and exhibitions (hightechhigh.org). The facility utilizes multiple display options (Figs. 2.16-2.21 ):



Figure 2.16 Student work at on gyp. and glass. Figure 2.17 Student work on chalkboard.



Figure 2.18 Art on exterior of building painted by student as a memorial to a student that passed away.



Figure 2.19 Project painted on homasote material.



Figure 2.20 History projects on display.



Figure 2.21 Literary project in progress.

Both theories of literal and phenomenal transparency are at work in this high school case study. The design of the Gary and Jerri-Ann Jacobs HTH building contains large amounts of glass in a layered manner, increasing the mysterious aspect and fosters visitors' desire to look far into the receding spaces (refer to Fig. 2.16 on pg. 45). Phenomenal transparency takes one's eye from views at the corridor level into the classroom and beyond which tells the story of more going on unlike the effect of solid, opaque partitions that dominate traditional school design. Literal transparency is employed in the example of carving out portions of standard wall construction to install a translucent material, as in the example of eroded corners (refer to Fig. 2.7 on pg. 37).

**LOCATION 2: University Facility, Date of Visit: November 14, 2012**

Located on the University of Arkansas's affiliate campus in Little Rock, Arkansas, the university case study selection is the George W. Donaghey College of Engineering and Information Technology building (Figs. 2.22, 2.23). This building was designed with a combination of classrooms, research space, and collaborative breakout areas. The academic program desires to take college students through a learning process of individual work then team meetings and revisions, much like their future careers in the field.



Figure 2.22 Common area at first level.

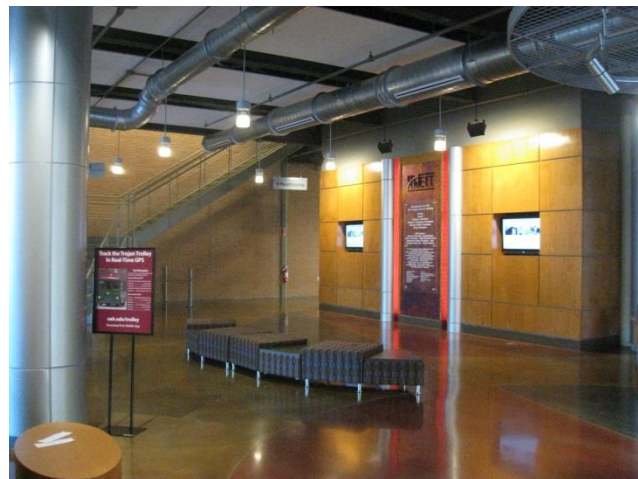


Figure 2.23 Lounge seating at entrance.

Upon entering the first level of this four-story building, one notices the open common area, small seating groups, a computer lab behind partitions segmented with glass, and a light-filled café and lounge. Materials used throughout the spaces are concrete, steel, glass, and wood.

The second and third levels contain classrooms, meeting/lounge space, and a vending/break area with tables (Fig. 2.24, 2.25). The fourth level consists of research offices and other faculty spaces.



Figure 2.24 Break out area on second level. Figure 2.25 Collaborative meeting areas.

While the classrooms maintain a traditional, stepped arrangement of desks and computers, primarily, the wide corridor incorporates open spaces for students to work together for an assignment, display ideas on the marker boards, or work individually before or after class. Unlike the first level common area, carpeting and artificial lighting lend a formal feel. However, exposed ceilings, natural materials, such as cork flooring inserts, and comfortable seating provide an inviting and engaging atmosphere.



Two (2) thirty-minute observations were taken: one in the main commons area on the first floor; the other on the third level in the meeting space and classrooms. The figures 2.26 and 2.27 illustrate these locations:

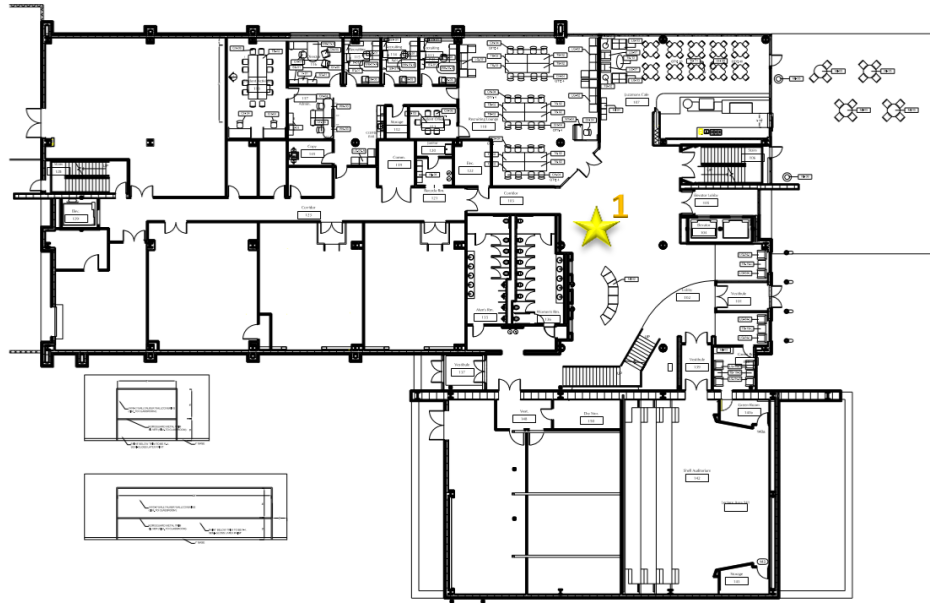


Figure 2.26 First level floor plan at UALR, EIT building, noting Observation 1.  
Source: Cromwell Architects Engineers, Little Rock, Arkansas, [www.cromwell.com](http://www.cromwell.com)

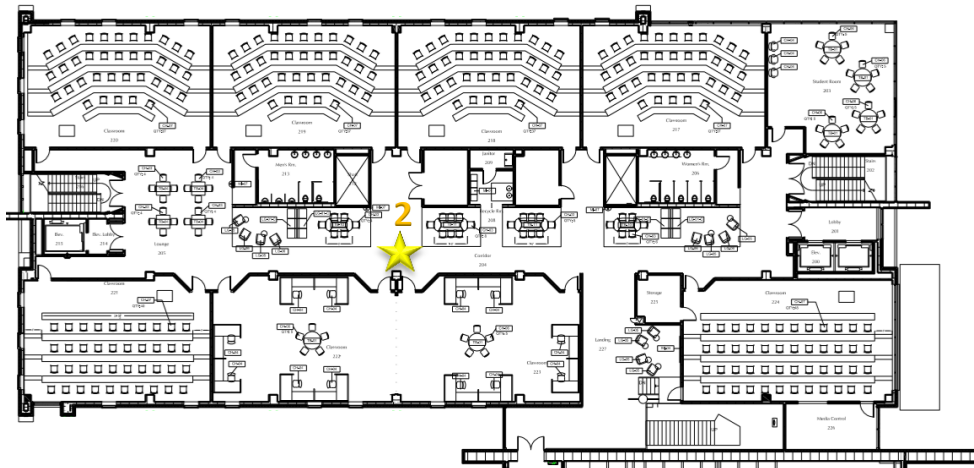


Figure 2.27 Second level floor plan at UALR, EIT building, noting Observation 2.  
Source: Cromwell Architects Engineers, Little Rock, Arkansas, [www.cromwell.com](http://www.cromwell.com)

## OBSERVATION 1:

*Setting- Main level commons area that opens up to a computer lab, café to the northeast, and several small seating groups. The space is active, informal, and industrial in design.*

- At the entry, a glass-enclosed vestibule juts out between two small seating alcoves. These spaces are highly visible, located near exterior windows and a vestibule enclosed in glass. Here, two students sit at lounge chairs in the south side seating area. They work on laptops and conversing casually. After inquiry, the students say they are playing games, waiting for their next class to begin upstairs (Fig 2.28).
- Across the way, in the computer lab, five students work individually on desk-top computers. They spread out across the room, no two students sit next to each other, obviously not working on a team project, but desire some form of privacy.
- In the café, four people sit at a round table. One person appears to be an instructor or teaching assistant by the way in which he is leading the conversation. After four minutes, this person gets up and walks to the hallway leading to faculty offices, while the other three people remain in the café (Fig. 2.29).
- After ten minutes, three students walk through the entrance vestibule and into the computer lab. This time, the students sit at computers next to each other, likely acquaintances.



Figure 2.28 Seating areas near vestibule.      Figure 2.29 Activity in café.

- At minute nineteen, four people walk down the stairs, perhaps from a classroom, and sit at a table in the café. One person opens up a laptop and they begin a focused discussion. After inquiry, the students reveal they were just assigned a group project and decided to come downstairs after class to have their first meeting and assign tasks to the team members.
- The remaining ten minutes of observation include twelve students exiting the building, two staff members entering the hallway to their offices, and five students entering the café to order food.

## OBSERVATION 2:

*Setting- On the second level, the wide corridor provides views of the lounge seating and collaborative space, the break out area with tables, and the traditional classroom spaces.*

*As a second central hub for social activity and meeting opportunity, the corridor is in close proximity to the classrooms and can be used as overflow and group study area.*

*There is sparse literal transparency in forms of translucent material, however the open main artery provides high levels of visibility.*

- At the beginning of the observation period, one student walks up the nearby stairs and takes a seat at a table on the east end of the corridor. He removes a binder from his bag and reads the material.
- Two classrooms out of four are occupied by students and one instructor each (Fig. 2.30).
- After eight minutes, four additional students walk up the stairs and head towards the break out area to sit at a round table. One of these students walks to the vending machine before joining his peers.
- Four minutes later, an instructor walks out of one of the classrooms and tells students to meet with their groups at the seating area (Fig. 2.31). After six students file out of the classroom and gather with their classmates, the instructor engages in a one-on-one conversation in the corridor with a student.
- One leader of a team writes on the marker board after three minutes, while the other group huddles around a laptop.
- Occasionally members of one team turn around and lean over the back of a lounge chair to talk with the adjacent group. During this meeting time, the space is loud with conversation of meetings and passerbys.
- After ten minutes of group activity, the students pack up and disperse downstairs, while additional students come up the stairs or elevator.





Figure 2.30 Classroom.



Figure 2.31 Students in meetings.

The second building visited on the University of Arkansas, Little Rock campus was the College of Business. This building had a different look than the Engineering and IT building and seemed to be geared toward a more sophisticated, workplace feel. Corporate artwork and awards adorn a central corridor while ceilings are finished and double-height. A popular feature of both buildings was the café area. Both were situated on an exterior wall with an abundance of natural light (Fig. 2.32). Multiple seating options and the appeal of food and drink source drew many students toward these locations. For the business students an airport-like store, called Business Brewing, provides coffee and other snacks (Fig. 2.33).

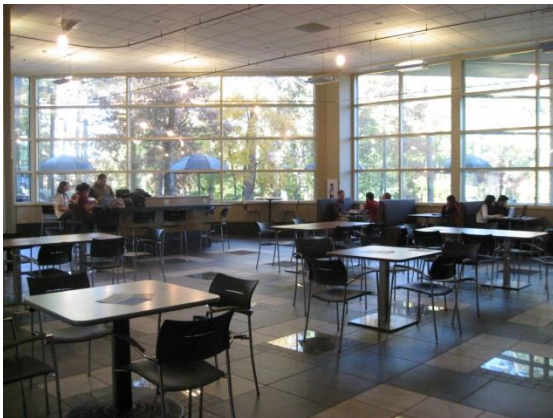


Figure 2.32 Café area in Business building.



Figure 2.33 Business Brewing store.

Both buildings have a transient feeling due to the nature of the traditional university program in which students meet for an allotted time period within a building and classroom, and then move to social locations, a library, or their place of residence, in order to study. There does not appear to be a lot of personal territory for individual students within these two buildings on campus. Similarly, student work is not as visible to a guest touring the facilities. A corkboard near the elevators of the EIT building sports mainly announcements, job opportunities, and the selling of items (Fig. 2.34). In the business building, formal awards are permanent displays, however any evidence of students contributing to the appearance by temporary display of work is not found (Fig. 2.35).



Figure 2.34 Message board at EIT building.



Figure 2.35 Student awards at Business building.

Literal transparency is used in designated areas in the form of expansive amounts of exterior glass to provide natural light into the interior spaces, particular at the common areas. However, in the bulk of the learning environments, which include traditional classroom spaces and more innovative break out areas, visibility is the result of open space, not transparent materials.

**LOCATION 3: Workplace Facility, Date of Visit: November 15, 2012**

A non-profit headquarters facility, Heifer International located in Little Rock, Arkansas, was designed with features such as open spaces and wide corridors that translate into generous amounts of transparency. A LEED Platinum-certified building, several of the green principles incorporated into the design and construction also contribute to its atmosphere. A sixty-two-foot wide building on a curve, oriented east to west, the Heifer facilities maximize available daylight (Fig. 2.36). All workstations are facing the north for the best view, clerestory windows allow light to filter to interior spaces, and translucent materials partially emitting light enclosed private offices (Fig. 2.37).



Figure 2.36 Exterior photo of Heifer International.



Figure 2.37 Interior photo of workstations and private offices.  
Source: Heifer International, Little Rock, Arkansas, [www.heifer.org](http://www.heifer.org)

The global mission of the organization is visible in the design of the building. Heifer's work across the world began with the idea of a small, thoughtful act with the potential to impact the future of many. For example, the founder of Heifer worked in the mission field after World War II delivering water and milk to citizens in third world countries. He soon discovered the need to for greater, long-term empowerment of the people instead of temporary relief.

To this day, the organization's programs aid community groups internationally by providing livestock and training in order to maintain farm animals as well as pass one of the animal's offspring onto another community. By paying it forward, the Heifer mission is founded on a concentric circle illustrated by the impact or ripple effect one small rock thrown into water can have, metaphorically. To this, the director of facilities revealed the fact that the new building, which consolidated fourteen locations to create a headquarters facility, needed to "walk the talk". The director says the facility "is not only eco-friendly, but considers the needs and best atmosphere for the employees." Designed with the smallest footprint possible, long-term energy and cost savings, and a focus on equality amongst the users, the facility also displays many elements of transparency.

Natural light touches every space due to the large expanses of glass, narrow width of the curvilinear building structure, and use of translucent materials on the interior. In addition, the design team specified furniture panels and partitions that are no taller than 54" in order to not create visual barriers. Going from a ratio of 4:1 workstations to private office, the new Heifer building ration is 12:1, keeping in line with the organization's mission of equality. When privacy is needed, the design includes huddle



rooms similar to Heifer's program of needing zero-grazing pins in the field when it comes to secluded space for livestock. This is an interesting concept (discussed in more detail later). Horizontal wood detailing on the glass and no ceiling render these spaces semi-private (Fig. 2.38). Large conference rooms contained by glass partitions are available to employees for meetings or additional work space (Fig. 2.39). Each floor boasts an open break area with bar-type countertop and small kitchen located at one end.



Figure 2.38 Huddle room.



Figure 2.39 Large conference room.

Two (2) thirty-minute observations were taken at this workplace: one was in the general workstation area and the other was in the central atrium on the second level. The floor plan illustrates the locations of the observations (Fig. 2.40):

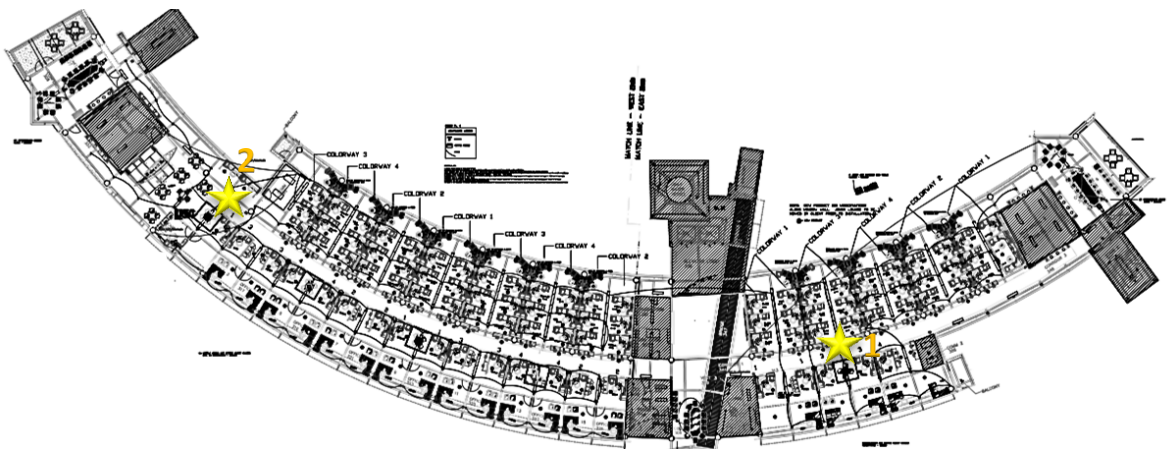


Figure 2.40 Third level floor plan at Heifer Intl.

Source: Polk Stanley Wilcox Architects, Little Rock, AR, [www.polkstanleywilcox.com](http://www.polkstanleywilcox.com)

## OBSERVATION 1:

*Setting- The first observation took place within an open office area with sightlines to the huddle rooms and nearby private offices. All employees at workstations faced north, for the best view. The corridor runs along as a central spine with storage cabinets backing up the workstations. Additional workstations are on the south end of the walkway and private offices with transparent partitions at the front runs along the south exterior wall. Solid partitions or more opaque panels divide private offices on the east and west. Natural light moves from exterior wall to front wall and carpeting covers the floor.*

- It is fairly quiet in the open office location during the first ten minutes of the observation period.
- In an area that can hold up to twenty-four employees at individual workstations, there are eighteen stations occupied with workers. Four workstations are located on either side of the huddle room and four private offices are located behind these. During the observation, three of the workstations are in use, and two of the private offices. The missing employees are probably out of the office because it appears that these spaces are lived in (Fig. 2.41).
- There are four employees with headphones on. One employee has a sign printed up on her tackable surface above her computer screen that reads “Headphones are on”, perhaps her attempt to inform those walking up behind her that she can not hear them. Others perform individual work on their computers, or talk on the phone.

- After twelve minutes, one employee rises and walks over to a workstation a few rows away to speak to a co-worker (Fig. 2.42). Their voices are low in tone as they look at the person's desktop computer. After three minutes, the first person returns to her workstation.
- Then, another employee walks down the hallway from the entrance. He continues to say Hello, fairly loudly to the five people in his area at the time. This sparks a casual conversation between the employees. The five that were seating remain seated, but speak to each other over their partitions. Because the front dividing partition of each workstation is 42", the employees are able to see each other and see outside at all times. The casual conference turns into three of the employees speaking about the meeting from which the one employee has just returned.
- Hearing of his return, an employee from a private office walks out into the open plan and begins chatting with his co-workers.
- At minute 25, one employee gets up from his workstation and puts a screen protecting cover over his screen and leaves the area.



Figure 2.41 Employees facing north.



Figure 2.42 Employees getting up to talk to one another.

## OBSERVATION 2:

*Setting- The second observation occurred at the end of a floor near what could be called a commons area because it is a wide space leading to a break room with small kitchen and bar. It offers lounge seating as well as tables and chairs. Workstations and private offices are just a few feet away, however this space feels different because it does not have a television, computer, or other built-in technology, except for wireless internet. Again, vast expanses of glass provide plenty of daylight into this space.*

- This area proved interesting to observe because it was used more than expected. It was about 11:15 a.m., not necessarily a typical lunch hour but several times employees entered into this space.
- Within ten minutes, six employees come into the kitchen area to retrieve a cup of coffee, water, or snack. During this time, most employees say Hello or speak with a co-worker for about one minute.
- One employee gets his phone out of his pocket and begins showing another employee images.
- On one occasion, an employee sits down at a table for five minutes, makes a few phone calls and then leaves the area.
- This commons space feels active and louder than the previous workstation observation.
- After the phone rings at a nearby workstation, one employee stands up and looks around the office to find her co-worker, whom she suspects might be in the break area. With no success, she sits down and finishes talking on the phone.



- After twenty-seven minutes, two employees walk into the break area and sit at a table to look at a laptop together.

### Notable Features

A significant feature of the workplace facility is the amount and quality of artwork and other cultural displays. Banners, artwork on chalkboards, artifacts such as cowbells and a carriage, for example, are visible in various areas. They underline the global mission of the organization and serve as reminders of the work at hand, while providing colorful additions to the interior (Fig. 2.43-2.48):



Figure 2.43 Banners in lobby.

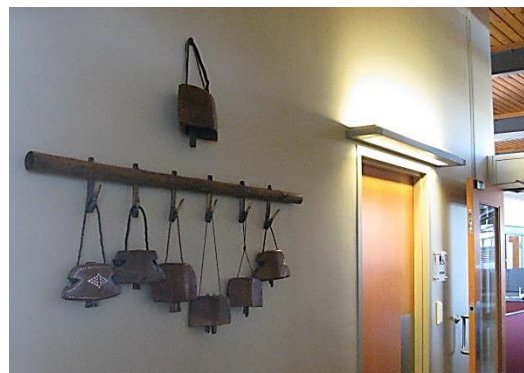


Figure 2.44 Cowbells are decoration.



Figure 2.45 Chalkboard wall with posters.



Figure 2.46 Cultural artwork in conference.



Figure 2.47 Sustainable features display in lobby.



Figure 2.48 Carriage artifact and banners in second story atrium.

With a foundation on equality and sustainability, the design of this workplace facility entails open spaces and generous amounts of natural light. To this end, the furniture was designed to not create visual barriers and instead demonstrate the desire for high levels of visibility in the majority of workspaces. These levels of transparency were beneficial to the client in obtaining its goals because several locations merged to create one family. Transparency is seen in both literal and phenomenal applications. In Figure 2.37, if one stands in the open workspace, there are many planes with which natural light is piercing to create a receding effect that does not block the passage of light.

Solid and opaque partitions create greater privacy and are used to display meaningful messages throughout the building.

### **Conclusion from Observation Periods:**

The on-site observations at each facility provide valuable information regarding spatial and material compositions. Also, studying the general feeling of a space and taking in the activity generated by the inhabitants, qualitative data was gained on the different uses of transparency at two different locations within each case study structure.

At the high school facility, the highly visible design provided an active and informal environment. Students worked in collaboration with one another and used the corridors and open areas to meet. Teachers made use of the spaces adjacent to their classroom in order to supervise students that were dispersed in groups. Intermittently, students appeared to become distracted and disengage from focused work to interact with peers on a social level. Due to the nature of the curriculum and design of the facility, social connectivity appeared to weave seamlessly into learning methods and practices.

The observation periods at the university revealed interesting notions of territoriality. Students gravitated toward the light-filled café downstairs and its counterpart, the open break area, upstairs. At each of these locations, students met with group members to work on a project or gathered informally with friends before or after class. Perhaps as a means to gain territory, students would often huddle in a small group and look or turn around to communicate with others they can see across the room or in an adjacent seating arrangement. In these open areas with blurred boundaries, students

appeared to create temporary social boundaries or delineations. When students were not specifically collaborating with peers, they would choose to position themselves at a sizeable proximity from a neighbor.

The workplace observation periods demonstrated how user habits form in semi-private and public areas of the facility. Because the open plan and transparent material usage permits employees to not only see what the other is doing but to approach a co-worker at will, social norms manifested. For instance, when an employee desires privacy and prefers not to be interrupted he may put headphones on, cover his computer monitor with a device, or display a message on his board. On the other hand, employees that enter the break area appear to be opening themselves up for social interaction or higher volume conversations. The open plan environment at the workstation seems to lend to productivity in terms of ease of information transmission. One example is the fact that two colleagues were able to carry out a quick conversation about a project over the adjoining partition without leaving their seats.

The information gained from the observation periods is useful to compare with the next section of data- interviews- to see what a student or employee feels about his or her particular space.

## INTERVIEWS

At each location, the principal researcher conducted interviews with five users of each facility. The open-ended interview questions were tailored to each facility- high school, university, and workplace. They focused around aspects of the human-environment relationship. The following are notes from the conversations with the focus group. Many interviewees offered different points and perspectives. Specifically, questions addressed sense of privacy, any existence of social status, perception of territory and control over one's environment, and creativity/ productivity. After each question and accompanying answers, results were evaluated based upon the environmental psychology theories and perspectives garnered from the literature review.

### LOCATION 1- High School Facility

#### 1) Describe a typical day at High Tech High.

One student stated that generally they remain with their same group of students throughout the day. They often have two different teachers, though, and join another class for a project. Additional students added that movable walls between two classrooms and the students or teacher open these frequently. There are no bells at their school and they are dismissed to work on a different activity or go to a separate classroom or space when the teachers direct them. Sometimes they are told to come inside, for instance, if they are outside working on a task. Standard school hours are from 8 a.m.-3 p.m.

*Theories- behavioral control; directors within integration theory*

## 2) What does your school environment look and feel like to you?

Many said they think it is more fun to go to school at High Tech High than other schools they attended or schools where they friends attend. One student said he feels like he can make a mess and not get into trouble. Another student said inside the school feels airy and light, just like when they are outside. Another student spoke up and said she feels comfortable going to school there but sometimes would rather sleep in. In general, they like the colors and furniture used.

Theories- behavioral control; arousal perspective of stimulation theory

## 3) Do you feel a sense of belonging at school?

Students said yes, they do. One student said there is a community feel and he can work at his own pace. Another student talked about the teachers, how they encourage leadership and they try and get to know the students. Along this note, one student said they even get to interview teachers if a substitute will be replacing a teacher. The consensus was that the students talk to each other as well. They said there was never any bullying; students were mostly friends. One student noted that there were few opportunities to hide from teachers or mistreat other students. They generally felt safe.

Theories- behavioral control; social component of behavior-setting; physical property of behavior-setting theory; environmental property of behavior-setting; directors

**4) What about territory? Do you have personal space and what are your thoughts on this?**

Each grade has their own wing of the building which includes classrooms and studio space. They said they do not have lockers but do a lot of work on the computer and access assignments at home from teacher websites if they need it.

One student said that more space to store items would be helpful. Each person typically has a desk or long desk that is shared with other students and they sit in the same places after a while. The students think it is habit that they tend to claim personal territory even though it is not assigned.

*Theories-* constraint of integration theory; adaptation level of stimulation theory

**5) How often do you do individual work vs. group work?**

The consensus was that students usually start off working by themselves to get ideas, or if they are doing math problems, for instance, but then they meet with a group. At school they do more group work, then at home they work by themselves.

*Theories-* Suggests attention restoration of stimulation theory by changing to work in the comforts of home

**6) When or where do your most creative or innovative ideas arrive?**

Two students said both at home and at school. Two other students agreed that they feel that more creative work happens at home when they are writing or sketching.

The last student said she gets the basic idea when working at school but usually changes it around when she is at home working privately. She added that “class raises curiosity [on the topic] but she can get distracted if she thinks someone is watching her work.”

*Theories-* attention restoration of stimulation theory; arousal perspective of stimulation theory; constraint of integration theory

**7) How accessible to others are you when you are working? Do you ever feel the need to limit any access from others (more privacy)? Do you feel supervised frequently when you work?**

At school, students agreed they are accessible because it is an open environment and everyone can ask any questions. But when the teacher says they are working individually, most students leave each other alone. There is competition in the work. Two students said that they are more quiet workers than others, so sometimes they wish they had more privacy. All students agreed that while the teacher is in charge, they feel they are not being supervised as heavily as other schools they have attended; more freedom is gained.

*Theories-* environmental setting of behavior-setting theory; director; cognitive control and behavior control

**8) Do you think being visible affects your ability to focus?**



All students said they are accustomed to the way in which work is done at the school. Three students said they love being able to see what other teams are working on. One student said it is harder to focus when it is loud and that it is more distracting to have a high noise level instead of a visual disturbance, such as when they are working in a conference room and someone walks by and looks in. Another student added that sometimes he just needs to take a break and look around. He said looking out through a glass partition into the corridor, or across the way at other students in the adjoining class is similar to looking at posters on a wall. The need for distraction is the same at different times in the day.

*Theories-* adaptation level of stimulation theory; behavior control; environmental setting; physical property of behavior-setting theory; attention restoration of stimulation theory

**9) Do you feel you have freedom to adapt your classroom or workspace? How often are they changed?**

All students agreed yes. They also have the option of using a different room if they need a different space, or they can work at the teacher's desk, which is in a visible, but closed off space next to the classroom. They are frequently modifying their environment depending on what they are learning.

*Theories-* behavioral control; physical property of behavior-setting theory

**10) How often do you receive feedback on your work? Do you trust others to respect your work and vice versa?**

The students said they perform after each project, so they receive feedback often and get to see what others are working on. They feel like some students might be shy at first, but they are encouraged not to judge work negatively, therefore they learn to trust their peers and respect each other's work.

*Theories-* supports of integration theory; directors of integration theory

**11) Do you think your school environment is visually interesting and makes you want to explore it- walk through it and be active? Is it exciting or boring?**

One student said she feels “expressive and free” at school. Another student said he thinks the design is interesting because he can tack things on the wall or paint on the glass for a project. Two students suggested they like working on projects and discovering new things\* by building in the hallway or going outside.

*Theories-* physical properties of behavior-setting theory; arousal perspective of stimulation theory; mystery aspect of Preference theory\*

**Results of High School Facility Interviews:**

The environmental settings appear to set the stage for student expectations and teachers are often the directors which lead the students toward a certain style or type of studying and collaborating. The students placed an emphasis on the amount of behavioral control they have and the freedom to modify their environment. The

stimulation theory is also present in that students stated that their interest and curiosity was sparked at school, but the need to restore attention and focus heavily on a task took place more steadily in the comforts of their home. Social components of the behavior-setting theory show that the students are able to function well in an open environment because they do not feel judged and have freedom to express themselves. Also, they prefer acoustical privacy over visual privacy when working or learning. Lastly, a variety of different spaces to work in and flexibility was a key component to accommodating different student work styles and providing students with the added perception of control.

**LOCATION 2- University Facility****1) How often are you in this building?**

Two students said twice a week for about two hours each visit. One student answered three days a week- two for class, one day for about two hours using the computer lab. The other two students have class three times a week.

**2) Where do you spend the majority of your time when you are in the building?**

Three students agreed that they spend a lot of time in the commons area- in the computer lab, in the lobby, and in the café. One student said he spends about two hours in class and another two-three hours upstairs studying at the lounge/break out area, or in the café. The last student said he goes to class and then goes to the library or his apartment.

**3) Do you feel a sense of belonging?**

Two students answered that they do feel they belong- they have met a lot of other students now and feel comfortable attending class. One student said “sure, I guess” but was not claiming any emotional ties or feelings toward the environment. The last two students agreed that it was easier to feel that they belong since they are now seniors, unlike when they were new to campus.

*Theories- adaptation level of stimulation theory*

**4) Do you have any personal territory here?**

One student answered “not much” but elaborated that there were **social norms of not wanting to sit near strangers sometimes**. The others generally stated that there was not any long-term territory for students, but in class they each had a computer and a place to sit, a group to work with- so **these things became habit and familiar**. One student noted that **many times students are found in the same places** studying, whether a lounge chair in the lobby or the same table with friends in the café.

*Theories- **constraint of integration theory**; **adaptation level of stimulation theory**; **behavioral control***

**5) Where do you typically do individual work and where do you work on group projects or meetings?**

Individual work is primarily done in the classroom or on one’s own time. Group work and meetings take place in the collaborative spaces in the EIT building, usually in the commons area, or upstairs around a table in the break-out space.

**6) How accessible to others are you when you are working? Do you ever feel the need to limit any access from others (more privacy)? Do you feel supervised frequently when you work?**

They feel inside the school, they are very accessible. In the classroom, the **setting is more supervised due to closed walls and proximity to the instructor**, however the students agreed that when they are meeting with groups outside of the

standard classroom, there is much more freedom. The students said that when they need more privacy, they leave the building to work at home, or set up a meeting at the library.

Theories- *physical properties of behavior-setting theory; behavioral control*

**7) Do you think being visible affects your ability to focus?**

One student answered that if everyone is working or is busy, then being visible does not affect him. However, if everyone was purposefully monitoring him, that would be distracting. Another student mentioned that she chooses where she works depending on the noise level, for example the student center on campus is too loud. The remaining students said that sometimes they prefer not to be visible and would rather work at home if it is a focused task.

Theories- *environmental setting; social component; environmental setting; behavioral control*

**8) Do you feel you have freedom to adapt your classroom or workspace? How often are they changed?**

All students agreed with the statement made by one student, “not really.”

Generally the tables and chairs in the classrooms are in a semi-permanent location and the lounge chairs in the break-out area or downstairs in the commons area stay where they are. They feel they use the space temporarily and many other students do as well, so not disrupting the setting would be best for everyone.

Also, one student pointed out that most of the in-depth group or project work takes place in a less formal setting- someone's house or apartment, another location on campus where they can meet for longer time frames.

Theories- *physical properties*; *social component*; *decisional control*; *constraint*

**9) How often do you receive feedback on your work and how often do you see others work? Is work displayed?**

The students said it depends on the course, but generally about twice a semester they have presentations. They receive feedback on their work after each assignment when the instructor grades their work and make comments. However, it is up to each student to collaborate with other groups during projects or check in to see what other students are up to. Work is generally not displayed permanently. Students will see the work of others when the instructor does a demonstration or shows examples, but any displays are awards around the building.

Theories- *behavioral control*; *constraint*; *director*

**10) Do you like to be where the action is or prefer quieter spaces when you are working with others?**

All students stated that when they are working with others it is fine to be where the action is. One student suggested that too high of a noise level can make the

group unproductive and distracted. All stated that quieter spaces are best for private, more individual work. Three students agreed that the café area was the preferred place for group work because many students can fit comfortably in the space and have plenty of lighting. One student expanded on the topic by saying that the café area is always more **fun and active** than the rest of the spaces in the building.

Theories- *environmental setting*; ***arousal perspective of stimulation theory***

**11) Do you think this environment is visually interesting and makes you want to explore it- walk through it and be active? Is it exciting or boring?**

One student commented that the commons area is interesting\* when you first walk into the building- **the flooring, the lighting, colors**. All students agreed the standard classrooms were boring. They prefer the open spaces in the building.

Theories- *mystery aspect*\*; ***physical properties of behavior-setting theory***

**Results of University Facility Interviews:**

Students within the university facility suggest a lack of territory and general sense of ownership to their learning environment. The results suggest that students, once they have become familiar with the idea of being a college student and/or perhaps the campus itself, feel a greater sense of belonging when they are attending class. It is also notable that these college students show a certain level of control over the way in which they



collaborate or seek to connect with others. Answers suggest that depending on the student's personality, he or she will position himself or prefer to study on campus in more informal areas, or the opposite- at his home or in the quiet nature of the library.

Regarding visual privacy, the students all found acoustical privacy and noise control to be more of an issue than visual access to others. As far as the physical properties and modifying their environment, most students felt they did not move furniture or other structures around. A personal detachment or lack of territory led them to believe that because others would need the space, they should not modify the general set up or make any long-term changes.

### LOCATION 3- Workplace Facility

#### 1) Do you feel a sense of belonging?

Yes, all employees agreed they feel a sense of belonging and are engaged in the collective mission of the organization. Those that have worked there longer suggested deeper ties to the work and people.

#### 2) Do you have any personal territory here?

Each employee has a personal workstation. One employee stated that when the new building was built, each employee was given an allotment to spend on selecting particular features of their workspace. Within constraints of the furniture vendor, style, and design, the employees chose storage options primarily.

*Theories- behavioral control over setting*

#### 3) Where do you typically do individual work and where do you work for group projects or meetings?

One employee stated he usually works alone at his workstation, but sometimes for a change of scenery, he sits in the break room area. For group meetings, they usually meet in a conference room. Two employees stated that impromptu meetings often happen in the open workspace where they can see and hear each other without getting up, if desired. The remaining two employees said they

rarely do individual work outside of their station, unless they are working from home.

Theories- *arousal perspective of stimulation theory*; *physical properties of behavior-setting theory*

**4) How accessible to others are you when you are working? Do you ever feel the need to limit any access from others (more privacy)? Do you feel supervised frequently when you work?**

All employees state that they are accessible to others when they are working. One expands by saying that the nature of the company encourages equality and a whimsical tone to a corporate office in that everyone is supposed to have an open-door policy. Two employees agree that additional privacy can be found in other areas of the department, such as a conference room or the break out area. The huddle rooms on each floor were designed to hold small meetings of 2-4 people with more visual privacy, but the employees state that everyone can hear the conversations within a huddle room, so they are rarely used. To the topic of supervision, the employees agree that the space is open and they could easily be supervised, but they don't feel micro-managed. One employee stated that the environment is set up so they could stand up and see into the director's office and vice versa, but rarely does that happen unless they were trying to flag someone down.

Theories- *social component of behavior-setting theory*; *physical property of behavior-setting theory*

**5) Do you think being visible affects your ability to focus?**

No, each employee stated that *they have made changes* or incorporate ways to stay focused within their workstation. One employee mentions not minding the visibility aspect but wears headphones with the noise level is distracting. Another employee says she uses a privacy screen to blur the contents of her monitor when she is not working on it or needs to step away but does not want to shut down a program. The remaining employees state how *they have adapted to the environment and can remain so focused that they are unaware of any visual or audio elements within their surroundings.*

Theories- *behavioral control*; *adaptation level of stimulation theory*

**6) Do you feel you have freedom to make changes to your workspace? How often are they changed?**

The employees address the ability to change their workspace by pointing out the adjustable height worktop, movable pedestals, and ability to move other storage components. *They are also able to take their mobile pedestal, if needed, to another workstation if they move, or need to work in a different location.* Most employees have tried moving their computer monitors around but prefer to face

the north exterior glazing due to the view. In general, small changes are frequently made to their workspaces, but major fixtures remain unchanged.

*Theories-* **decisional control**

**7) How often do you receive feedback on your work and how often do you see others work? Is work displayed?**

Most feedback is in the form of daily and weekly emails, depending on the department. In order to see others work, team meetings are held weekly and employees go over status of work and accomplishments. Displays on wall surfaces of current work are generally found in the large conference rooms.

**8) How often are you interrupted or have casual conversation? Do co-workers walk up or is it over instant message via intranet?**

One employee stated the phrase, “cubicle etiquette”, which underscores the importance of not disturbing someone often and trying to remain cognizant of others’ time. The employees agreed that they are usually interrupted over the office intranet via email and instant message. Some co-workers do prefer to get up and walk around. They state it is probably a personal preference.

*Theories-* **social component; environmental setting; behavioral control**

**9) Do you feel a certain amount of status at work or not?**

One employee states that there is no way around a certain level of status within a corporate environment because it is inevitable that employees have different pay ranges and job requirements. However, he continues, the new building design does a nice job of keeping finishes consistent and the amount of daylighting and views are the same across the board. Another employee adds that the culture of the organization does not place emphasis on status and that everyone tries to remain accessible to colleagues.

*Theories-* physical properties of behavior-setting theory ;social component

**10) What spaces are used more socially used than others? For instance, break room vs. workspace or central atrium?**

Three employees agree that the central atrium throughout, no matter what level they are on, feels very social. As an area of transit, employees gather here waiting for the elevator, or downstairs greeting visitors. A close second is the break out area where employees are on down-time and have a minute to make casual conversation. One employee noted that the open plan of the workstations provides several opportunities for small, quick conversations throughout the day.

*Theories-* supports of integration theory; attention restoration theory; environmental setting

**11) Do you think your workplace is visually interesting and makes you want to explore it- walk through it and be active? Is it exciting or boring?**

One employee states that they are constantly amazed by the level of visitors to the space (usually due to the sustainability practices) because after a while, the building is just their office. But each employee agrees that working in the space provides a great feeling, unlike other office environments they have worked in.

Another employee states the fact that the structure provides 98% fresh air into the building and the amount of natural light filling the spaces is what, according to the director of facilities, has allowed the organization fewer sick day and absentees. Lastly, an employee adds that although the interior design does not jump out vividly with bright colors, it feels **active and alive**.

*Theories- **arousal perspective of stimulation theory***

**Results of Workplace Facility Interviews:**

The answers from the interviewees at the workplace facility support the notion that the employees are afforded a sense of permanence and territory within the environment. Because many are long-term employees and the fact that each has a personal workstation in which he or she can modify, the sense of belonging and territory is enhanced. Also, employees suggest that they have a variety of workspace options in which to use depending on the type of work at hand.

Feedback and communication happens primarily digitally outside of separate meetings. Regarding control, employees can make decisions on how they work

individually and what can aid in their ability to focus. The employees also stated that they rarely have an issue with visibility but acoustical privacy can become a constraint if it is lacking. Because of the permanent, all-day program of the workplace facility, behavioral and social norms have come into play in order to respect others' time and space. Along with this, the culture of the organization promotes high levels of equality which are manifested in the openness of the design.



### CHAPTER III: FINDINGS AND DISCUSSION

According to the research findings, high levels of visibility within learning and working environments can lead to the increase of five factors which have a positive effect on the human-environment relationship (Fig. 3.1).

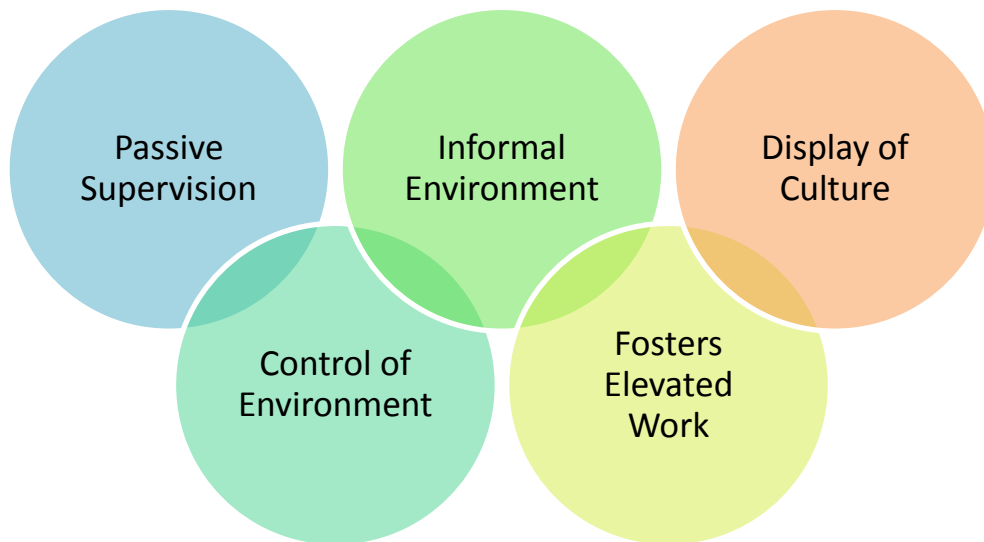


Figure 3.1 Resulting factors of high levels of visibility within learning and working environments.

**Passive supervision** is the ability to facilitate a group without being directly and physically next to the others at all times. This is applicable in learning and working environments because knowledge and production is a goal. Considering many discussions on open vs. closed environments of these project types, high visibility may be a solid design element to fit both needs. Transparent materials can be used to create segmented and contained spaces that do not feel closed off yet they can still provide privacy, particularly through acoustics, as needed. When one is not directly supervised, an increase in freedom and trust begins to surface.

When spaces are planned with visibility in mind, an increased feeling of **control over one's environment** can be seen. Privacy and territory are large contributors to examine with control. Being able to affect one's access and avenues of approach from visitors define the role of privacy in the working and learning environment. Acoustical and visual privacy should be considered together because often it is a balancing act where one can become a constraint to productivity. In this study, visual privacy was less important than being able to limit what others could hear. Similarly, territory is important because the user can manipulate his or her environment for added flexibility to meet productivity needs. In highly visible atmospheres there are less hidden corners and less surprise visits. Compare eroded corners in solid walls and lower workstations with visible access to the alternative of opaque material with few windows or tall cubicle partitions. The former scenario provides the inhabitant with much more awareness and control over the happenings in and around his environment.

An **informal environment** contributes to more communication and less formalities in general. An office with copious amounts of transparent material use in its design often provides an abundance of light transmitting the spaces. On the other end of the spectrum, solid, tall partitions block the access of light and require additional, often artificial lighting to be put back into a space. Also, colleagues tend to approach each other's workspace less when formal permission is required. Finished ceilings and closed spaces tend to lend a more buttoned-up feeling to an interior. While not every space can remain open and filter large amounts of natural lighting, design programs that aim to

increase communication and an overall feeling of freedom will incorporate the elements that lead to an informal environment. Cafes, break out areas, widened corridors, and other opportunities for conversation (in the preference framework, known as “nodes”), can be utilized to add to an informal environment. Research shows that people need to be able to restore attention through self-imposed breaks in order to return back to work refreshed and at optimal production. Also, as social beings, these opportunities create heightened trust among peers which leads to greater sense of belonging.

High levels of visibility within learning or working environments allow users to participate vicariously in other’s projects. Naturally, this **fosters elevated work** among a group because healthy competition can arise or even just a reminder of the goal at hand. Because the use of transparency leads to openness, a person can now see what a colleague, peer, or another team is working on. Collaboration and creativity could be increased due to inquiry about a project and thoughts exchanged where they might not have if work was never shared. Freedom to include oneself, perhaps, into the work of others is increased.

An increased **display of culture** is the last result of incorporating the element of transparency into a design. Literal transparency has a way of acting phenomenally in terms of revealing what an organization is all about. The ability to see the innerworkings of a group leads to greater understanding of the overall mission. This is effective not only for a visitor of a space, but also the everyday inhabitant to act as a reminder of the collective mission. Additionally, a transparent environment that displays a deeper motive could be said to enhance the mysterious aspect of Kaplan’s preference framework. An

active, purpose-driven environment which tells a story is thought to provide stimulation, as opposed to a predictable, monotonous feel.

The original two hypotheses stated in the introduction are as follows:

1. The notion that there is power behind being able to see and contribute, if desired, in the happenings of others and the group at large. This generates a sense of trust and freedom in which people, as social beings, navigate toward, are more satisfied with their environment, and feel more productive and creative.
2. The culture of an institution or group is a driving force behind what is displayed in the built environment and what is expected and accepted. When transparency and openness is celebrated, the users thrive.

Comparing these predictions to the results of research, it is apparent that both hypotheses have merit. What the hypotheses did not explain were the methods of which transparency in learning and working environments produce these outcomes. It is helpful, now, to understand specifically the five contributing factors that high levels of visibility increase and the effect these have on the human-environment relationship of users in schools and workplaces.

### Further Considerations and Limitations

High school, university, and workplace environments have many things in common although often the overall curriculum and directives differ. For this reason, the research engines for each project type might gain from some findings or characteristics of another type. For example, the university setting yielded a more transient, less stationary feeling, evident from the tours as well as through interviews with college students. Certainly the program dictates the time-space nature of university buildings, but an interesting discussion relates to the lessened sense of ownership and territory that came along with being a temporary user of an environment. One resource from the previous literature on higher education design leaned toward future innovation centers that are more project-based. The findings of this research suggest college students could benefit from this alteration or addition to traditional programs from an environmental psychology standpoint.

Along these lines, one limitation of the research is the variety of work a student, college student, or employee might be doing. In an effort to research outcomes of general study, as opposed to a creative field of study and career, this paper did not include an environment within an architecture studio, for instance. It is known that an art student and a graphic design firm carry out different tasks than a business major or information technology professional. An opportunity for further research of the field of interior design, for instance, from secondary education all the way through practitioner could exist.

An additional consideration relies on the notion of teacher's influence and managerial presence has on an institution. For this reason, this study realizes the definition of architectural determinism and the idea that several factors, such as the physical properties, social components, and environmental settings, all play a part in determining a learning outcome.

### Conclusion

The impact a design professional has on a place in time and a culture at large is far-reaching. Because the built environment affects the client, visitor, onlooker, street and environmental landscape, to name a few, it is pertinent for the designer to consider many areas of influence with which the final product could enhance or detract.

In this American study of visibility within learning and working environments, spatial and material compositions are the result of design decisions that ultimately create an atmosphere for the student or employee. Considering the factors that transparent environments can increase, such as elevated work and the opportunity for passive supervision, designers can generate conversations with a client to meld organizational goals with design outcomes. Furthermore, transparent physical attributes of an interior space manifest a feeling of social and psychological openness. This fantastic example of the human-environment relationship speaks to the equally simple, yet profound role of creating space.

C. William Brubaker stated in *School Ways* by Ben Graves that the best architecture somehow captures the essence of an institution's character- picking up in its

materials, common spaces, siting, relationship with the outdoors, or basic organization the elements that make the building distinctive (Graves 1993, 8). Where learning is fostered and innovation is embraced, the goal of the built environment is to enhance the spirit of the institution and increase user opportunity and experience. Designing with transparency in mind can propel this notion of openness into the direction of success for learning and working environments.

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