

**PATTERN LANGUAGE AS A DESIGN AND EVALUATION TOOL FOR
TEAMING ENVIRONMENTS**

by

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University in partial fulfillment of the requirements for the degree of

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Abstract

The transformation of the office from the standard bullpen configuration to today's dynamic, flexible and open floorplans has required new design methodologies that incorporate tools and technologies that are readily available to interior designers. Moreover, the increased use of teams in the workplace challenges interior designers to create environments that accommodate group and individual tasks. This two-phased research study explored the use of a web-based pattern language as a new tool for designing and evaluating teaming spaces. Pattern language is a design formulation methodology developed in 1977 by Christopher Alexander and his associates. It consists of a series of interrelated physical elements combined to create a framework for design solutions.

A web-based pattern language for teaming environments was created by this researcher and evaluated by an e-mail questionnaire sent to a sample of expert design professionals. The feedback from the survey was used to revise the existing language and was the tool used for phase two. This phase tested the pattern language against an existing teaming environment by having the researcher evaluate the space determining the inclusion of each pattern. A focus group was also surveyed and the results of both evaluations were compared for similarities.

The results of phase one showed that of those design professionals surveyed, the majority believe pattern language could be a valuable design as well as evaluation tool. Phase two results showed similarities between the responses by the researcher compared with those of the focus group.

In summary, pattern language may be a useful tool for the design and evaluation of teaming environments.

Dedication

I would like to dedicate this work to my husband whose support, patience and love have strengthened my commitment to this endeavor and whose encouragement constantly motivates me to reach for my dreams and accomplish my goals.

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I would like to thank my committee members, Bob Parsons and Dr. Roseanne Foti for their support and direction throughout this study. A special thank you to Dr. Joan McLain-Kark, my committee chair for whom I hold in high regard as a mentor for her knowledge in the field of interior design research. Her encouragement, guidance and assistance throughout this research project have influenced its quality and direction.

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Chapter I

Introduction

Introduction

Interior design continues to re-define itself as a discipline when designers are presented with new problems that require innovative solutions. This is particularly true in the case in office design. The transformation of the office from the standard bullpen configuration to today's dynamic, flexible and open floor plans has required new design methodologies that incorporate tools and technologies that are readily available to each designer.

Moreover, the increased use of teams in the workplace today has provided another challenge for today's designer. Teamwork has received considerable attention as organizations focus on productivity and reducing costs to compete in a global economy. Many organizations have implemented project work teams that have helped increase efficiency and decrease overhead expenses (Hamilton, Baker & Vlastic, 1996). Although teaming has been only used sporadically in the United States since the 1960s, it has recently become a work method that has influenced many corporate restructuring plans in the past decade (Van Aken, 2000). Teams are being created to solve problems, manage employees, improve processes and develop new products (Van Aken). U.S. companies are now recognizing that merging people with specific specializations into a cohesive group is more successful in achieving both organizational and economic goals.

To accommodate teaming, companies are designating specific areas, floors and sometimes buildings. The emergence of these groups as a viable corporate composition has sparked the interest not only of the design community but also major furniture manufacturers. Designers and architects are being called upon to create environments that respond to dynamic, moveable and flexible work methods. No longer can they simply block in row after row of the standard partition enclosed cubicle. Furniture giants such as Steelcase, Herman Miller and Haworth have responded to the needs of team workers with moveable

desks and support tools that respond to the mobility and flexibility requirements of team members throughout the workday.

Concurrent with the evolution of teams, focus has shifted to the social-psychological needs of workers. These needs are those that address human nature, interests, or affairs (Barnhart, 1969). Following the downsizing in the 1990s, employers recognized that employee satisfaction and retention was critical to remaining successful and profitable (Knoll, 1998). The cost of replacing an employee is far greater than developing methods and practices that keep existing employees happy. And, as Knoll discovered in a recent study, the work environment plays an important role in this employee retention. To explain, employees that were content in their job were also reported to be satisfied with their physical workspace (Knoll). Thus, incorporating elements that satisfy a worker's psychological needs is another challenge faced by interior designers and architects. To meet this challenge, designers need tools that help them easily incorporate these social-psychological needs with the physical needs of the team workplace. Accordingly, the focus of this research was to explore the development of such a tool.

Several factors are important in developing this design tool. First, the tool should be based on current research and established trends in designing for teams. Second, it should communicate design guidelines quickly. Third, as stated before, it should incorporate both social-psychological needs and physical needs of the workers in the team environment. Finally, the tool should be able to be used as an evaluation as well as a design tool.

One design method that was explored for the purpose of this research was pattern language. Named as one of the "25 Products that Rocked Design" by the American Society of Interior Designers (Blixt, 2000), Christopher Alexander's [A Pattern Language](#) is comprised of intrinsically interrelated elements that focus on spatial relationships of inhabitants to their surrounding environments. Published in 1977, it was intended to be used as a design formulation tool by creating the framework for design solutions using interconnected elements of the physical environment while also addressing the

users' social-psychological needs. Each of the 253 patterns is organized to include a picture representing a typical physical problem, links to other related patterns that are larger than the pattern problem, a short description that includes empirical information to support the topic, the solution to the problem and links to other related patterns that are smaller than the pattern problem (Alexander, Ishikawa, Silverstein, Jacobson, King, & Angel, 1977).

A Pattern Language is organized to provide the reader with a road map to designing a space that according to Alexander “lives”. This description of a space being alive is a personal interpretation of a feeling one experiences when entering a room, viewing a garden, opening a gate or standing on a busy city street. These intrinsic feelings are incorporated into the patterns so the designer can include them in the overall design with the hope that the end result will provide a pleasing “alive” space that people will want to inhabit.

While pattern language has had an impact on design, many designers have found the approach to be problematic:

While pattern language has been influential, many designers have not found the concept to be particularly cost-effective to develop for individual projects. However, generic pattern languages may be especially useful as a reference during the programming phase for designing large, complex environments such as nursing homes, office complexes, and shopping malls. Nonetheless, the format as prescribed by Alexander for a pattern is perhaps too long and not conducive to quick reference. (McLain-Kark, 2001).

Accordingly, the concept of pattern language coupled with a more efficient method of communication, the Internet, was explored in this study. From e-mail to checking codes, the world-wide-web has become an integral part of communicating in interior design. Therefore, this research will explore the possibility of using a web-based pattern language for teaming environments as a

valuable design tool in providing the much-needed link between informational programming and evaluation criteria.

Purpose

The purpose of this study is to explore the effectiveness of pattern language as a design tool and evaluation instrument for designing teaming environments.

Objectives and Research Questions

The objectives of this research study are to:

1. Develop " pattern language for office teaming environments" based on related research.
2. Test the "pattern language for office teaming environments" for usefulness as a design tool by obtaining feedback from expert designers.
3. Develop an evaluation instrument based on "A pattern language for office teaming environments." Test the evaluation instrument with one teaming environment.

The underlying research questions for purposes of this study are:

1. How useful is "pattern language for office teaming environments" as a design tool for office teaming environments?
2. How useful is "pattern language for office teaming environments" as a design evaluation tool for office teaming environments?

Justification

Ideally, the insight obtained from this study will provide designers, architects and facility managers with the informational tools necessary to create effective teaming spaces. The easy accessibility of the Internet will enable designers to use this tool while concurrently developing their designs on the computer. However, it is necessary to get feedback from designers to the usability of " pattern language for office teaming environments." In addition, it is

important to test an instrument based on "A pattern language for office teaming environments" in order to test its effectiveness for design evaluation.

Chapter II

History and Background

Background on Teaming

The use of teams is not new to American work culture; in the 1980s American auto and industrial organizations began using teams to combat Japanese competition (Dumaine, 1994). The Japanese implemented teams by empowering groups of people to assemble products from start to finish and rewarded performance of the team instead of the individual members. These Japanese companies relied on teams to solve problems, increase productivity and develop new products (Van Aken, 2000). Prior to 1980, the organizational structure of American manufacturers was structured around a series of assembly lines with individual workers responsible only for their segment or task within the line. Rewards and benefits such as pay, bonuses, raises and promotions were based on individual performance. In most American companies teams and teamwork were not a natural part of the culture but with recent technological advances, governmental regulations, global competition and increasing changing expectations of the workforce impacting organizational compositions in the 1990s, they recognized the need to respond to such external factors and began to focus on the merits of the Japanese work methods; namely teaming (Van Aken). Within the past 10 years an average of 39% of the United States employee population is on a team (Van Aken). Companies have decided to implement teams to produce better business results responding to the demand for faster, better and less expensive products and services.

The 1990s brought many alternative methods of working and teams were formed to serve a multitude of functions from product development to corporate policies and decision implementation at the executive level. To thoroughly understand the needs and requirements of a team, it is important to define what constitutes a team. A team is a group of individuals who are:

1. independent in their tasks
2. share responsibility and accountability for a common goal and outcome

3. see themselves and are seen by others as an intact and bound entity (Van Aken, 2000).

There are various types of teams but two specific categories have evolved and become prominent over the past few years. The most popular are work teams and problem-solving teams (Dumaine, 1994). A work team is an on-going permanent group assembled to conduct day-to-day work. Typically it is a self-managed team and each team member has authority to make decisions regarding work methods. A problem solving team is an ad hoc group assembled to tackle a specific problem then dissolved once the problem is resolved (Dumaine). Both types of teams can be used congruently and employees can find themselves on several teams at one time. These teams are very dynamic in nature and require work tools that are responsive to their needs.

With teaming evolving as a viable organizational structure, designers, architects and furniture manufacturers are responding to the physically dynamic needs of teams. As people shift from team to team flexibility and mobility become the underlying factors to consider in designing teaming spaces. Team members, however, do not work in a team all day (Brill, 1998). Generally the workday of a team member consists of both collaborative group work and individual tasks. Team members must have privacy and space that provides them with the opportunity to work in solitude as well as open group spaces that foster teamwork. Therefore, not only must a teaming environment respond to flexibility and mobility, it must provide ample space for individual work. The challenges facing today's interior designers, architects and furniture manufactures in planning open and collaborative spaces for teams mirror those struggling to plan open office environments in the 1950s using the open office-landscaping concept.

Open office design has not been able to establish acceptable standards because ongoing events are constantly challenging anything that might seem like established norms. The results of this office revolution are not yet sorted out – new equipment is made obsolete by newer equipment almost daily; changing the nature of office work in ways that are almost impossible to follow. The physical

environment of the office is usually designed as a reactionary response to external factors effecting work (Pile, 1984). With no real standards, the task of training students and practitioners to space-plan such environments becomes extremely difficult.

History of Open Office Planning

The history of open office planning is relatively new with its origination dating to the mid 1950s. During this time, the office was transformed from the typical American bullpen office layout that was row after row of desks amassed in a large open room, to an innovative design approach termed *office landscaping*. This concept, originated by the Quickboerner team in Germany, changed the nature of office design (The Business Press, 1969). The Quickboerner team determined that work environments needed to facilitate communication and work flow. Paper flow throughout the office was also studied and evaluated (Pile, 1978). Office landscaping is the foundation for open office planning, as it is known today. The elements of office landscaping included an open space with minimal hard wall applications, meandering paths to create interest, curved moveable panels for division of space, desks arranged to promote communication but situated in such a way that direct eye contact was not possible, open filing areas central to all employees and many plants which also helped divide space (Pile) (see Figure 1).

The office landscape concept of office planning was viewed as an obscure method of situating people in spaces that had no geometric symmetry and no perceived organizational layout. Although this new concept originated in Germany, much of Europe was hesitant to adopt this radical new way of designing office space. They believed the office landscaping concept of planning was hindered with many restrictions and dictated the manner in which an office was designed.

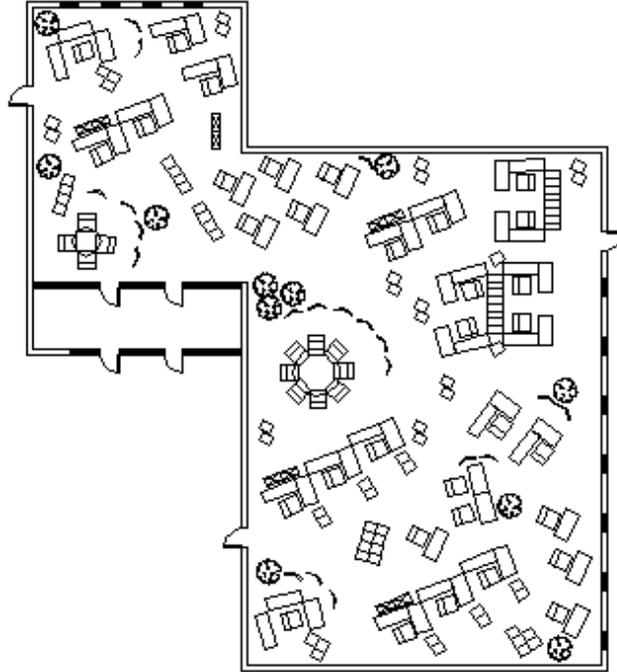


Figure 1. Burolandschaft or office landscaping floorplan.

In America, about the same time office landscaping was evolving as a new planning method, a man by the name of Robert Propst inadvertently contributed to the development of open office planning as it is used and recognized today. In the 1960s another revolution in office planning addressed the increased need for privacy and storage. Propst designed a partitioned panel system consisting of screens and storage components for the furniture manufacturer Herman Miller and named it Action Office (Pile, 1978). This system gave designers the opportunity to provide workers with individual work areas, centralized filing and acoustical privacy.

The panel system sparked excitement in the office furniture industry and soon the furniture manufacturing giants Steelcase, Haworth and Knoll each had their own version of Action Office. Throughout the 1970s and 1980s enhancements such as electrified panels, additional storage components and upgraded fabrics and finishes provided workers with better work environments that fulfilled a multitude of requirements (see Figure 2). Interior designers and architects became accustomed to designing with panel systems and including

the “ice-cube” tray layouts in their designs (see Figure 3). These layouts satisfied the need for privacy and individual work; collaborative meetings and work requiring interaction typically occurred in a conference room.



Figure 2. Typical office layout with panel systems furniture using Action Office.
Note. From Herman Miller Product Brochure [on-line], 2001. Reprinted with permission.

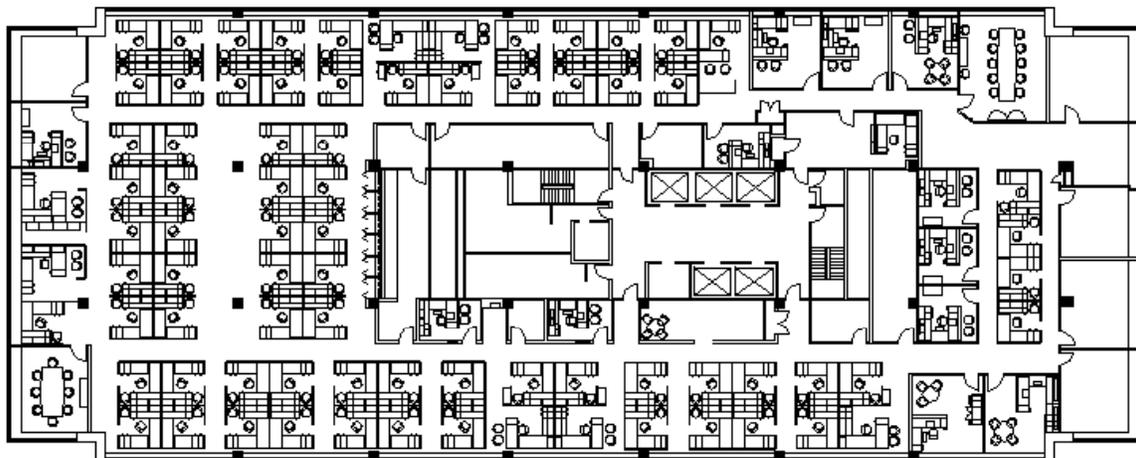


Figure 3. Typical “ice cube” layout with panel systems furniture.

Open Office & Teaming Environments

In the 1990s attention turned to communication. Group work and teaming became important as the use of teams in organizations was increasing. The need for a designed layout that incorporated both a space for private work as well as areas for group interaction became requirements for the interior designer. A balance between the open design of office landscaping and the individual private cubicle became the challenge for designers in the 1990s. Furniture manufacturers responded to these challenges by introducing mobile furniture such as moveable screens, storage pedestals and conference tables. No longer were designers able to block in row after row of cubicles. They needed to design teaming environments as constantly changing dynamic spaces. The new furnishings for teaming environments provided challenges in accommodating cabling and communication connections yet responded to the new alternative ways of conducting work. The new teaming layouts resemble those of office landscaping (see Figure 4). The furniture is an updated version of the 1950s office landscaping furnishings and the concept of free flowing pathways and integration of spaces is very similar to that found in the early open offices (see Figure 5).

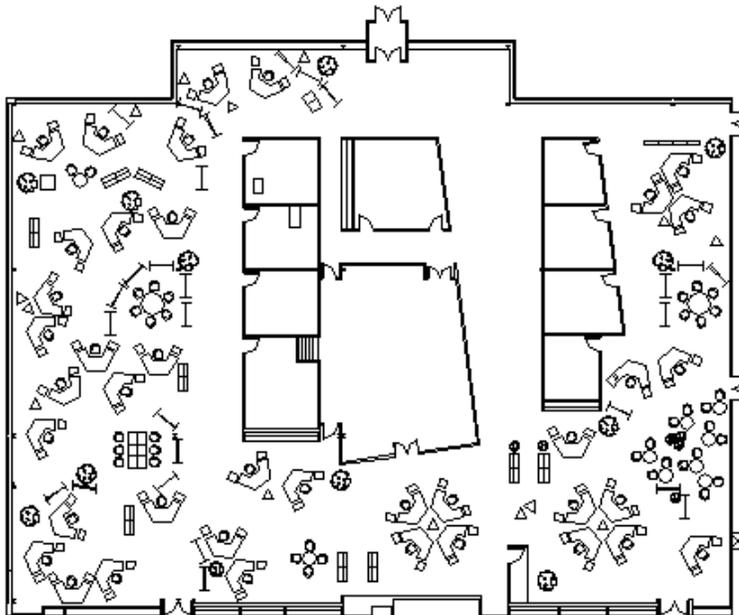


Figure 4. Typical layout of teaming environment.



Figure 5. Typical teaming environment for the 1990s. © Steelcase Inc. 2001

Note. From Steelcase Product Brochure [on-line], 2001. Reprinted with permission.

Many have considered teaming a fad of the 1990s, however, the need still exists for improvement in processes and products, collaboration across disciplines and quicker cycle times (Van Aken, 2000). Teams may vary in size and function, yet they have proved to be an integral part of today's organizational composition. As organizations continue to center work around teams and teamwork, combining the knowledge from planning open office landscaping spaces with that obtained from designing private individual cubicles may prove beneficial in finding the balance needed in satisfying the group and individual requirements of team members.

Planning & Evaluation Methods for Office Planning

When designers are called upon to design a traditional office, (no alternative officing elements), they draw upon previous knowledge and experience. Each designed space provides the designer with feedback regarding what should be repeated in the next office design and what should be revised or eliminated. This pool of information provides the foundation for the

next design. It gives the designer the tools needed to ask the appropriate questions and gather the pertinent information required in designing the office. This process of information gathering, implementation and evaluation is termed the design process (Kilmer & Kilmer, 1992). Kilmer and Kilmer have devised an eight-step design process (see Figure 6). These eight steps can be further subdivided and categorized into those pertaining to information gathering, (commit, state, collect and analyze), implementation, (ideate, choose, implement) and evaluation. The design process is cyclical in that information received from the evaluation phase influences the information gathering phase in the next project. These two phases impact the success or failure of the implementation phase and ultimately the project.

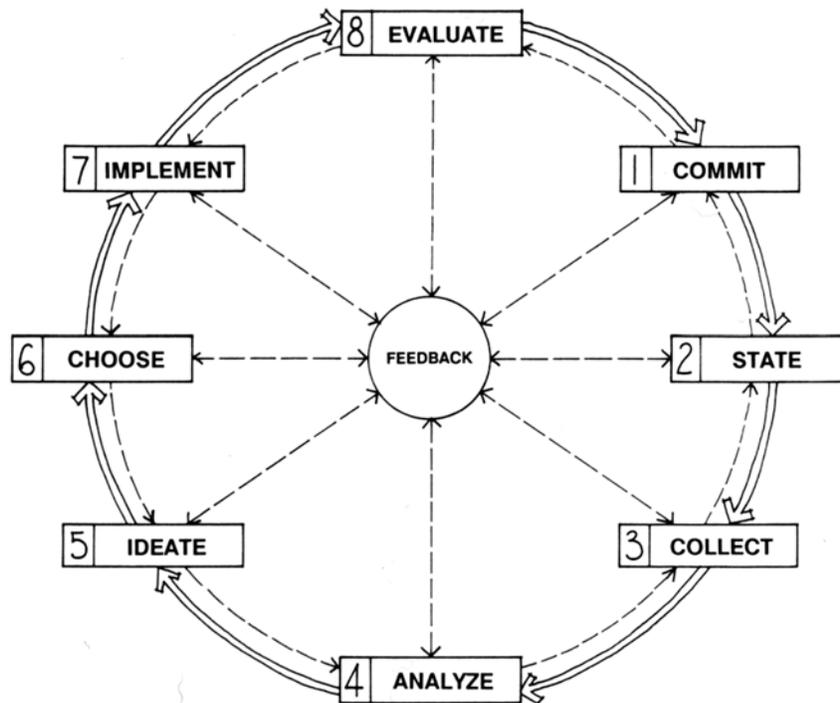


Figure 6. The design process.

Note. From *Designing Interiors* (p. 156), by R. Kilmer & W. O. Kilmer, 1992, Orlando, Florida: Harcourt Brace Jovanovich. Copyright 1992 by Holt, Rinehart and Winston. Reprinted with permission.

The programming or informational gathering phase is essential to beginning any project. It is during this phase that the designer commits to the project, states the intent, collects pertinent data and information and critically analyzes the details. A designer must understand the scope and requirements of a project before design implementation can occur. Implementation includes creating a design, choosing the appropriate selections and installing the materials, finishes and furnishings. Although many consider the evaluation phase equally critical, the evaluation is sometimes overlooked due to cost and time constraints thereby breaking the informational link between evaluation and programming. Failure to conduct a final evaluation can be analogized with a teacher preparing a test, administering it to a student and failing to grade the completed test. This last evaluative step provides the student and teacher with important information just as it does the designer and the client

Designing for teams requires insight into the interior design process. Interior designers typically begin the process of creating a new office environment by assessing the needs of their client. This information gathering is referred to as the programming phase in the design process (Miller, 1995). Communication between the client and designer is critical for this phase. It is during this phase that decisions are made regarding function, aesthetics and budget (Miller). Feedback and revisions on the part of both the client and the designer are typical for this phase. Programming information is gathered through designer-client interviews, on-site observations and behavioral mapping. Forms and worksheets are created to aid the designer in gathering pertinent facts and information relevant to the project. Figure 7 is an example of a worksheet used to collect information using the behavioral mapping technique. Through observation, over a specific time period, the designer records behaviors that occur in the space. This information identifies behavioral criteria and contributes to the pool of programming knowledge necessary to successfully design the space. Pre-printed programming tools are also helpful in identifying specific individual requirements and information. Many major furniture manufacturers such as Steelcase, Haworth and Knoll provide designers with pre-printed

planning surveys to assist in the collection of important data. Figure 8 illustrates an example of the questions posed in such a survey. The designer questions the client on specific quantifiable requirements such as the amount of storage and filing cabinets desired, the type of documents to be filed and the number of work surfaces considered necessary. Quantitative requirements identified from these surveys can be calculated and incorporated into the design of the new work environment. Information obtained through on-site observations and behavioral mapping can provide both statistical information as well as qualitative insight. Qualitative data is more subjective and typically is obtained through interviews with the client and personal observations of the designer. This information contains descriptions that cannot be statistically calculated. Corporate image, goals of the organization and psychological needs of the worker are qualitative elements that cannot necessarily be obtained from a quantitative survey.

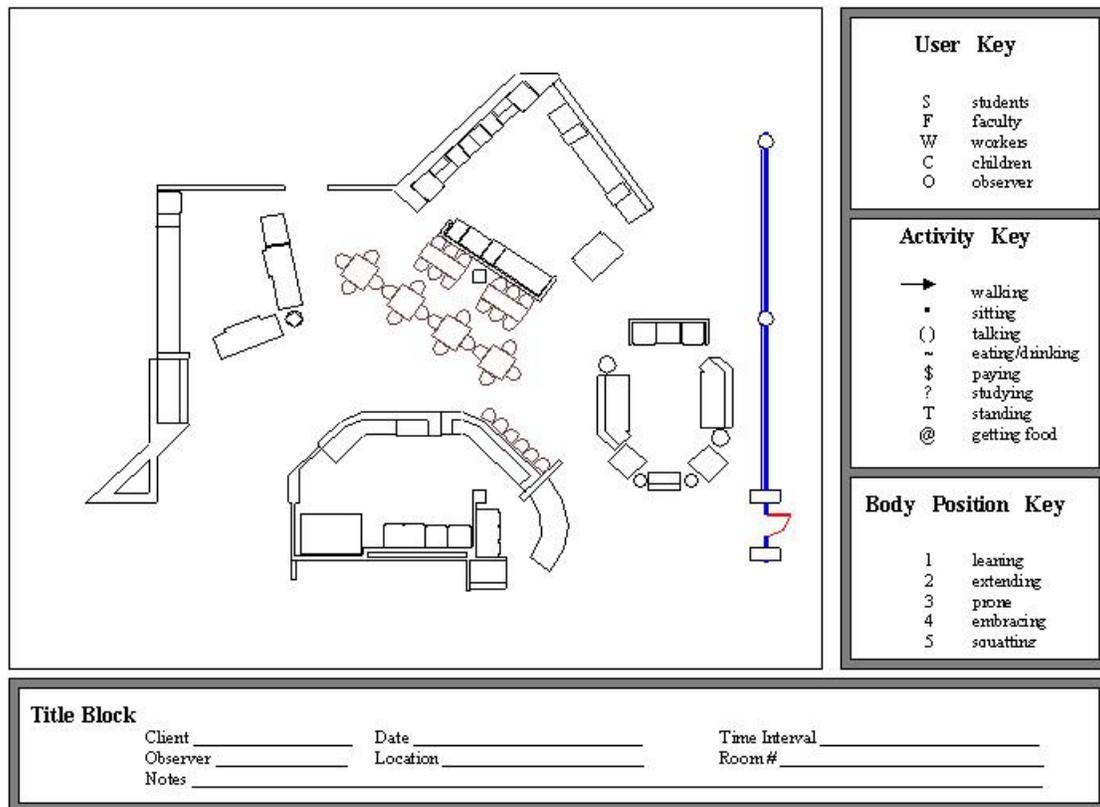


Figure 7. Behavioral mapping worksheet.

Work Station Design Planning Survey

2. Does your job require storage of any of the following: Indicate their approximate dimensions (length x width x height) and if they are personal or shared with others in your department:

	Dimensions	Personal	Shared	N/A
a. Awards	_____			
b. Binders	_____			
c. Blueprints/Plans	_____			
d. Computer Disks/Tape	_____			
e. Data Reports	_____			
f. Directories	_____			
g. Files	_____			
h. Presentation Boards	_____			
i. Reference Books	_____			
j. Slides	_____			
k. Supplies, etc.	_____			
l. Videos	_____			
m. Other	_____			

4. Are conference areas readily available when you need them for larger meetings?
For how many people, on average?

Yes _____

No

Figure 8. Typical questions in pre-printed workstation survey questionnaire
Note. From Work Station Design Planning Survey brochure. (p. 1,3), by Haworth Inc., 1996, Holland, Michigan: Haworth Inc. Reprinted with permission.

The result of this information gathering phase or programming process is a list of goals for the project, problems to be addressed and requirements to be fulfilled (Miller, 1995). Both quantitative and qualitative information acquired at the programming phase of the design process are incorporated into the development and implementation phases (Steelcase, 2000). During these next

phases, the designer strives to satisfy the quantitative requirements established by the client. Congruently, the qualitative issues are addressed and incorporated into the overall design.

After the implementation phase, it is necessary to ascertain the successes and shortcomings of the project. Found problems in the work place are most often due to a lack of communication regarding expectations between the designer and the client. Often the goals of the designer conflict with those of the client creating an unsuccessful design solution. The needs of the employees and the use of the office are sometimes not properly addressed in the programming phase, which can result in an ineffective workspace (Davis & Sziget, 1982). The final design phase, (evaluation), is typically conducted using a post occupancy evaluation. These evaluations are conducted after the client has assumed occupancy of the space and are intended to provide both positive and negative feedback with the built environment. Evaluations usually consist of a simple walkthrough, a few interviews and perhaps an inventory of the furniture (Davis & Sziget). Information obtained from these evaluations is invaluable to the client as well as the interior designer. Not only does it provide the opportunity to correct existing problems, it contributes to the pool of knowledge necessary in planning the next project. Although evaluating a completed project supplies critically useful information, post occupancy evaluations often face opposition due to companies not willing or able to justify the cost of such a service (Duffy, 1997). Without a post occupancy evaluation, viable information is not available for use in programming future office environments. Experts in the field, however, recognize the merits of post occupancy evaluations and encourage clients and designers to participate in this final step of the design process. An important guideline in conducting post-occupancy evaluations includes appraising the design from a large perspective and incorporating external factors outside the immediate designed space (Duffy, 1997).

With new work methods and changing demands of the worker constantly evolving, other programming and evaluation tools such as workplace performance surveys, time utilization studies, workplace envisioning and building

appraisals have evolved and can be combine with existing design tools in contributing to the pool of information needed in designing successful spaces (Duffy). These newer planning and evaluation methods work together to provide programming information and criteria for workplace evaluation.

The building appraisal tests the spatial needs of clients against existing buildings and floor plans. Workplace envisioning constitutes a method of involving end users in the development and design of their workplace, (recognizing that involvement will increase the sense of ownership in the work environment and lead to greater commitment to the newly designed space). Time utilization studies measure the amount of time spent in specific locations and computer-aided techniques measure the interaction between time and space (Duffy, 1997). Also included in the newer methods is the workplace performance survey, which is distributed to employees to measure the benefits and shortcomings of their office environment. Typically consisting of 50-60 topics, the employee is asked to identify the important elements and the effectiveness of their workplace (Duffy). Although these tools are the most popular methods of planning and assessing a workspace, often, those called upon to conduct them lack training in obtaining behavioral information about the designed space; thereby failing to incorporate the impact of external factors on behavioral issues.

These planning and evaluative methods have evolved with the changing work force as it has sparked innovative ways of developing and assessing the work environment. For the most part, these new methods collect and quantify physical data. The information collected successfully identified and satisfied deficiencies in the physical work environment based on quantifiable and measurable criteria. More recently, however, focus has been directed towards satisfying the socio-psychological needs of the office worker (Herman Miller, 1999). Employers find themselves struggling to retain qualified, well-educated employees. With a slow population and labor force growth rate, employers are adjusting jobs, training, and work environments to suit the needs of the worker (Herman Miller). Also, with the continuation of technological advances, skilled workers will become more in demand as the education system fails to parallel the

advancement (Herman Miller). Employers will make great efforts to entice and retain qualified workers and as work methods continue to change and demands placed on employers and employees increase, the workplace will continue to evolve in a response to external factors and stresses. In addition to addressing the physical needs of the worker, programming and evaluations of the workplace will need to include psychological elements.

After the walls are built and the final finishes are applied, the inhabitant of a space accesses the “feeling” of the space and begins to make changes to adapt it with personal changes. This sense of creating a humanistic environment is a relatively new field of study known as placemaking (Herman Miller, 2001). Placemaking bridges the gap between the physical and the mental and is becoming extremely important in today’s offices. It is the mental response to the environment and the surrounding spaces one inhabits (Herman Miller). Addressing socio-psychological needs in the work place will become as important as the physical requirements with employers striving to retain qualified workers. The difficult part of placemaking or designing such an environment is determining the role of the inhabitant using the space. The key is to develop new skills in identifying the conceptual connections between the inhabitant and the environment (Herman Miller). According to Michael Brill, architect and president of BOSTI in a booklet titled, The Office as a Tool, the following are suggestions for incorporating placemaking in office planning:

1. “Design to help integrate work life and ‘life-life’. One of the characteristics of high-performing staff is that there is no clear demarcation between their life at work and their lives in general.”
2. “Subdivide floorplates into understandable ‘places’.”
3. “There is a kind of psychic oppression people have with a large number of near-identical workstations in a large area. In such a situation, the whole place feels like ‘no-place.’”
4. “Design each workgroup so that it is recognized as a separate ‘place’.”

5. “Create a center for each workgroup and for each neighborhood. There should be a place for behaviors which are part of work but not its core, like the coffee break.”
6. “Recognize people in the streets. To reduce feelings of anonymity and increase the sense of community and feelings of security, no corridor should be longer than about 65 feet which is the maximum distance at which people’s faces can be recognized.” (Teknion, n.d. p. 29-31).

While often the more difficult part of the design solution, addressing and satisfying socio-psychological needs becomes the most culturally fulfilling and the most enriching part of designing a space (Herman Miller).

Pattern Language

Just as placemaking is the creation of an “enjoyable, comfortable, supportive, and meaningful environment” (Herman Miller, 2001. p. 1), another equally revolutionary methodology was developed by a group of architects from the Center for Environmental Structure to address these same psychological needs. Presented in 1977 as a two-volume set of theoretical design solutions used to transform space into meaningful designs for human use, The Timeless Way of Building and A Pattern Language by Christopher Alexander, Sara Ishikawa and Murray Silverstein is a poetic and thoughtful response to the mass reproductive designs seen today. The first book, The Timeless Way of Building describes the motivation and theories behind the methodology. The second volume, A Pattern Language details the intended implementation of the methodology. Together, they provide an intuitive solution to designing spaces that address the physical as well as socio-psychological needs of the inhabitants.

Alexander presented his approach to design development through a series of components known as patterns. Each pattern describes a relationship between a specific context, problem and solution (Alexander, Ishikawa & Silverstein, 1977). These three components are included in each of the 253 patterns described in the book A Pattern Language. A unified approach is given

in presenting each of these patterns. First, a picture provides a physical example of the pattern. Next, there are links to other patterns at a higher macro-level of abstraction. A brief description of the problem is presented followed by the solution. Last, links are provided directing the user to smaller patterns at a micro-level of abstraction (Herzog, 1995). Patterns are not to be used alone. They are based on hierarchical relationships between larger and smaller elements and using these hierarchical patterns together forms a language. As with any language, letters must be used together to form words, words combined to form sentences and sentences grouped together to form paragraphs. This also applies to pattern language; a specific pattern must help satisfy larger patterns while be completed by smaller ones. It is from this methodology that design generation considers interrelated elements that go beyond satisfying a single specific requirement. For example, a room has larger relational links to the building in which it is housed, the street location of the building, and the city, state and country that identifies the street. That same room is also linked to smaller elements such as the walls within the room, the furniture placed throughout, perhaps a particular chair behind a desk and the finish placed on the chair. These macro and micro hierarchies translate to pattern links within Alexander's language. The language does not need to be used in a particular order; the authors intended for the user to select those patterns that pertain to a specific design problem and design a solution by creating sub-languages with certain patterns.

Pattern language was developed after many years of studying human behavior in relation to its environment and Alexander's influence on urban planning and architecture can be seen in the design of the following projects:

1. Julian Street Inn – Shelter for the homeless (San Jose, California)
2. San Francisco Museum – Carpet Gallery (San Francisco, California)
3. West Dean Visitor's Centre – Gallery Space (West Sussex, England)
4. The Mary Rose Museum (Portsmouth, England)
5. The Medlock House – User designed house (Whidbey Island, Washington)

6. University of Oregon – Student apartments (Eugene, Oregon)
(Alexander, on-line, 2001)

Each of these listed spaces reflects the ideas of providing a sense of place for the inhabitant while satisfying specific problems with solutions. Alexander's works and theories have been highly regarded in both the residential and commercial design communities. A growing segment of the residential design community has embraced Alexander's theories with books inspired by his ideas such as The Not So Big House and Creating the Not So Big House by Sarah Susanka which incorporate designs and ideas for the way humans live and combat the traditional American belief that more is better. Understanding human behavior and designing in response to that behavior is the cornerstone of the pattern language methodology for all types of design. His ideas have become so well respected that recently the American Society of Interior Designers named pattern language as one of the "25 Products that Rocked Design" (Blixt, 2000).

Although pattern language has been influential in the architectural and urban planning disciplines, an unusual venue for its use and implementation has been among software developers. Using Alexander's model as a framework, these groups have rallied around the use of pattern language for developing new products, improving processes and evaluating problems and solutions (Coplien, on-line, 2001). Today's growing acceptance of pattern language among software developers can be seen by their support of nationwide conferences focusing on patterns and the growing body of literature written on the topic (Coplien). This growing field demonstrates that innovative approaches to problem solving are relevant to new disciplines that are constantly transitioning, changing and evolving.

Alexander has, throughout the years, provided insight into office planning. Many of his published patterns are applicable to team work and the overall office environment. He has described the current methods of office planning as "malicious negligence towards unwitting end-users" (Gandee, 1987, p. 120). He believes offices can be built with humanistic attributes at the forefront of design. His view of current work environments criticizes the sterile, lifeless work shells

equipped with inhuman furnishings. Most of today's culture has come to accept these work environments without question and do not expect an office to respond to their human needs of comfort, pleasure and enjoyment. Alexander has proposed three guidelines for transforming current philosophy into one that would create a psychologically pleasing environment. They are:

1. "People have a right to expect an emotionally enriching workplace environment."
2. "It is possible, with materials and methods already available, to achieve this."
3. "The actual cost is not significantly greater than what it costs to create an oppressive work environment. "

(Salingaros, 1997. p. 2)

These principles require educated thought and careful planning on behalf of the interior designer and architect as well as educating the client on how to address and satisfy workers' socio-psychological needs in the office. Just as pattern language proved to be a beneficial tool for software development, perhaps it may also be a relevant programming and evaluative instrument for teaming office environments.

Chapter III

Methods

Research Design

Although information is currently known and documented about pattern language, what is not known is the feasibility of using it to establish criteria in designing and evaluating teaming spaces. The purpose of this research was to explore the possibility of using pattern language in a way never imagined by its creators. In order to evaluate pattern language as both a programming tool as well as an evaluative instrument, a two-phase approach was selected; to first validate it as a design tool for teaming spaces and second to evaluate it against an existing team space.

A pilot study was conducted with a select sample of interior designers to test the logistics and content of the e-mail survey proposed for phase one. Suggestions provided from this sample group were used to revise the existing survey and process before the phase one survey was administered.

Phase one surveyed a select sample of design professionals from top architectural and interior design firms to evaluate and provide feedback on an existing pattern language developed for teaming spaces. Information received from this survey was used to revise the existing language. This revised language was then tested in phase two as an evaluation tool on an existing purposefully selected teaming space. The information from this research will be important in that it will provide insight into the possibility of utilizing pattern language as criteria for both design development and evaluation of teaming environments.

Framework

The conceptual framework for this study was developed from a four-phase process used to access and gather meaningful information in evaluating a designed space (Steelcase, 2000). Most evaluation tools focus on quantitative benchmarks for proving design and functional success. With the emphasis of designers and planners to satisfy not only the physical needs of a work

environment but also the socio-psychological needs of workers, a more qualitative approach to evaluating workplace design is needed. Employers are concerned with employee retention and recruitment and the work environment is often a contributing factor to both of these concerns. This framework demonstrates the importance of pattern language as both a programming tool and an evaluation instrument for teaming environments.

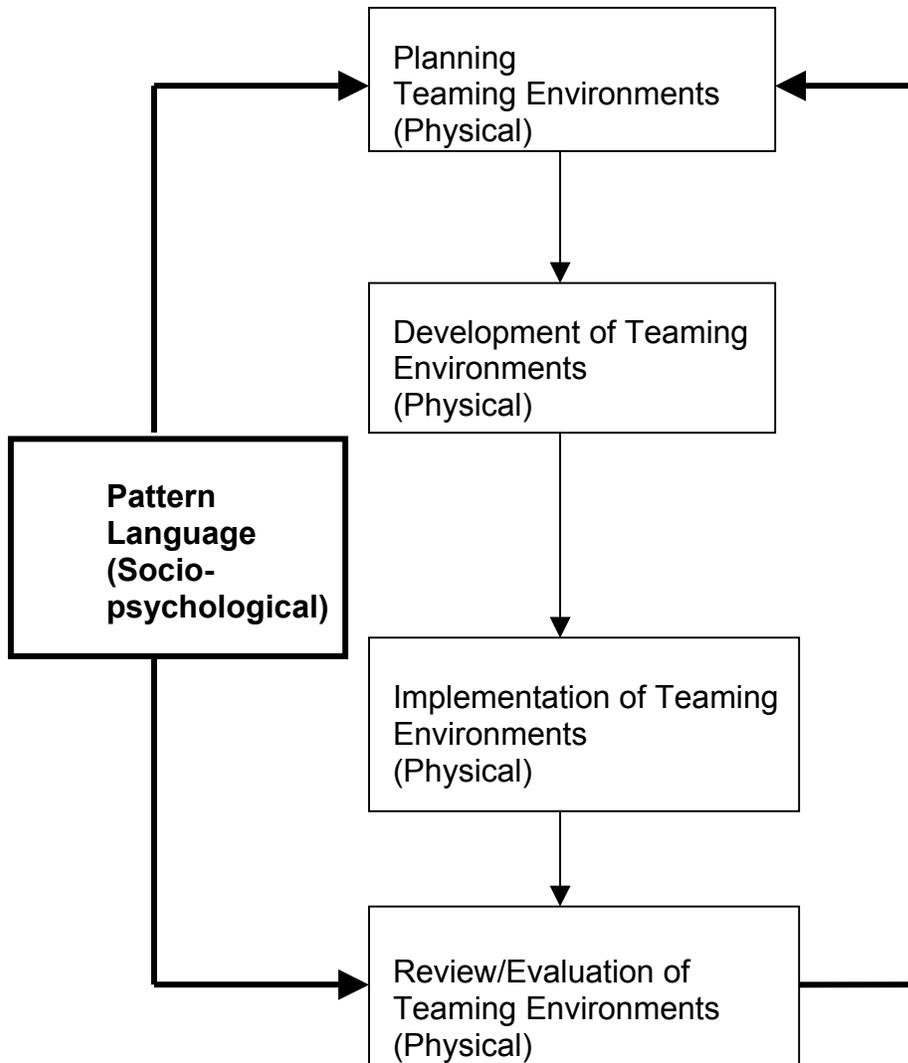


Figure 9. A conceptual model demonstrating the use of pattern language in providing the link between programming and evaluation, (adapted from Steelcase, 2000).

Pilot Study

A pilot study was conducted to evaluate the internal validity of the e-mail survey that is to be used in phase one. A select sample of ten interior designers known by the researcher was asked to review the phase one survey and evaluate it on ease of accessing the pattern language website and clarity of the survey (see Appendix A). Each designer was e-mailed a brief questionnaire and asked to respond using e-mail to a five question Likert scale survey. The questions evaluated the length of time necessary to complete the survey, the ease or difficulty accessing the pattern language website, the format of the pattern language on the website, the e-mail letter requesting participation in the study and the survey itself. Six interior designers completed and returned the pilot survey.

Based on the response of five of the interior designers surveyed, (the sixth did not respond to the question regarding time), the length of time to complete the process of reading through the pattern language on the website and answering the e-mail survey ranged from 5 minutes to 20 minutes with a mean time of 13.75 minutes. This is important because it is believed that a shorter response time will increase the chance of a larger return rate for the phase one survey. Table 1 summarizes the findings from the six designers regarding the remaining four questions.

Table 1
Means of Responses to Understandability of Items for Survey

<u>Description</u>	<u>n</u>	<u>M</u>
1. Access to the website	6	5
2. The pattern language	6	4.5
3. The e-mail letter	6	4.9
4. Survey	6	4.9

Note. Scale of 1-5 with 1=confusing and 5=easy to understand.

In addition to the Likert scale questions, the designers in the pilot study were asked for suggestions in improving the readability and understandability of the pattern language and survey. One designer suggested an easier method of responding to the Likert style questions. She described difficulty in understanding where to type her response using the scale. With e-mail as the medium for this survey, the response method must be easy and understandable for the reader. For that reason, the survey has been revised and is now included as an attachment to the e-mail. This places the survey in a format familiar to most people (Microsoft Word). The Word document was saved as an earlier version to accommodate those who may be running an older version. The lines for descriptive feedback have been eliminated and responses can be typed in the empty space provided (see Appendix B).

The survey is also included in the body of the e-mail for those participants who hesitate opening attachments. This e-mail survey has been revised to provide space for responses above the scale.

Phase One – Instrument Development and Testing for Internal Validity

Description of the Instrument

A pattern language for teaming environments was designed by this researcher for a graduate interior design project at Virginia Polytechnic Institute and State University. This language includes 11 patterns that have been researched and detail the essential elements needed in designing a successful teaming space. A descriptive home page introduces the concept of pattern language and explains its intended use for teaming environments. Each pattern consists of a title, description and image to communicate the problem and solution as outlined by Alexander. Following the format of Alexander's pattern language, the website is organized to link the reader from the largest concept (connections to the community) to the smallest (a place to call your own). This pattern language is accessible on the web at <http://filebox.vt.edu/users/lanthony> (see Appendix C) and served as the instrument for phase one. It was tested for internal validity and was the basis for instrument development in phase two.

Participants in the Study

In the January 2001 issue, Interior Design Magazine published the top 100 interior design firms. This list of top design firms was compiled using financial and revenue criteria. For purposes of this study, each design firm on the list was first evaluated based on web-site availability. It was believed that if the firm has a corporate web site, it is advanced in computer technology and would respond to a web-based research project. Search engines were used to locate corporate websites. Those without a corporate web site were eliminated from the sample. Next, those firms with websites were investigated to locate e-mail addresses for interior design and architectural contacts. If the company had various locations, each location was included if e-mail contacts were provided. A total of 341 were included in the phase one survey.

Procedure

A questionnaire was e-mailed to the sample of experts in the field of architecture and design. This questionnaire consisted of five questions, each exploring the usefulness of pattern language in designing and evaluating teaming spaces. Two questions were formatted using a Likert scale upon which statistical conclusions provided insight for this phase. The remaining three questions required yes or no responses and encouraged feedback. The existing language was revised based on feedback obtained by the completed surveys. It is this revised language that was the basis for phase two of this study.

Two weeks was allotted for responses to be returned to the researcher. After seven days, a reminder e-mail was sent to those who had not responded, (see Appendix D).

Data Analysis

The data from the first two questions was evaluated based on frequency response to the Likert scale. This information tested the usefulness of the pattern language as a tool for designing and evaluating teaming environments. The remaining three questions required yes or no responses and were analyzed

based on frequency of response. The descriptive feedback was used for revising the existing pattern language.

Phase Two – Evaluation of Teaming Environment

Description of the Instrument

Using the revised pattern language for teaming environments as criteria for a successful design, two Likert scale observation forms were developed to test the inclusion of each pattern within a selected teaming space (see Appendix E & F). The first form was used by the researcher and utilized a three-level scale designed to judge the selected space on no inclusion, partial inclusion or full inclusion of each pattern element. Space was provided for comments by the researcher. The second instrument for this phase (see Appendix F) was developed to survey responses from a focus group. This survey provided feedback from employees relative to the pattern language and validated the data from the researcher's observations. Having established in phase one the criteria for a successful teaming environment, phase two evaluated the pattern language against an existing selected teaming space.

Participants in the Study

Through various inquiries with peers and colleagues in the interior design and architectural community, several companies were suggested as potential candidates for phase two of this study. Requirements for selection were purposefully flexible and the only restrictions were that the company include a large teaming space and have been built no earlier than 1996. It was believed that evaluating a small teaming space would not provide enough information to test the pattern language as an evaluative tool. Further, with workplace teaming being a relatively new concept, a space designed in 1996 or later was believed to be a reasonable timeframe to possibly include some of the pattern language concepts within the teaming environment.

The company selected for this study was an architectural and interior design firm in Pittsburgh, Pennsylvania. This firm was not included in phase one

of this study. The firm employs 62 employees and moved into their new office space in 1998. The firm was organized into ad-hoc work teams; coming together to design and complete a project and then reorganizing team members for the next project. All employees were on a team and their offices were designed to reflect teamwork.

Procedure

The selected company was contacted by telephone and given a brief description of the study. Request for participation in the study was posed and upon approval, meetings were scheduled for evaluation and observation using the phase two instruments. The researcher first conducted an observational walk-through. The instrument developed for this was used to evaluate the inclusion of each pattern on the teaming environment. Next, the researcher surveyed a focus group of employees to gather information that addressed the inclusion of each pattern. For example, the researcher may have observed that the teaming environment had a welcoming entry. Employees were asked to validate that finding and explain if they believed the entry welcomed them to work each day. Finally, the group was interviewed to expand on their responses. The information collected from the focus group was used with the data gathered from the walk-through to compare and evaluate the teaming environment.

Data Analysis

From the data gathered in phase two, descriptive analysis was conducted to determine the percentage of patterns included in the teaming environment, the number of patterns with full inclusion, the number with limited inclusion and the number without inclusion. The same analysis was performed on the employee responses and the collective information was then compared and contrasted.

Chapter IV

Discussion of Results

This chapter will analyze the results of both phases of this study. An analysis of the sample will first be presented then statistical data will be presented detailing the findings.

Phase One

A total of 341 design professionals representing 73 design and architectural firms from Interior Design magazine's Top 100 Design Giants were e-mailed the phase one questionnaire. Immediately 70 individuals were eliminated from the sample due to undeliverable e-mail addresses thereby reducing the sample pool to 271 individuals. A time frame of two weeks was allotted for responses to be returned to the researcher. After seven days, a return rate of 5% (15) was noted. Upon receipt of each response, the researcher deleted the respondent's name from the master list. On the eighth day, a reminder e-mail was sent to those that had not responded. At the close of the fourteenth day, 18.5% (50) of those surveyed had responded. Of the 73 companies polled, 33% (24) were represented in the responses. Those individuals that did not respond may be due to the fact that contact lists were developed from the companies' web site. Some of the e-mail addresses were general and may not have reached the appropriate target sample. In some cases, several professionals from the same firm were contacted. It is possible that some may have forwarded their survey to a common designer thereby eliminating multiple responses from the same firm. Also, some of the firms on the list focused on hospitality design or retail design and may have had no interest or knowledge in the area of teaming or office design.

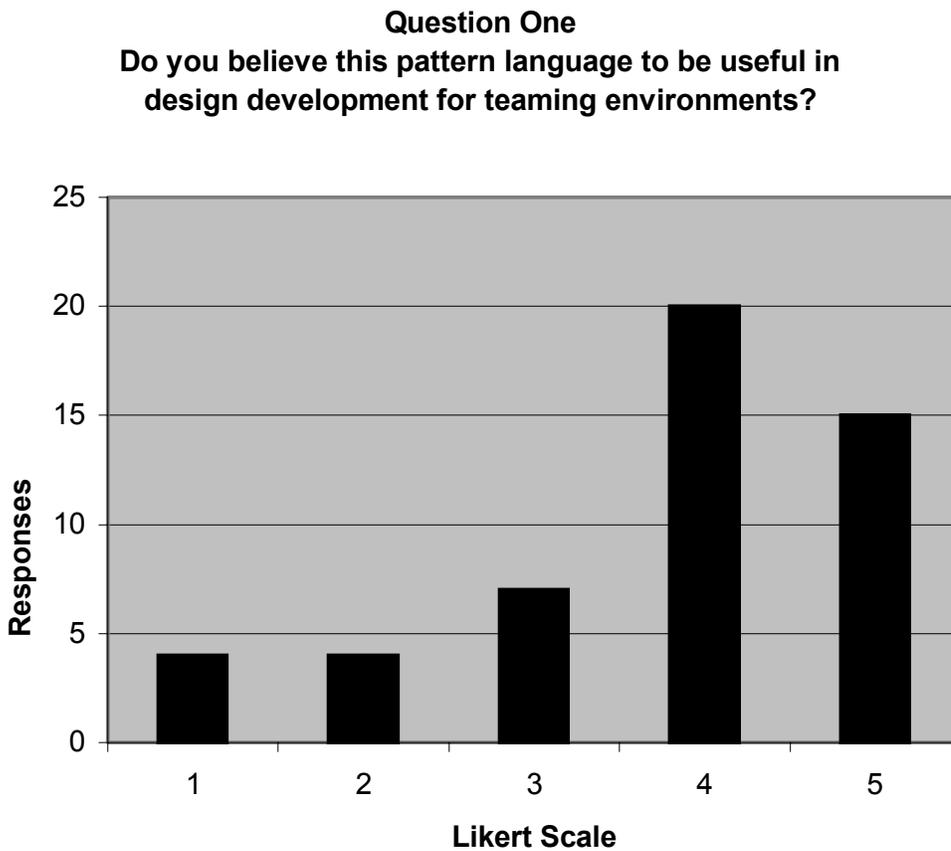
Upon receipt of the responses, each numerical response was entered into an Excel spreadsheet. Descriptive responses were recorded and categorized by question. Common responses to these descriptive questions were taken into account and used to revise the existing pattern language.

Question One

Question one of the survey addresses the usefulness of the web-based pattern language as a design development tool for teaming environments. A Likert scale from 1 to 5 with 1 and 2 indicating negative responses, 3 equating to an average response and 4 and 5 representing positive responses was used for questions one and two. Of the 50 that responded, 16% (8) did not find the language useful, 14% (7) found it to be somewhat useful, and the majority, 70% (35) found it to be useful. A bar chart of the Likert scale responses is illustrated in Table 2.

Table 2

Frequency of Responses to the Usefulness of Pattern Language in Design Development of Teaming Environments



Note. Scale of 1-5 with 1=not useful and 5=very useful

According to the results from the one-way ANOVA (see Table 3), there were significant differences among the means of each response group for question one. The Tukey test revealed that responses 4 and 5, which represented useful (4) to very useful (5) were significantly different from responses 1 (not useful), 2 (somewhat not useful), and 3 (possibly useful).

Table 3
ANOVA Table

SAMPLE	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9429.500	4	2357.375	107.916	.000
Within Groups	983.000	45	21.844		
Total	10412.500	49			

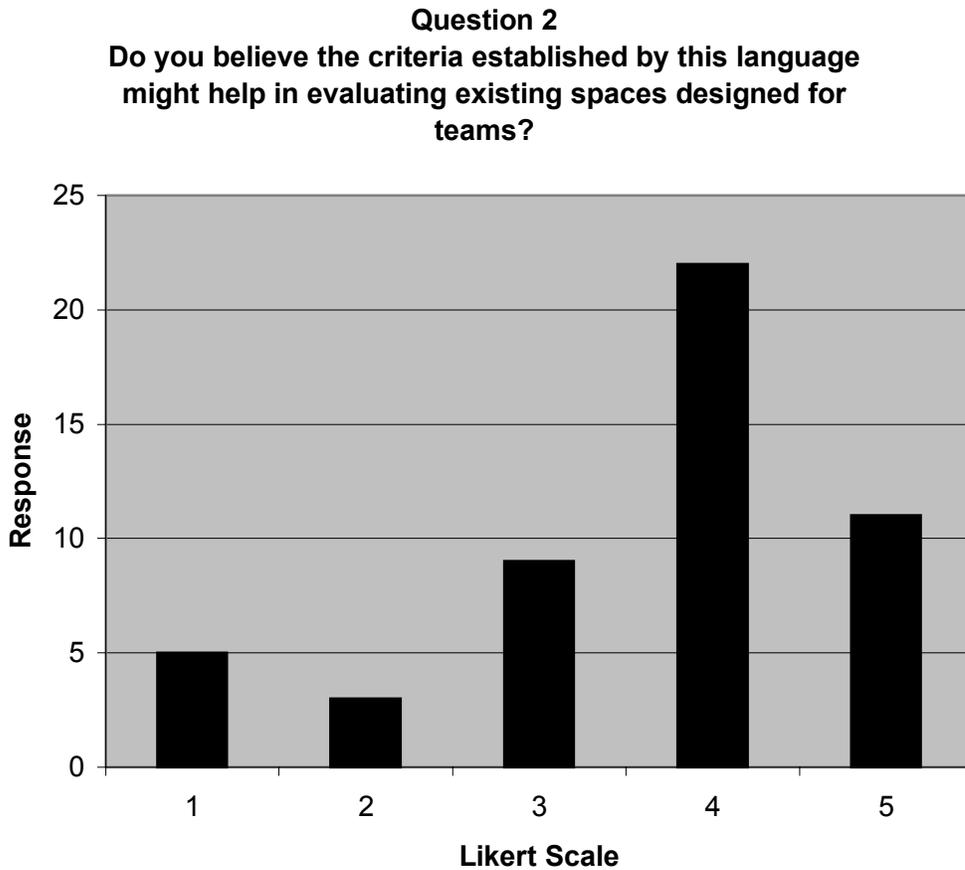
F (4,45) = 107.916 p<.05

Question Two

Question two inquired as to the possibility of using the existing pattern language as criteria for evaluating existing teaming spaces. Of the 50 respondents, 16% (8) did not find the language to be a useful evaluation tool, 18% (9) believed it to be somewhat useful, and the majority, 66% (33) thought that it could be a useful tool. The Likert scale responses are illustrated in the bar chart in Table 4.

Table 4

Frequency of Responses to the Usefulness of Pattern Language in Evaluating Teaming Environments



Note. Scale of 1-5 with 1=not useful and 5=very useful

According to the results from the one-way ANOVA (see Table 5), there were significant differences among the means of each response group for question two. The Tukey test revealed that responses 4 and 5, which represented useful (4) to very useful (5) were significantly different from responses 1 (not useful), 2 (somewhat not useful), and 3 (possibly useful).

Table 5

ANOVA Table

SAMPLE					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9345.000	4	2336.250	98.484	.000
Within Groups	1067.500	45	23.722		
Total	10412.500	49			

F (4,45) = 98.484 p<.05

Question Three

Question three is the first question on the questionnaire that addresses the specific patterns within the language. The question requires a yes or no response and is open ended to encourage the respondents to clarify their answer. When asked if any of the patterns within the language should be deleted, 22% (11) of the 50 respondents answered yes, the majority, 72% (36) responded no and 6% (3) did not answer the question. The result of the Chi-square indicated that more design experts believed that patterns should not be deleted than those that thought some should be deleted ($X^2 = 13.298$, $p = 0.000$).

The descriptive responses varied. The small group that responded negatively to the usefulness of the language in questions one and two recommended a deletion of all patterns. Most, however, provided specific pattern deletion suggestions. The one pattern that received several deletion requests was pattern number one, Connections to the Community. It was argued that designers have little influence over this element and therefore it should be eliminated as a pattern. A few other patterns such as knowledge centers, café connections and work areas on wheels received requests for deletion. One

individual believed café connections is more for personal level interaction and not professional. Another saw redundancies between teaming neighborhoods, nerve centers and work area on wheels. As the requests to delete these patterns were singular, the only pattern that received multiple requests for deletion was Connections to the Community. Therefore, this pattern was the only pattern deleted from the language for teaming environments. Table 6 details the response rate per answer and Table 7 lists the descriptive responses for question number three.

Table 6

Responses to the Deletion of Patterns in the Existing Language

Question 3

Would you delete any patterns to this language?

<u>Response</u>	
Yes	11 (22%)
No	36 (72%)
No Response	3 (6%)

$X^2 (1, N = 47) = 13.298, p < .05$

Note. n=50

Table 7

Descriptive Responses to the Deletion of Patterns in the Existing Language

Pattern	Reason to Delete
All	Language should not be something we impose Existence is solely dependent upon false assumptions
Work area on wheels	Combine with place to call your own Should deal with flexibility
Connections to the Community	Does not relate to interior design Designers typically have no control
Knowledge Centers	Electronically centralized
Café Connections	Coffee is for personal interaction not Professional

Question Four

Question Four asks if any patterns should be added to the existing language. Again, requiring a yes or no response with descriptive feedback if the response is yes, Table 8 details the breakdown of responses. Of those who responded, 50% (25) suggested that additional patterns should be added to the language, 46% (23) did not find it necessary to add patterns, 2% (1) thought that maybe some should be added and 2% (1) failed to respond to the question. The result of the Chi-square indicated that there was no significant difference between design experts responding yes and those who selected no ($X^2 = .083$, $p=0.773$).

Table 8

Responses to the Addition of Patterns in the Existing Language

Question 4

Would you add any of patterns to this language?

Response

Yes	25 (50%)
No	23 (46%)
Maybe	1 (2%)
No Response	1 (2%)

$\chi^2 (1, N = 48) = 0.083, p < .05$

Note. n=50

Ten suggestions were incorporated into the revised language for phase two. The first pattern suggested was Service Centers. This is to be a centralized area that houses copiers, fax machines and other common office equipment. With today's office relying on technological information, the second pattern suggested was related to technology. The pattern Technologically Connected was added and specifically relates to all team members being connected to the Internet and having e-mail capabilities. A pattern titled Concierge was suggested and added. This pattern incorporates the functions of greeting guests and providing information to employees and special visitors. A Breath of Fresh Air was added as a pattern to the existing language, as it was believed to be an important element for team members. Related to the technology pattern, it was suggested to have a Presentation Theatre where special multi-media events could be presented. Community Dining was perceived as a missing pattern and therefore was added to the language. A Wellness Center was suggested and added to provide employees with an area to rest or seek medical assistance. Phone Booths for private telephone calls were suggested as places for personal telephone calls. A suggestion for giving team members access to daylight was satisfied with a pattern entitled Let There be Light. Last, with the open

collaborative environment inherent to most teaming spaces, it was suggested that an area for quiet work be included in the language and therefore Silence is Golden was added. Table 9 summarizes the suggestions with the corresponding pattern additions.

Table 9

Descriptive Responses to the Addition of Patterns in the Existing Language

Suggestion	Added Pattern
Central equipment area	Service Centers
Incorporate technology	Technologically Connected
Provide a contact person to greet	Concierge
Allow access to outside	A Breath of Fresh Air
Area for multimedia presentations	Presentation Theatre
Area for members to dine together	Community Dining
Area to go if members are sick	Wellness Center
Place to make personal telephone calls	Telephone Booths
Access to windows	Let There be Light
Access to a quiet place to work	Silence is Golden

Question Five

The final question of the phase one questionnaire asks if any of the existing patterns should be revised. Table 10 summarizes the findings for this question. The result of the Chi-square indicated that there was no significant difference between design experts responding yes and those who selected no ($X^2 = 2.174, p = 0.140$).

Table 10

Responses to Revising of Patterns in the Existing Language

Question 5

Would you revise any of the existing patterns to this language?

Response

Yes	18 (36%)
No	28 (56%)
Maybe	2 (4%)
No Response	2 (4%)

$\chi^2 (1, N = 46) = 2.174, p < .05$

Note. n=50

Many of the suggested revisions stemmed from a misunderstanding of the language or the use of the patterns. For example, it was suggested that the titles were not descriptive. Several commented that the drawings on the web-site did not accurately represent the patterns. As in question 3, any patterns receiving more than one suggested revision were amended in the language. Therefore, two revisions were incorporated into the modified language for phase two. The first was renaming the pattern Knowledge Centers to Resource Centers recognizing that many teaming environments have areas not necessarily specific to the educational enrichment of the team member. The second revised pattern was Work Areas on Wheels. This pattern was reworded to read Flexible Work Area so as to incorporate furniture and equipment that is responsive to the needs of team members but not necessarily on wheels. Table 11 details the suggested revisions to existing patterns.

Table 11

Suggested Revisions to Patterns in the Existing Language

Original Pattern	Suggested Revision
Knowledge Centers	Rename to Resource Centers
Work Areas on Wheels	Rename to Flexible Work Area

Each of the suggested deletions, additions and revisions were included in the phase two instrument. The web site was not updated as its use was for phase one of this study and has no relevance in phase two.

Phase Two

Phase two of this study tested the revised pattern language as an evaluation tool on an existing teaming space. The sample firm was one familiar to this researcher and satisfied the established criteria for sample selection. One and one half hours was allotted for the observational walkthrough by the researcher. Upon arrival the firm’s contact provided the researcher with a floorplan detailing the company layout. After a review of the floorplan, the researcher recorded the observations using an observational worksheet developed from the revised pattern language to evaluate the firm against the language. For recording purposes, each pattern was numbered and identified on the floorplan. A pattern not included was so noted in the margin of the plan.

A focus group of 13 employees was asked to evaluate their office using the same worksheet used by the observer. They were allotted twenty minutes to first complete the questionnaire. Many provided written comments to each pattern. After completing the form, they were then requested to elaborate on their responses as the researcher read through each pattern. The researcher recorded their responses on a focus group worksheet, (see Appendix G). Table 12 summarizes the findings of both the observer’s recordings and the focus group’s responses and details the common findings regarding included patterns between the two evaluations.

Pattern Language as a Tool for Teaming Environments

The observer found 50% (10) of the patterns included in the firm's layout, 25% (5) of the patterns with limited inclusion and 25% (5) not included. The focus group found 55.4% (11) to be included, 30.4% (6) with limited inclusion and 14% (3) not included. Of the 12 patterns considered included between the observer and the focus group, 9 of those patterns were commonly thought to be integrated by both evaluators. Four of the seven patterns were commonly thought to have limited inclusion between the observer and the focus group and three of the five patterns were thought to be not included by both parties.

Table 12

Included Patterns of Observer Compared with Focus Group

Pattern	Observer	Focus Group
Welcoming Entry	●	●
Public Spaces that tell a Story	●	●
Concierge	●	●
Town Hall		●
Main Street Thoroughfare		●
Community Dining	●	●
Technologically Connected	●	●
Telephone Booths	●	●
Resource Center	●	●
Let there be Light	●	●
A Place to Call Your Own	●	

Note. Total of 20 possible patterns.

Note. ● = Pattern was found by the observer and/or focus group.

It is interesting to note that the focus group thought they had both a town hall and main street thoroughfare while the observer did not list either as full inclusion for

the space. Most focus group members cited areas such as the lunchroom and various conference rooms as town hall spaces because at times they are used for impromptu meetings of various group sizes. The observer envisioned this as a separate functional area or room. The focus group also detailed a “tour path” along which firm principals tour clients through the space as the Main Street. The observer did not view this as a distinguishable main thoroughfare as it was not obvious while walking through the space.

Table 13 highlights those patterns with limited inclusion as seen by the observer and the focus group.

Table 13

Limited Inclusion Patterns of Observer Compared with Focus Group

Pattern	Observer	Focus Group
Town Hall	●	
Presentation Theatre	●	●
Café Connections		●
Teaming Neighborhoods	●	●
Nerve Centers	●	●
A Place to Call Your Own		●
Silence is Golden	●	●

Note. Total of 20 possible patterns.

Note. ● = Pattern was found by the observer and/or focus group.

The observer thought the space partly conveyed a town hall while the focus group listed it as being fully included. The focus group stated that they had some café connections specifically citing the lunchroom. The observer did not include this because the pattern describes several informal coffee/tea areas scattered throughout the layout. The focus group noted limited inclusion to the pattern A

Place to call Your Own while the observer recorded this pattern in the fully included category. The question posed to the focus group “Do you have a sense of personal space that balances privacy with interaction” may have stressed privacy instead of personal space. The intent was to discover if everyone had their own place to work. The responses and feedback suggested that while each had a work area, the amount of privacy varied depending upon the location within the office.

The patterns not included by either the focus group or the observer is noted in Table 14.

Table 14

Patterns not Included by Observer Compared with those not Included by the Focus Group

Pattern	Observer	Focus Group
Main Street Thoroughfare	●	
A Breath of Fresh Air	●	●
Wellness Center	●	●
Café Connections	●	
Flexible Work Area	●	●

Note. Total of 20 possible patterns.

Note. ● = Pattern was found by the observer and/or focus group.

Both evaluators did not include a breath of fresh air because the office is on the 22nd floor of a high-rise building. A wellness center was also not included and the focus group commented that if someone is sick they usually go home. The observer did not include a main street thoroughfare because it was not clearly defined. Café Connections was also not included because the observer did not consider the lunch area to satisfy the pattern requirement. Both evaluators did

not believe the work areas to be flexible and it was observed and reiterated in the focus discussion that mobility and the ability to configure a work area to suit the needs of team members was not possible due to the custom millwork furniture provided as the workstation.

This phase of the study focused on the specific patterns of the language and was not used to establish the success or failure of the teaming space. The similarities in findings between the observer and the researcher provides some evidence that the criteria established for this language might prove beneficial in the evaluation of teaming environments thereby contributing to the cyclical link between programming and evaluation.

Chapter V

Conclusions and Summary

This chapter will report the major findings from phase one and two of this research study, highlight the implications of these findings for interior designers and conclude with suggestions for continuing research into the use of pattern language as a design and evaluation tool for teaming environments.

Major Findings

The purpose of this research was to explore the usefulness of pattern language as a tool for interior designers to create and evaluate teaming environments. To satisfy this purpose, an existing pattern language designed for teaming spaces was first tested for usefulness by a sample of design experts and second used as an instrument to evaluate an existing teaming space. Throughout this process, the objectives established for this study were addressed and incorporated into the processes and procedures.

The two research questions for this study were addressed in phase one of this research. Questions one and two from the questionnaire for this phase tested the usefulness of pattern language as a design tool and evaluator with teaming environments. According to the sample of expert design professionals, the majority believed pattern language could be a useful tool for the creation of teaming spaces. Designing specifically for teams can be a challenge for interior designers and the possibility of accessing a web-based design tool for design development may aid in the first step of the design process.

The second research question inquired as to the usefulness of pattern language as a design evaluation tool. Question two of the e-mail survey addressed this and the majority of the professional experts believed it could be used as such a tool. These findings suggest that the pattern language information used to create team spaces could also be used as evaluation criteria. The possibility of utilizing pattern language for both functions provides an

informational link between design development and design evaluation for teaming spaces.

With the feedback provided by the design professionals in questions 3,4 and 5, the existing pattern language was revised to include a total of twenty patterns. To further determine the feasibility of using pattern language for evaluation, this revised pattern language was then used to evaluate an existing teaming environment. This environment was an architectural and design firm in which all employees were members of a team. Comparing both the observer's recordings and the focus group's evaluation of the firm using the pattern language tool, similar findings were noted regarding the inclusion or lack of patterns within the space. Having the focus group validate the observer's findings suggests a strong possibility that pattern language can be used as an evaluation tool for teaming spaces.

In summary the following were the major findings for this research study:

1. Based on the responses from the sample of expert design professionals, pattern language could be used as a design tool for developing teaming environments.
2. Based on the responses from the sample of expert design professionals, pattern language could be used as an evaluative tool for teaming environments.
3. When tested against an existing teaming environment pattern language showed evidence of being an effective tool for evaluation.

Implications and Future Research

Just as software developers have found a web-based venue for sharing information using pattern language, this research suggests that such a tool may be helpful for interior designers creating teaming spaces. Having access to such a powerful tool at the designer's desktop would enable the designer to supplement the language thereby building and refining the tool for future use by other design professionals. Although this language is not intended to be used as an instructional manual, it's usefulness as a tool for design development could be

very relevant. Used as an evaluator, pattern language can satisfy the need for supplying informational criteria. This dual use of pattern language provides the cyclical link in the design process between development and evaluation.

As this study was exploratory by design, further research is needed to continue studying the usefulness of pattern language as a design tool and evaluator. Perhaps further evaluation of the revised language by a select sample of office designers might prove beneficial in continuing to refine the specific patterns. Research using the pattern language as a design development tool in creating a new teaming space would reinforce the usefulness in this stage of design just as phase two of this study validated the usefulness of pattern language as an evaluation tool. Continuing to test pattern language using other teaming environments would further validate its benefits as a design tool. Creating a language for other environments such as retail, hospitality and healthcare spaces may prove interesting and beneficial to designers. The sharing of this information on a website is key to its success and implementation.

This research study used a methodology developed in 1977 and updated it by making it accessible through the Internet and tailoring it to an audience of interior designers that might find it useful in providing answers for a design problem relevant in today's office design. This study further investigated using pattern language in a manner never explored; as an evaluator of a built environment. The possibilities and usefulness of this tool in interior design were validated by this study. Further research and implementation of this language will help further the communication between design research and design practice.

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Appendix A

Pilot Study

Dear friends and colleagues,
Please help!

I am sending this to you in hopes that you will help with my thesis research study. With any study, a pilot test must be conducted to provide validity to the instrument (survey). I am hoping that as experts (and friends) you will take a few minutes to review the first phase of my research.

I am sending the following e-mail to a large sample of interior designers throughout the country. They will be asked to complete a survey based on a pattern language found on a website I developed (pattern language will be explained on the website). I would appreciate if you would follow the process they will be asked to complete and then in addition provide feedback based on your experience. The goal is to provide clear and concise directions and information (that is not too time consuming) in hopes of a large return rate.

Please complete the following questionnaire and return it to me no later than March 2, 2001.

1. How long did this process take?
2. Please evaluate the following and provide feedback as necessary:

Access to the website

Difficult

Easy

| | | | |

If difficult, please explain:

The Pattern Language

Confusing

Easy to Understand

| | | | |

If confusing, please explain:

E-mail letter

Confusing

Easy to Understand

| | | | |

If confusing, please explain:

Survey

Confusing

Easy to Understand

| | | | |

If confusing, please explain:

Other comments:

Please let me know if you have questions (lorianth@bellatlantic.net)

Your participation and assistance is greatly appreciated!

Lori

The following is the e-mail I will be sending:

Dear (),

I am an interior design graduate student at Virginia Polytechnic Institute and State University conducting research in the area of planning and evaluating teaming environments. As an expert in the field, you have been selected to participate in a brief survey regarding the use of pattern language as a design and evaluative tool. Your involvement in this study will explore a new design tool for creating and testing innovative team spaces and expand on the knowledge designers need to design functional spaces that respond to the humanistic needs of the worker. As the office environment continues to change, designers need access to new design tools.

I would greatly appreciate the 10-15 minutes of your time it will take to complete this survey process. Your participation and insight is critical to the success of my research project.

Please follow the directions listed below. If you have questions or concerns do not hesitate to contact me at lorianth@bellatlantic.net

Thank you for helping me further interior design research.

Sincerely,
Lori A. Anthony

Directions:

1. Access the following website: <http://filebox.vt.edu/users/lanthony>
2. Read through the explanation found on the title page as well as the patterns found on the subsequent pages.

3. Complete the brief survey (5 questions) below and e-mail your responses back to me (lorianth@bellatlantic.net) by March XX, 2001.

Survey Questionnaire

1. Do you believe this pattern language to be useful in design development for teaming environments?

Not Useful | | | | Very Useful
| | | | |

2. Do you believe the criteria established by this language might help in evaluating existing spaces designed for teams?

Not Useful | | | | Very Useful
| | | | |

3. Would you delete any of the patterns in this language?

Yes No

If yes, which ones and why?

4. Would you add any patterns to this language?

Yes No

If yes, please provide suggested additions.

5. Would you revise any of the existing patterns to this language?

Yes No

If yes, please provide suggested revisions.

Appendix B

Revised Phase One Instrument (Survey)

3. Would you delete any of the patterns in this language?

Yes No

Your Response: _____

If yes, which one(s) and why?

4. Would you add any patterns to this language?

Yes No

Your Response: _____

If yes, which one(s) and why?

5. Would you revise any of the existing patterns to this language?

Yes No

Your Response: _____

If yes, which one(s) and why?

Appendix C

Phase One Instrument

Pattern Language for Teaming Environments

<http://filebox.vt.edu/users/lanthony>

Pattern Language for Flexible Teaming Office Environments

Introduction

This website was created to illustrate the interrelated components involved in designing flexible teaming office environments using the neighborhood concept with Pattern Language methodology.

Pattern Language

In 1977 Christopher Alexander, Sara Ishikawa and Murray Silverstone proposed a conceptually unique design methodology. Named as one of the “25 Products that Rocked Design” by ASID, (Blixt, 2000), their language is comprised of intrinsically interrelated patterns that focus on the relationships of spaces to inhabitants and surrounding environments. The culmination of their patterns forms a “language” that enables designers and architects to create thoughtful and successful design solutions.

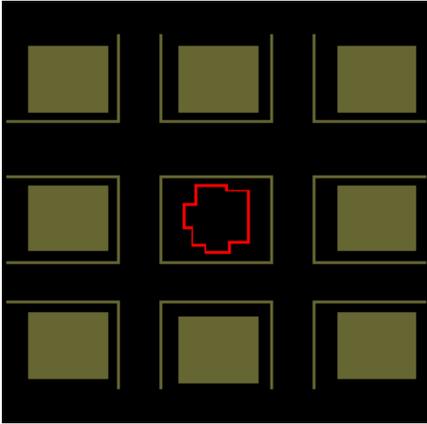
Flexible Teaming Office Environments

Many organizations have implemented working in teams to increase efficiency and productivity. Teaming is not a new concept, yet within the past few years it has become a work method that has influenced many corporate restructuring plans. Teams are created to solve problems, manage employees, improve processes and develop new products. Companies are re-organizing their work environments to respond to the needs of teams.

Neighborhood Concept

With many adaptive reuse projects transforming abandoned warehouses and industries into useable office space, designers and architects have begun to incorporate ideas from city planning into office design (Shirley & Brunner, 1996).

Connections to the Community



Connections to the Community

Description

For flexibility in a work environment, offices must be convenient to customers, shops, parking, airports, restaurants and other modern amenities.

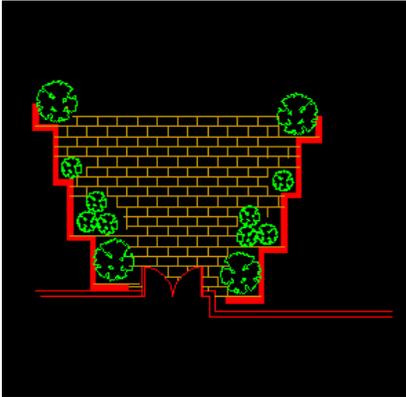
Justification

Today's worker rarely works an eight-hour day. Striving to find a balance between home and work has been an influential factor in the evolution of alternative officing (i.e. working from home, telecommuting, etc.) Because workdays are longer, those who spend the majority of their time in the office are forced to run errands and manage personal affairs during lunch and break times. Convenient access to amenities allows the worker to accomplish these tasks in a timely manner, (personal observation, Anthony).

Links to Other Patterns

[Welcoming Entry](#)

Welcoming Entry



Welcoming entry to office space.

Description

The entry to an office or building is the transitional element that invites or welcomes an employee to work.

Justification

A unique and well-designed entry communicates an inviting welcome to employees and visitors, (Personal observation, Anthony). These entries should be reflective of the image a company wishes to portray and be distinctive in its use of materials and architecture.

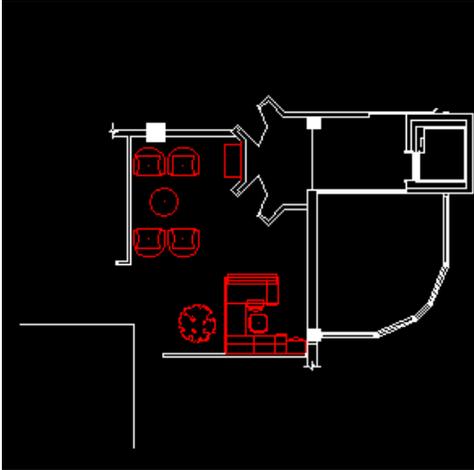
Links to Other Patterns

[Connections to the Community](#)

[Public Spaces that Tell a Story](#)

[Back to top](#)

Public Spaces that Tell a Story



Public Spaces

Integrated Office Concepts

Pittsburgh, PA

Description

The public spaces within an office should communicate the company story. These areas are visited by clients and guests and should reflect the corporate philosophies and goals by being an extension of the overall image portrayed by the company.

Justification

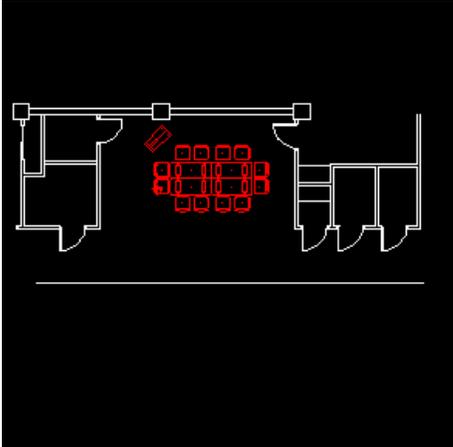
The corporate image should be an outcome of the company's work philosophy and goals. (Becker & Steele, 1995, p. 30). The public spaces within an office environment should communicate these philosophies and goals by clearly defining the company in terms of how the organization functions. These spaces should be integral elements in the overall design concept and be reflective of the company's structure and organization.

Links to Other Patterns

[Welcoming Entry](#)

[Town Halls](#)

Town Halls



Town Hall

Integrated Office Concepts

Pittsburgh, PA

Description

Town halls are informal multi-functional congregational places. These areas are used for large or small meetings and are typically available to all company employees.

Justification

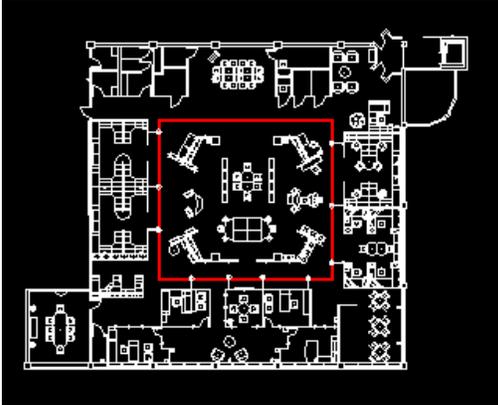
“New ways of working requires meeting areas that go beyond conventional conference rooms.” (Evolutionary Workplaces Issues Report, 1996). Not all meetings need to be formal and enclosed within four walls. Open and re-configurable congregational areas provide space for impromptu gatherings as well as company meetings.

Links to Other Patterns

Public Spaces that Tell a Story

Main Street Thoroughfare

Pattern Language as a Tool for Teaming Environments Main Street Thoroughfare



Main Street Thoroughfare

Integrated Office Concepts

Pittsburgh, PA

Description

The Main Street thoroughfare is the centralized major artery connecting public spaces with the office environment. This thoroughfare should be an integral part of the design concept and provide workers with interesting places to communicate and share information.

Justification

The void created by continuous panel runs or walls typically form Main corridors. With the demand placed on the workplace to provide environments that respond to flexible work, these main corridors become more than simply paths of travel. As people migrate between office and home, the need for accommodating communication between workers increases, (Brill, 1998). Main corridors are the cohesive links between common and public areas, (Becker & Steele, 1995).

Links to Other Patterns

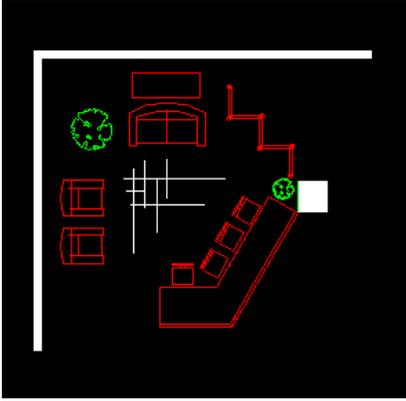
Town Halls

Cafe Connections

Teaming Neighborhoods

Knowledge Center

Café Connections



Cafe within the main street thoroughfare.

Description

During the day, the path to the coffee machine is well traveled. Providing café locations throughout the office equipped with comfortable seating and necessary communication tools gives employees a place to interact informally.

Justification

It is important to identify where work is being conducted, (Brill 1998). Informal communication can greatly enhance creativity and it is necessary to go beyond adjacencies to explore how to encourage interaction and sharing of ideas on a more casual level ((Facilities Focus, 1989). Areas such as coffee counters or break areas support informal communication and become integral parts of accommodating teaming and flexible work environments.

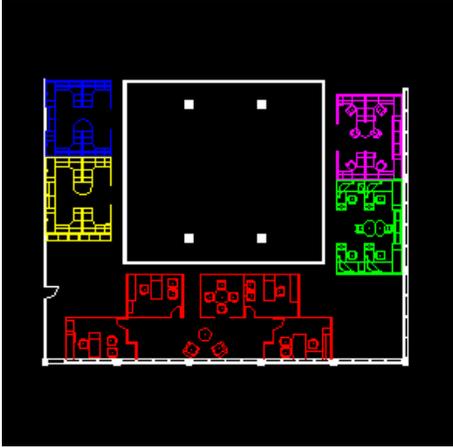
Links to Other Patterns

Main Street Thoroughfare

Teaming Neighborhoods

Knowledge Center

Teaming Neighborhoods



Teaming neighborhoods along the perimeter of the main street thoroughfare.

*Integrated Office Concepts
Pittsburgh, PA*

Description

Groups of teams clustered around the main thoroughfare within an office define team identity and provide privacy. These neighborhoods are accessible to encourage collaboration between members and teams.

Justification

“By nature, work teams and work groups are multi-functional. Having a proper work environment – from the perspective of architecture, furniture and equipment – is crucial to the success of a work team or work group.”, (Facilities Programs, 1993, p. 10). Team layout in an office is dependent upon the team type as well as individual team requirements. Each teaming neighborhood should be equipped with the tools necessary to be successful.

Links to Other Patterns

[Main Street Thoroughfare](#)

[Cafe Connections](#)

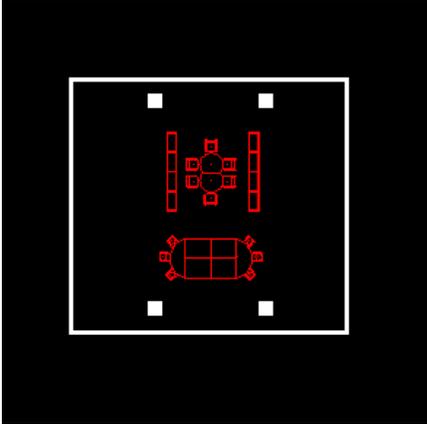
[Knowledge Center](#)

[Nerve Centers: Team Huddle Spaces](#)

[Work Areas on Wheels](#)

[A Place to Call your Own](#)

Knowledge Centers



The Knowledge Center is central to the office environment.

Integrated Office Concepts

Pittsburgh, PA

Description

A centralized area with educational materials that enrich the knowledge of employees within an organization.

Justification

70-80% of what we learn at work is informal, (Brill, 1998). Learning is an integral part of today's workday. Providing the resources for employees to learn in an informal manner enriches the careers of the employees and enhances the output contributions to the company.

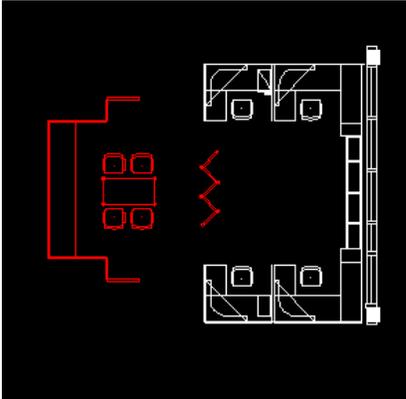
Links to Other Patterns

Main Street Thoroughfare

Teaming Neighborhoods

Nerve Centers: Team Huddle Spaces

Nerve Centers: Team Huddle Spaces



Team Nerve Centers are central areas to meet within the team environment.

Description

A place conveniently located to all members within a team to support meetings, brainstorming and problem solving activities.

Justification

Group work is not “open” work and should be supported with designed areas for interactive communication and brainstorming (Brill, 1998). Providing an area removed from individual work areas within the team space, gives members a central place for group interaction.

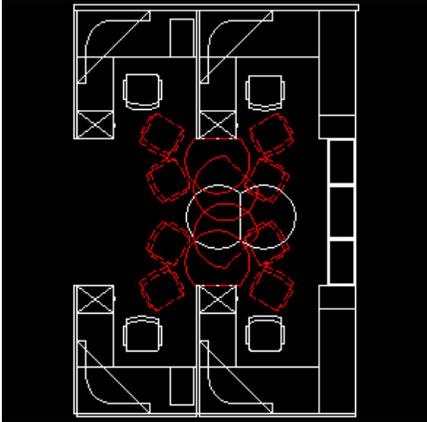
Links to Other Patterns

Teaming Neighborhoods

Knowledge Center

Work Areas on Wheels

Work Areas on Wheels



Mobile furniture permits ease in configurations that respond to teams' work needs.

*Integrated Office Concepts
Pittsburgh, PA*

Description

Team members respond to varying demands and tasks that require mobility and flexibility in their physical surroundings. Furniture and equipment should respond to these needs by accommodating mobility.

Justification

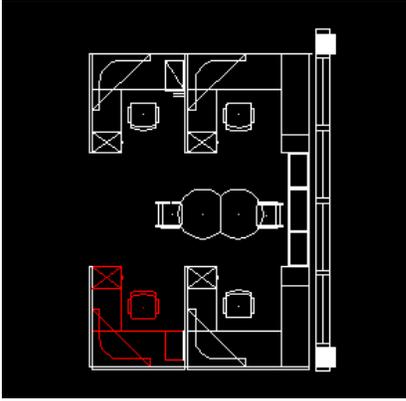
Furniture within the team space should be versatile and easy to reconfigure, (Facilities Programs, 1993). Mobile tables, drawer pedestals, screens and chairs provide the opportunity for team members to reconfigure their physical environment based on activity requirements.

Links to Other Patterns

[Nerve Centers: Team Huddle Spaces](#)

[A Place to Call your Own](#)

A Place to Call your Own



Within the team space, private workstations provide a sense of ownership.

*Integrated Office Concepts
Pittsburgh, PA*

Description

A sense of personal space provides employees with the opportunity to balance privacy with interaction.

Justification

It is important in a dynamic teaming environment to provide personal work areas or zones for employees who seek privacy, (Mudgett, 2000). Since no one works in a team all day (Brill, 1998), these areas provide refuge from team activities and foster thoughtful, concentrated work. Workers spend between 60%-80% of their time at individual workstations and it is important to recognize that these areas remain the primary spatial office tool (Brill, 1998)

Links to Other Patterns

Teaming Neighborhoods

Nerve Centers: Team Huddle Spaces

References for Pattern Language

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Appendix D

Follow Up E-Mail

Please...

I need your help! Early last week I e-mailed a survey for my masters thesis pertaining to Pattern Language. To date, my response rate has been very low. In order to be successful in my research, I need at least 50 more returns! Your insight as a designer or architect is greatly needed and a valuable part of the next phase of my study. I implore you to please take 10 minutes to complete and return my survey. My deadline is Friday, as I need to analyze the data and prepare the rest of my thesis.

I am truly grateful for your assistance. If I can be of assistance please do not hesitate to ask.

(If you have already responded, please accept my thanks!)

Lori Anthony

(Previous E-mail w/survey)

Appendix E

Phase Two

Instrument for Observation

Phase Two Instrument

Pattern 1: Welcoming Entry

Not Welcoming	Limited Welcome	Welcoming
Observations: _____		

Pattern 2: Public Spaces that Tell a Story

Not Conveyed	Limited Conveyance	Conveyed
Observations: _____		

Pattern 3: Concierge

Not Included	Limited Inclusion	Included
Observations: _____		

Pattern 4: Town Hall

Not Included	Limited Inclusion	Included
Observations: _____		

Pattern 17: Flexible Work Areas

Not flexible	Some is flexible	Flexible

Observations: _____

Pattern 18: Let there be Light

No Visibility	Limited Visibility	Visibility

Observations: _____

Pattern 19: A Place to Call Your Own

Not Included	Limited Inclusion	Included

Observations: _____

Pattern 20: Silence is Golden

No ability	Limited ability	Ability

Observations: _____

Appendix F

Phase Two

Survey Instrument for Focus Group

Phase Two Instrument

Questionnaire

Directions: Please circle the appropriate mark below your response and detail comments on the lines provided.

Example:

No Access	Limited Access	Access
		⊕

Does the entry of your office welcome you to work each day?

Not Welcoming	Limited Welcome	Welcoming

Comments: _____

Do the spaces that are viewed by the public convey the company story?

Not Conveyed	Limited Conveyance	Conveyed

Comments: _____

Do you have a “concierge” that greets guests?

Not Included	Limited Inclusion	Included

Comments: _____

Does your office have a multi-functional “town hall” space where the company can meet as a whole or individuals/small groups can meet or congregate as needed?

Not Included	Limited Inclusion	Included

Comments: _____

Does your office have a main aisle thoroughfare acting as a major artery that connects the public spaces with the office environment?

Not Included	Limited Inclusion	Included

Comments: _____

Does your office have an area for community dining?

Not Included	Limited Inclusion	Included

Comments: _____

Does your office provide a “service center” area where copying, faxing and other office functions take place?

Not Included	Limited Inclusion	Included

Comments: _____

Does your office provide a separate, enclosed area for private telephone conversations?

Not Included	Limited Inclusion	Included

Comments: _____

Does your office provide coffee stations throughout the office?

Not Included	Limited Inclusion	Included

Comments: _____

Does your office have teaming neighborhoods each defined in some way?

Not Included	Limited Inclusion	Included

Comments: _____

Is there a centralized area within your office that houses educational materials that enrich the knowledge of the employees?

Not Included	Limited Inclusion	Included

Comments: _____

Within your team environment, is there a space conveniently located to all members that supports brainstorming and problem solving activities?

Not Included	Limited Inclusion	Included

Comments: _____

Is the furniture within your team space flexible?

Not flexible	Some is flexible	Flexible

Comments: _____

Does each employee have visibility to a window?

No Visibility	Limited Visibility	Visibility

Comments: _____

Do you have a sense of personal space that balances privacy with interaction?

Not Included	Limited Inclusion	Included

Comments: _____

Does each employee have the ability to work in a quiet atmosphere?

No ability

Limited ability

Ability

|

|

|

Comments: _____

Appendix G

Focus Group Discussion Questions

Focus Group Discussion Questions

Why do you believe or not believe that your office welcomes you to work each day?

Why do you believe or not believe the spaces that are viewed by the public convey the company story?

What makes you believe or not believe you have a “concierge” that greets guests?

Why do you believe or not believe there is a multi-functional “town hall” space where the company can meet as a whole or individuals/small groups can meet or congregate as needed?

Why do you believe or not believe your office has a main aisle thoroughfare acting as a major artery that connects the public spaces with the office environment?

Why do you believe or not believe your office has an area for community dining?

Why do you believe or not believe your office provides an area where copying, faxing and other office functions can take place?

Why do you believe or not believe each team member is technologically connected to E-mail and the Internet?

Why do you believe or not believe your office provides a place to get a “breath of fresh air” within its space?

Why do you believe or not believe your office has a “presentation theatre” where multi-media events can take place?

Why do you believe or not believe your office has a separate area or “wellness center” where employees can go if they are sick?

Why do you believe or not believe your office provides a separate, enclosed area for private telephone conversations?

Why do you believe or not believe your office provides coffee stations throughout the office?

Why do you believe or not believe that your office has teaming neighborhoods each defined in some way?

Why do you believe or not believe there is a centralized area within your office that houses educational material which enriches the knowledge of the employees?

Why do you believe or not believe that within your team environment, there is a space conveniently located to all members that supports brainstorming and problem solving activities?

Why do you think or not think the furniture within your team space is flexible?

Why do you believe or not believe each employee has visibility to a window?

Why do you believe or not believe that you have a sense of personal space that balances privacy with interaction?

Why do you believe or not believe that each employee has the ability to work in a quiet atmosphere?

Appendix H

IRB

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

**Informed Consent for Participants
of Investigative Projects**

Title of Project: Pattern Language as a Design and Evaluation Tool for Teaming Environments

Investigator(s) Lori A. Anthony/Dr. Joan McLain-Kark

I. The Purpose of this Research/Project

The purpose of this study is to explore the effectiveness of pattern language as a design tool and evaluation instrument for designing teaming environments. Pattern language is a methodology of interrelated design elements used for providing solutions to design and spatial problems. It was intended to communicate a thoughtful and conscientious method of designing inhabitable spaces. It's ideology and processes identify problems and present solutions to designing space. It's application in designing teaming environments would inject a social psychological element as well as possibly link programming or information gathering data with evaluation criteria to satisfy the necessary feedback link required in improving and evolving the design of team environments.

II. Procedure

A pattern language designed by this researcher will be tested as an evaluation tool with an existing designed teaming environment. Using the pattern language for teaming environments as criteria, your firm's teaming space will be evaluated based on inclusion of each pattern in the language. You will be asked to complete a survey requesting a description of your impression of each pattern relative to your work environment. Finally, you will be interviewed and encouraged to expand and explain your responses.

III. Risks

It is not expected that this research will cause additional risks over and above those that occur naturally on a daily basis.

IV. Benefits of this Project

Designers are responding to the needs of this teaming movement by creating what they believe to be the best and most effective layouts by striving to satisfy the functional requirements and address the social psychological needs of the team members. By studying built teaming environments and assessing the programming information needed to design such spaces, much information can

be gained and applied to future environments. The insight obtained from this research will provide designers, architects and facility managers with the informational tools necessary to create effective teaming spaces.

No promise or guarantee of benefits has been made to encourage you to participate.

You may contact the researcher at a later time for a summary of the research results.

V. Extent of Anonymity and Confidentiality

Responses to the focus group questionnaire will be completed without requiring a name or identification. Only the researcher will have access to the data.

At no time will the researchers release the results of the study to anyone other than individuals working on the project without your written consent.

VI. Compensation

There will be no compensation for participation in this study.

VII. Freedom to Withdraw

You are free to withdraw from this study at any time without penalty.

VIII. Approval of Research

This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University, by the Department of Near Environments.

IX. Subject's Responsibilities

I voluntarily agree to participate in this study. I have the following responsibilities:

- Complete questionnaire.
- Participate in the group discussions.

X. Subject's Permission

I have read and understand the Informed Consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project.

If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project.

Signature Date

Should I have any questions about this research or its conduct, I may contact:

Lori A. Anthony

(412) 780-4440

Investigator(s) Phone

Dr. Joan McLain-Kark

(540) 231-7415

Faculty Advisor Phone

David Moore

IRB Chair,

(540) 231-4991

Research Division

Subjects must be given a complete copy (or duplicate original) of the signed Informed Consent.

Appendix I

Vita

Vita

LORI A. ANTHONY

1740 Jamestown Place
Pittsburgh, PA 15235
(412) 780-4440
lorianth@bellatlantic.net

EDUCATION

Master of Science, Interior Design, May 2001
Virginia Polytechnic Institute and State University
Blacksburg, VA

Thesis Topic: Pattern language as a design and evaluative tool for accessing teaming environments

Major Advisor: Dr. Joan McLain-Kark

Graduate Courses Highlights

- Advanced Design Research
- Advanced CAD/3D Studio VIZ including virtual reality (CAVE)
- Industrial and Organization Psychology
- Instructional Design
- Graduate Teaching Assistantship Seminar

Bachelor of Science, Interior Design, May, 1984
Seton Hill College
Greensburg, PA

Course work included interior design theory and was supplemented with two-dimensional and three-dimensional fine arts courses.

PROFESSIONAL EXPERIENCE

Teaching

Teaching Assistant – Interior Design Department
Virginia Polytechnic Institute and State University, Blacksburg, VA
August 1999 – May 2000

Departmental Assignments:

Assisted in CAVE (virtual reality) demonstrations

Proofread and provided supplemental assistance with the revision of The Designer's AutoCAD 2000 Tutorial by Joan McLain-Kark

Adjunct Faculty – Interior Design Department

La Roche College, Pittsburgh, PA

August 1996 – May 1999, August 2000 - Present

Courses Taught:

Color & Design

AutoCAD Release 13,14

Sophomore Studio

Interior Office Systems

Business Procedures

Special Topics in Interior Design: AutoCAD and 3D Studio VIZ

Departmental Activities:

March 2001 Participated in Senior Research Project Review

December 2000 Sophomore Advisory Review of student work

December 2000 Juror – Sophomore Presentations

August 2000 Taught Interior Design Faculty AutoCAD seminar

August 1999 FIDER Review – Collected organized and presented all written course materials in bound volumes

Adjunct Faculty – Interior Design Department

Seton Hill College, Greensburg, PA

August 1997 - May 1998

Courses Taught:

Color Theory

Senior Portfolio

Interior Design Apprenticeship

Senior Design Seminar

Departmental Activities:

April 1998 Senior Portfolio Review: Organized and facilitated a department portfolio review for graduating seniors

February 1998 Senior interior design students designed vignettes for Westmoreland County Home Show

February 1998 Recruited perspective students at the Westmoreland County Home Show

January 1998 Facilitated and proctored ASID student competition

December 1997 College Program Review for Interior Design Program. Prepared documentation and represented the department in evaluating the merits of the program

Fieldwork

Director of Design/Customer Issues Specialist

Integrated Office Concepts, Pittsburgh, PA

April 1998 – June 1999

- Managed Interior Design department
- Marketed company and department capabilities to perspective clients
- Hired and trained new designers
- Qualified design projects
- Delegated work responsibilities
- Researched and consulted with clients on current workplace issues

Director of Design

Delta Furniture, Pittsburgh, PA

January 1992 - July 1996

- Managed Interior Design and CAD department
- Designed and managed large corporate accounts
- Allocated time management and scheduling procedures
- Oversaw drafting and specifying software functions

Facilities Administrator

Legent Corporation, Pittsburgh, PA

August 1990-April 1991

- Developed furniture and finish standards
- Oversaw and coordinated the design process, construction phases, phone/data cabling, furniture installation and employee relocation for offices throughout the United States and Canada

Senior Interior Designer

Franklin Interiors, Pittsburgh, PA

April 1991-November 1991, August 1988-August 1990

- Met with clients to discuss requirements and set expectations
- Designed and delivered customer specific presentations
- Analyzed departmental flow, inventoried existing equipment and furniture, and field measured space allocations
- Created block plans and schematics, space planned layouts and floor plans using AutoCAD

Interior Designer

Stuart Drug & Surgical Inc., Greensburg, PA

January 1985 - August 1988

- Designed healthcare interiors
- Produced solutions to customer bid packages
- Space planned and drafted floorplans/furniture layouts
- Specified furniture

PROFESSIONAL WORKSHOPS, ASSIGNMENTS, ACTIVITIES

Teaching

- Graduate Teaching Seminar, Virginia Tech, August, 1999
- IDEC Regional Conference, Pittsburgh, PA, September, 1997
- Guest Lecturer: Pittsburgh Triangle Technical School, Topic: The field of interior design. June, 1996

Fieldwork

- Assisted with the ASID Design Show, November, 2000
- Company Relocation Seminar, May, 1999
- Managing Negativity in the Workplace Seminar, March, 1999
- Women in Leadership Seminar, February, 1999
- Alt Office, San Jose, California, August, 1998
- NEOCON, Chicago, Ill. June 1986, 1988, 1992, 1996, 1998
- Knoll Furniture Systems Seminar, March, 1998
- Steelcase Product Training Conferences, September 1997
- Dun & Bradstreet Time Management Seminar, March 1991
- Haworth Product Training Seminar, September, 1985

HONORS

Recipient of Jean M. Lane scholarship, 1999, Virginia Tech
Tuition Fee Waiver, 1999, Virginia Tech
Juror, Academy Hill Art Exhibit, December, 1998
Artwork exhibited in senior show: May 1984
Seton Hill College, Dean's List, 1981, 1982, 1983 and 1984
Seton Hill Scholarship, 1981

PROFESSIONAL MEMBERSHIP AND CERTIFICATION

NCIDQ Certified – Certification # 016112
Interior Design Education Council, (IDEC), 1998– present
ASID, Educational Member, 1998–present
International Interior Design Association, Associate member, 1998–1999

TECHNICAL AND COMPUTER SKILLS

Proficient in the following:
AutoCAD Release 14 and 2000
3D Studio VIZ Release 2
Microsoft Word
Microsoft Excel
Microsoft PowerPoint
Web design

PUBLICATIONS

Anthony, L. (1999, March). Oh, the stress. Small Business Times, 5, 8.