

USER PREFERENCES IN AN INTERIOR MULTIUSE
SPACE AS RELATED TO COMMUNITY ENHANCEMENT
IN A COLLEGE OF LAW

By

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Wanda McMullen

I dedicate this thesis to my father, William Earvin McMullen, a master builder who introduced me to the art of creating places. All those close to him remember him with much love and affection.

ACKNOWLEDGMENTS

There are many influences that culminated into this Masters Research project and thesis. Among the most important are my University of Florida professors and my graduate advisor, Mary Joyce Hasell, PhD. The topic was suggested by a previous study in which I participated, that was directed by professors Janine King, Richard Pohlman, and Mary Joyce Hasell. The project involved the programming for remodeling the University of Florida Levin College of Law campus existing buildings and a proposed new building. I believe that a major focus of every design project should be the user needs and preferences. I am very fortunate because this project was unique as a Masters Research project; it involved actual users (members of the Levin College of Law), a real site context, and a definite need for improved facilities in which to work and communicate. I have the members of the Levin College of Law to thank for their suggestions and cooperation in participating in this study. The experience has brought me to the full realization that change is needed in the direction of the design community towards more Action Research with user participation and the incorporation of human vision into our building designs.

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Abstract of Thesis Presented to the Graduate School
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This study was a continuation of the design, research, and programming of a new building for the Levin College of Law at the University of Florida. Based on prior interview results, the campus end-users requested spaces with an improved *sense of community*, *identity of place*, and *improved facilities*. These requests included an identifiable entrance, spaces for gathering, group study, student activities, better dining facilities, and views of nature.

The researcher conducted a review of theories about human behavior and the physical environment, as well as the relationship of our built environment to the *sense of community* and the *identity of place*. Five interior perceptual attributes that are related to the evolution of the human species in the landscape were identified: Spaciousness, Multilevel Vantage Points, Levels of Complexity,

Wayfinding, and Refuge. Guidelines for designing a large-scale interactive multiuse interior space were developed from the selected theories. A three-dimensional scale model of an atrium multiuse space that connects the two existing buildings was designed and constructed based on these guidelines.

A survey instrument was developed to test responses to the five perceptual attributes. A convenience sample of 112 (students, faculty, and staff) responded to the survey instrument, which was presented in various places at the proposed LCoL campus site. The study was conducted in the presence of this researcher, during a one-week period in July 2001.

Survey findings showed a large majority of positive responses to the five perceptual attributes that were incorporated into the model design. A significant negative finding was the high level of awareness of the need for privacy (related to Refuge) that was exhibited by the response to the clear glass octagonal study spaces. Strong responses were also given for the mystery and complexity attributes of the designed atrium. Emphasis on creating unity within the atrium design was independently recognized by the respondents, and concurs with architect Christopher Alexander's theories of affording a coherent whole.

The survey's ninety-four percent positive approval of the final atrium plan and model leads this researcher to conclude that use of the selected environment and behavior theories in a multiuse interior activity space appears to enhance the sense of community and identity of place. The design guidelines developed in this study require further testing by interior designers and architects alike.

CHAPTER 1 INTRODUCTION AND PURPOSE

The topic of this study is the exploration of community interaction as related to the aesthetic and functional design qualities of an interior activity space at the University of Florida campus of the Levin College of Law (LCoL). The LCoL currently consists of two buildings, Holland and Bruton-Geer Halls, (see figures 1-1 & 1-2) which are located parallel to each other and separated by an open courtyard space. The remodeling of these buildings and construction of a new building is currently planned for completion by 2006. At the request of the Dean of the LCoL, the Interior Design Junior Class, faculty, and this



Figure 1-1 Holland Hall

researcher performed extensive programming and design exploration for remodeling and space planning of the existing buildings and proposed addition. The programming project was completed in collaboration between the LCoL Facilities Planning Committee and representatives of the University of Florida College of Design, Construction, and Planning.



Figure 1-2 Bruton-Geer Hall and Connecting Walkway

The LCoL's Facility Planning Committee is composed of nine members, selected by the Dean, and included faculty and students. This group identified two related issues that were to be addressed in the new plans. These issues were 1) the need for *a sense of community* and 2) an *identity of place*.¹ After extensive

¹ Phrases defined in the next section.

survey work and analysis of the collective view of faculty, staff, and administrators, the Facilities Committee stated that spaces designed to support community interactions were needed in the campus complex (see figure 1-3 for campus map.) The design Program Plan (developed over an 18 month period) outlined requirements for spaces where community activities could occur. Betty Taylor, Chair of the Levin College of Law Facilities Committee wrote,

the Student/Faculty Community Center will provide an open atrium for law students and faculty: a mall of student administrative services, student organization offices, etc... The concept is that of a communicore designed to collect the community of scholars in an area for student/faculty interaction, classroom discussion, and student services.” Here the students, faculty, and staff could mingle together daily and network as they perform necessary functions, such as: studying, having group discussions, using a portable computer to get out of the office, eating meals, playing games for recreation, or just for relaxing and people watching. (Taylor, 1999, p. 5)

These requirements will be incorporated into the proposed plan.

A Sense of Community

Currently many faculty members reported that they are isolated from students and each other by the layout of their office spaces. The two existing buildings each have long halls that do not facilitate interaction among faculty members other than those close by them. In addition to the office layout problems, there is no gathering space or lounge that can accommodate the entire faculty.

Numerous students also reported feeling isolated from the law school community, because there is no interior place available for interacting, eating, studying, having group debates, relaxing, and recreating. McMillan and Chavis

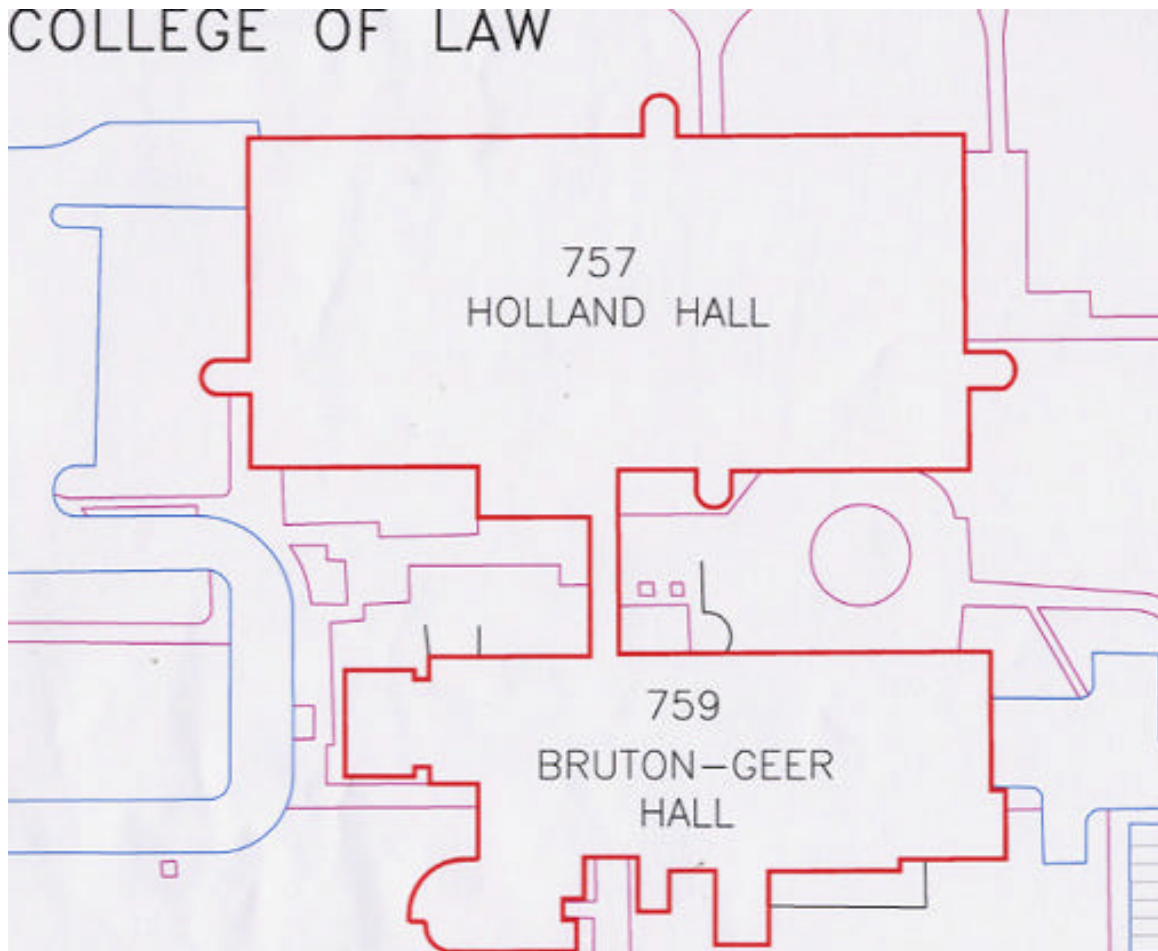


Figure 1-3 Levin College of Law Campus Site

state in their definition and theory of community that, “a sense of community is a feeling that members have of belonging, a feeling that members matter to one other and to the group, and a shared faith that members’ needs will be met through their commitment together” (McMillan, 1986, p. 9). (See Figure 1-4 for a historical example of debate.) The members of the Levin College of Law report that the physical environment of their campus buildings is not supporting the development of a sense of community, as defined by McMillan and Chavis (1986).

J. J. Gibson (1979), an environmental perception theorist, believes that the optic array facilitates our perception of the environment directly through the lens of our eyes. His work relates the physical environment to our behavior, as does the work of Christopher Alexander. Christopher Alexander (with Silverstein,



Figure 1-4 Courtroom Practice (University of Florida Archives)

Angel, Ishikawa, & Abrams, 1977) made an early first attempt by an architect to systematically connect units of behavior called a *pattern language* to architectural elements. In the section of his book regarding the encouragement

of the formation of local centers in communities and neighborhoods, he identifies several of the key components. His list includes:

Eccentric Nucleus: this is the articulation of patterns of low and high density of interaction of people, with the eccentric nucleus being the peak place of density. Activity and quiet can thus co-exist.

Density Rings: these density gradients differ within regions and will vary from community to community, according to the position in the region and the culture of the people.

Activity Nodes: As a community grows, certain “stars” form where the most important paths meet: these are potentially the vital spots of a community: the relationship between paths, community facilities, and public squares is vital and hard to achieve.

Promenade: Each place needs a center for its public life- a place where you can go and see people, a 10-minute walk between points in a community. (Alexander, 1977, p. 153-154)

R. Barker and H. Wright (Bechtel, 1997), ecological psychologists, studied behavior settings beginning in the mid 1950's. They discovered in their research, that certain behaviors are tied to particular places. Bechtel observed from his research that “a well integrated community will have a very rich, most central behavior setting with many behavior settings near it and with few clusters of isolated behavior settings” (Bechtel, 1997, p. 242). This central behavior setting provides a place where the members of a community meet face-to-face.

C. M. Deasy and T. Lasswell (1985) discussed how our modern communication systems generate additional social and business activity at great speeds with accuracy, and yet they also increase rather than decrease the need for meeting face to face. These “face to face meetings are more efficient than any

written or electronic alternative. Not only can gestures, expressions, posture, and intonation be used to supplement words, but clarifications and amplifications can be sought to confirm precise understanding” (Deasy & Lasswell, 1985, p. 74). Meetings can occur anywhere, and unscheduled discussions over a cup of coffee in a lounge area can accomplish problem resolution that would be difficult with multiple office memos. It is Deasy’s assertion that meetings deserve to be supported by the design of the meeting place. It is the premise of this study that the Levin College of Law campus is lacking appropriately designed gathering spaces that can facilitate the integration of its community members.

Identity of Place

J. B. Jackson (1995), in *A Sense of Place, a Sense of Time*, describes the origin of *sense of place* as a modern translation of the Latin term *genius loci*. In classical times *genius loci* meant not the place itself, but the guardian spirit of the place. It was generally believed that the locale of a space, structure, or an entire community derived much of its unique quality from the presence or guardianship of a supernatural spirit. The inhabitants or visitors to the place were always aware of the presence of the spirit and would give reverence to it repeatedly on many occasions. The phrase thus implies ritual or celebration and the place acquired a special status as a result. The common use of the term now is to describe the atmosphere of a place, or the quality of its environment.

According to Jackson, we do recognize that certain localities give us a certain indefinable sense of well-being and we want to visit there, time after time. This researcher suggests that we sense the harmony that is created when the qualities of the natural/built environment interact positively with the event that takes place there. Christopher Alexander stated that

those of us who are concerned with buildings tend to forget too easily that all the life and soul of a place, all of our experiences there, depend not simply on the physical environment, but on the patterns of events which we experience there. (Alexander, 1979, p. 62)

That sense of well-being is an experience that gives us a change of mood, however briefly, and ensures a sense of fellowship with those who share the experience. In earlier times, what made the marketplace significant was not the architecture, but what took place there, day after day. Modern America, for the most part, has abandoned the traditional seasonal calendar. We now share the



Figure 1-5 Homecoming Skit Presentation

same timetable of work hours, religious observances, habits, and customs. The commemoration of the passing of time is what we are sharing in our celebrations and rituals. It is our sense of time, our sense of ritual, which in the long run creates our sense of place, and of community. Alexander believes that recurrences of certain rituals, or seasons, eventually produce those spaces and structures that we consider essential to our society. (See Figure 1-4.)

Cultural geographer Yi-Fu Tuan, observes, “*identity of place* is achieved by dramatizing the aspirations, needs, and functional rhythms of personal and group life” (Tuan, 1977, p. 178). In early formations of villages and cities, the functional and celebratory needs of the individual and groups in the society were the basis for the building forms and exterior spaces that evolved. Buildings and



Figure 1- 6 Moot Court Trophy Award Ceremony (University of Florida Archives)

outdoor spaces were added to over the years, the result being a rich tapestry of built environment that is still evident and enjoyed in many places in Europe.

The members of the LCoL have expressed a need for an interactive gathering space that will allow them to develop a sense of being apart of an impressive educational facility. The current building complex and interior spaces exhibit little or no sense of the history of the LCoL and the interior architecture does not support any cohesive gathering space for meetings of the different groups. The communicore, as defined by Betty Taylor in the LCoL program, is proposed as such a gathering place. Here the growth of an identity of place and a sense of community can be facilitated. The plan of the communicore will try to embody the functional rhythms, celebratory needs, and user preferences of its diverse members, allowing the users and their activities to give shape to the fabric of the built environment.

Purpose

The purpose of this research and design project is twofold. The first purpose is to develop a set of design guidelines by exploring the users' preferences and their rhythms of daily life and celebrations. The second, equally important purpose is that the guidelines will be used in designing and constructing a three-dimensional model of a communicore activity space for the LCoL. The development of these guidelines and model is expected to have several desired results.

The first result of these guidelines is for the design solutions to visually engage the members of the LCoL community, to attract them to the communicore space for their activities. The resulting increase in the number of people using the space may increase the possible daily communication interactions between the various college members. This potential increase in interaction can facilitate and foster the affordance of a *sense of community* within the LCoL.

A creation of a large node or series of smaller nodes in the communicore space can afford an increase in potential moments of interaction, as the faculty, students, and staff moves through the space going about their daily routines. A well-known example of a city street node is Times Square in New York. A node has supporting elements within it for various activities and socialization, and may be anyplace where paths intersect or come together, according to Lynch (1960). Scott (1993a & 1993b) and other researchers (Gimblett, 1990; Herzog, 1984, 1987; R. Kaplan, 1973; S. Kaplan, R. Kaplan, 1982; S. Kaplan, R. Kaplan, & J.L. Deardorff 1974) have investigated the user's cognitive models of preference for certain types of interior spaces. Scott has applied these preferences to interior environments in order to create stimulating places. Research findings of Scott, Gimblett, 1990; Herzog, 1984, 1987; R. Kaplan, 1973; S. Kaplan, R. Kaplan, & Wendt, 1972; and Wohlwill, 1976, have been used to guide this research study and three-dimensional design model in order to create an active, interesting, and useful community space for the LCoL campus.

The second desired result of this study is to suggest design guidelines for other designers to utilize in projects where clients are interested in increasing the users' interactions in interior community spaces. A large proportion of the community spaces this researcher has encountered appear to be very poorly planned with little thought to the actual users' needs.

Definitions

The following is a clarification of terms used in the preceding text to allow the reader to better understand its content.

Design Guidelines

The term "design guidelines" refers to a set of recommendations, based on research, theory, and experimentation, that can guide the planning of the interior spaces and support the level of community interaction desired by the LCoL members. Other interior designers who wish to increase the attraction and use of interior community spaces for communication can also test these recommendations to find out if they perform as expected with different types of settings and groups. The guidelines from this study will be both written recommendations and visual representations (pictures) of interior installations representing the LCoL space in the model. These design guidelines were conceptualized according to accepted human behavioral research findings. Basic interior design aesthetic principles are also incorporated into these recommendations, such as the use of scale, proportion, harmony, variety, contrast, balance, and rhythm.

Sense of Community

The term “community” related to a college of law means: a diverse but unified body of people (students, faculty, and staff), who are near one another and jointly participate in a social relationship; a body of people with a profession in common (teaching and learning about the profession of Lawyers); groups who share the same environment (offices, classrooms, library, and ancillary spaces at the college of law); with common ownership (Webster’s Dictionary, 1990).

“Sense” in the term *sense of community* is defined to mean a conscious perception derived through the senses or intellect (Webster’s Dictionary, 1990). Collectively, *sense of community* relates to that conscious perception of being involved in a place and its’ activities, as well as of belongingness.

Interaction

“Interaction” is defined as: to act upon each other (Webster’s Dictionary, 1990). In the College of Law community interaction was identified as one of the most important functions of a professional college. Convincing arguments and facts are the tools used in the US system of law. The LCoL students and faculty engage in discussions in class and outside of class, but they have few appropriately designed spaces that comfortably facilitate both formal and informal discussion. The LCoL Facilities Committee identified this limitation in the existing facility and requested that new community interaction spaces be a part of the new facility. By providing appropriate spaces where community interaction can occur, the users of the LCoL will have a better chance to practice

what they are taught while at the same time becoming a more interactive educational community. It is the desire of the Dean of the College and the Facilities Committee that the *sense of community* be enhanced to help unify the diverse population of the LCoL campus. Many departments within the college lack the physical support for interaction, and the administration stated that these departments could benefit in a positive way from increased communication levels. By positive recognition of the different characteristics of the diverse groups, a mutual respect can be fostered, which can help provide the needed sense of community integration.

Intentions of the Research Study

In summary, the intentions of the research study are as follows:

- 1) To develop guidelines for an Interior Multiuse Activity Space that will promote an identity of place and sense of community;
- 2) To apply the guidelines to the design project as stated to the LCoL multi-use activity space;
- 3) To use the completed three-dimensional project model along with a survey instrument to ascertain the preferences of a sample of end-users towards the perceptual attributes and other theoretical concepts incorporated in the model;
- 4) To report the findings of the study;
- 5) To refine the design guidelines used and tested in the project model so that other designers may utilize them.

CHAPTER 2

REVIEW OF LITERATURE

As a result of our increasing urbanization, research shows that the percentage of time spent indoors by Americans increased to as much as 80 percent (Bechtel 1997). Planning and creating more appealing and humanly supportive spaces is important in responding to this increased use of interior spaces. This study focuses attention on research about the interaction of humans with their environment and utilizes the research findings of Scott (1993) and other theorists to inform the making of design guidelines for interior community spaces. Guidelines such as those developed here are an important addition to the field of interior design.

Sensitivity to user needs and understanding how people interact with their environment is an important part of applying the current research. Hershberger and Cass (1974) have given us awareness that the designer is unable to predict from intuition the type of environment that is needed by the client, and frequently design building environments that compromise the aspirations of users and at worst are intolerable for them. By being aware of user needs and knowing how people interact with and respond to interior space, more comfortable and interactive spaces can be created. Having this awareness of space and user needs has the potential to facilitate the development of a *sense of*

community and an *identity of place* in interior spaces. People respond to interior space in all its different configurations, i.e. enclosure, exposure, verticality and horizontality, mass, volume, interior spaciousness, and light. Our human species may have evolved over the millenniums, but according to Kaplan and Kaplan (1973), Scott (1993a), and Lynch (1960) we still instinctively respond to some basic design features that are related to our distant historic evolution within the landscape. Furthermore, these design features can be applied to the design of interior architecture.

Environmental Cognition

Preferred Design Attribute Identification

Scott indicated, in “Visual Attributes Related to Preference in Interior Environments, “ that cognitive models of preference, emerging from studies of the natural and urban landscape, also have utility for explaining preferences for interior environments” (Scott, 1993b, p. 15). Two of the predictors of interior preferences found in the article “Complexity, Mystery, and Preference as Predictors of Interior Preferences” (Scott, 1993a), are *mystery* and *complexity*. Mystery is defined as something that cannot be explained or a quality of being incomprehensible (Webster’s Dictionary, 1990). In this context it refers to the characteristic of an environment when it has places that are not all completely perceivable at first view, needing further exploration, and suggesting the possibility of other vantage points from which to view the area. Complexity is defined as the quality of consisting of many parts (Webster’s Dictionary, 1990).

The users respond to a certain level of complexity that is attractive to them.

Related to mystery and complexity are several design attributes that were identified as preferred by users. Scott found that complexity and mystery are necessary for shaping spaces that are preferred by many people. These are included in the design attributes chosen from the environmental and landscape theorists:

1. Spaciousness: perceived spaciousness--vertical and horizontal expansiveness.
2. Multi-level Vantage Points: spaces with different levels of vantage points.
3. Coherence (Wayfinding): a space with coherence that enhances the impression that wayfinding is possible.
4. Levels of Complexity: spaces with levels of complexity that will intrigue the viewer and encourage exploration.
5. Refuge: partial enclosures with some degree of concealment.

The interior preferences noted by Scott (1993a) are based on research that is guided by a theoretical framework called the informational approach by Levin (1976). This approach blends cognitive psychology and reasonable evolutionary speculation. Kaplan and Kaplan (1982) as behavioral psychologists are proponents of this approach. The main idea of the informational approach is that spatial information was crucial to survival as humans evolved in changing environments and that instinct remains coded in our genes today.

Two general cognitive processes (preference judgments) that were likely important to evolving humans are *making sense* and *involvement*. Environmental

features relevant to these cognitive processes can be rapidly and automatically assessed and we are biased by evolution to do so (Kaplan and Kaplan, 1978, 1982). *Making-sense* involves the process of structuring an environment so that wayfinding is enhanced and one can predict what is likely to occur in a particular setting.

Kevin Lynch (1960) in *The Image of the City* theorizes that people use certain elements of a city to identify physical features and organize them in their mental map of a place for wayfinding. This mental map allows a person to navigate through their routines each day and return home safely. Lynch calls the names of the elements that are used in the mental maps: landmarks, paths, nodes, edges, and districts. These elements can be found in the interior spaces of buildings as well.

Wayfinding is comprised of three abilities: a cognitive mapping ability, a decision-making ability, and a decision execution resulting in behavior, according to Passini (1984). *Involvement* relates to the process of the engagement and maintenance of one's interest in an environment. Environments that permit both are highly preferred by many people. The informational approach asserts that evolving humans found that spatial information processes are crucial to survival. Today it still provides us with a sense of order and security.

Two variables involved in the making-sense process include the coherence (the degree of structure or order present in the environment) and the spaciousness (the extent in which the larger setting is well structured in depth),

(Herzog, 1984). Two predictor variables relevant to the involvement process are complexity and mystery. Complexity involves the amount of visual information present in the immediate environment (variety and number of elements present) (Berlyne, 1971). Mystery in an environment suggests to an observer that different vantage points may be present where new information about the area may be obtained (Kaplan, 1982).

Scott's (1993a) study "Complexity and Mystery as Predictors of Interior Preferences" was based on prior research linking preferences for natural and urban landscapes to the complexity and mystery present in them (Gimblett, 1990; Herzog, 1984, 1987; R. Kaplan, 1973; S. Kaplan, R. Kaplan, & Wendt, 1972; Wohlwill, 1976). Miller (1984) found that rock outcrops and cliffs form a special category that is often rated high in preference. Miller observed that these particular scenes were strong in legibility and mystery. How a space is organized, with respect to the observer, appears to be key. Appleton (1975) discussed the features of an environment that provide an opportunity for concealment. More recently, Woodcock (1982) discussed a distinction between a primary and secondary refuge. Primary refuge is a vantage point, which is concealed from view or enclosed. Such an environmental affordance could have an important attraction for a user.

Community Behavior Settings

J.J. Gibson's (1979) view of perception is that it is the result of the constantly moving nature of the optical array and that depth perception is

provided by the textural gradient. Gibson's theory refers to qualities in the optic array called *affordances*. Affordances are opportunities for behavior in the environment, such as places where we can sit because they have the qualities needed for being sat upon, or places to run because they have qualities conducive to being used for running, etc.

R. Barker and H. Wright, ecological psychologists, have studied such behavior settings since the mid 1950s (Bechtel, 1997). They discovered in their research, that behavior was tied to places. The behavior always occurred at a specific place and at given times. The people who were in the place could change but the behavior stayed the same. These behavior settings were the parts of the community that people would go to in order to accomplish the daily business of life.

Bechtel (1977) utilized the research of Barker and Wright in devising a system of mapping a community's behavior settings to show how internally integrated the residents are with each other. A community that is not well integrated will have a most central behavior setting low in richness, without other behavior settings around it, and with many richer settings in the outer layers of the diagram. (See figure 2-1.) By contrast, a well integrated community will have a very rich most central behavior setting with many behavior settings near it and with few clusters of isolated behavior settings. The most central behavior setting is the one where all the people in a town have the most contact with each other. Peripheral to this behavior setting are the behavior settings

close to it, and at each successive outer level the behavior settings become less related and form separate clusters on their own.

Bechtel calls the most central behavior setting a behavioral focal point because it is literally the focal point of behavior for the community. A good behavioral focal point has the following qualities:

1. It is centrally located with easy access for everyone.
2. It is at a crossroads of traffic, specifically pedestrian traffic
3. It is behaviorally rich, with a mix of many different kinds of behaviors and people.
4. It has maximum visual access so people can see and be seen.
5. It has provision for lots of seating. Very often this means some kind of food and drink is served. (Bechtel, 1997, pp. 242, 243)

Biophilia Theory

The biophilia hypothesis proposed by Wilson (1984) is an evolutionary concept that ties humans to the terrestrial landscape. Human beings are genetically attached to the natural landscape by the evolution process. We have genes that are coded to preferences for the natural environment. This concept is inclusive of Appleton's (1975) refuge theory and Balling and Falks's (1982) preference for savannahs (wide open grasslands), but is much broader and does not limit itself to specific types of environments.

Ulrich (1993) in "Biophilia, Biophobia and Natural Landscapes", extended the biophilia hypothesis from merely a preference for the natural environment into the restorative aspect of natural settings. Exposure to natural settings has been shown to reduce stress and restore the subject to a more healthful state. Ulrich, Dimberg, and Driver (1991) exposed 120 subjects to a stressful movie and then divided the group in half and showed half of them

urban settings and the other half natural settings. Those subjects viewing the natural settings recovered faster and more completely than those who were exposed to the urban settings, in physiological measurements of heart rate, skin conductance, muscle tension, and pulse transit time, and also self reports on such things as positive feelings and feelings of anger and fear. So not only did they recover faster by 4 to 6 minutes, they also recovered in more consciously beneficial ways.

Exposure to the daily cycle of light and darkness is important to our health. Our circadian rhythms are driven by an innate program that evolved to adopt the organism to the most reliable and predictable of environmental changes, the solar cycles of day and night (Pittendrigh, 1960). Natural light is the major synchronizing agent in humans. Even minor changes in light can upset the balance of our biological rhythms (Danilenko et al., 2000). Research in this area continues, and points to the interruption of these biological rhythms as one of the underlying causes of ill health and disease (Stevens, R. G.; Rea, M. S., 2001).

Application to Design Guidelines

A plan for the communicore was developed for the LCoL using the research of Scott (1993a, 1993b), and thereby, Gimblett, 1990; Herzog, 1984, 1987; R. Kaplan, 1973; S. Kaplan, R. Kaplan, & Wendt, 1972; Wohlwill, 1976 who studied predictors of preferences and identified design attributes relating to their perception by users in interiors. Next, a three-dimensional model of the

communicore space was designed using the information developed from reviewed theories as a preliminary guideline. End-users of the LCoL communicore space were surveyed for their observations and responses to the three-dimensional model placed in the proposed location of the communicore space. By utilizing the design attributes in a three-dimensional scale model of a multiuse activity space in an educational setting, the study explored creating a community activity space that was planned to appeal to the user on a basic response level as well as aesthetically.

By providing a space with behavior settings that afford more points of contact between the users of the LCoL, the social interactions of the users may be increased, thereby fostering a *sense of community*. The preferences for the study attributes were incorporated into a final list of design guidelines for a large interactive community space, as presented in Chapter Four. The space resulting from the use of these design guidelines has the character of the behavioral settings that the members have positively responded to in the survey. Thus the LCoL respondent's opinions of the proposed atrium model have helped to determine the final plan for the space.

Experiential Psychology

Identity of Place

Yi-Fu Tuan (1977) states in *Space and Place, the Perspective of Experience*, that place has the qualities of an organized world of meaning. Tuan asks,

What gives a place its identity, its aura? These questions occurred to the physicists Niels Bohr and Werner Heisenberg when they visited Kronberg Castle in Denmark. Bohr said to Heisenberg: Isn't it strange how this castle changes as soon as one imagines that Hamlet lived here? As scientists we believe that a castle consists only of stones, and admire the way the architect put them together. The stones, the green roof with its patina, the woodcarvings in the church, constitute the whole castle. None of this should be changed by the fact that Hamlet lived here, and yet it is changed completely. Suddenly the walls and the ramparts speak a quite different language. The courtyard becomes an entire world, a dark corner reminds us of the darkness in the human soul, and we hear Hamlet's "To be or not to be." Yet all we really know about Hamlet is that his name appears in a thirteenth-century chronicle. No one can prove that he really lived, let alone that he lived here. But everyone knows the questions Shakespeare had him ask, the human depth he was made to reveal, and so he, too, had to be found a place on earth, here in Kronberg. And once we know that, Kronberg becomes quite a different castle for us. (Tuan, 1977, p. 4)

According to Tuan, humans share certain behavioral patterns with other animals, yet people respond to place in complicated ways that are inconceivable in the animal world. It is not simply explained by culture, as this approach overlooks the problem of shared traits that transcend cultural particularities and may therefore reflect the general human condition. People experience place with all the different methods of which we are capable (sensori-motor, tactile, visual, and conceptual). Place can be interpreted as images of complex feelings about experiences that are repeated in that location. In the home, the inhabitants move along a complex path with points of pause (moments) day after day. The path and the pauses link together to create a larger place—the home. Such local places like the desk or the kitchen sink, are in themselves important places connected by an intricate path, pauses in movement, markers in routine and circular time.

Karl Marx is quoted as saying “Men can see nothing around them that is not their own image, every thing speaks to them of themselves. Their very landscape is alive” (Debord, 1981, p. 51). The LCoL campus has great potential for becoming a place with a definite identity. There are countless experiences that are repeated there daily, but they take place in a relatively cold and inhuman environment. Utilizing the present campus as the filtering place that it currently is, and combining it with places of pause has the potential to ingrain the experiences in the memory of its users. By creating interesting places of pause that fulfill the current needs of the users of the LCoL, the campus can provide meaningful experiences for its members.

Sense of Community

D.W. McMillan and D.M. Chavis (1986) present a definition and theory of the *sense of community* in which they list four main elements. The first element is membership, which is the feeling of sharing a sense of relatedness or of belonging. Next is influence, which is a sense of mattering, that one makes a difference to the group, or of the group being important to its members. The third element is reinforcement, which involves integration and fulfillment of needs. This is the feeling that members’ needs will be fulfilled by resources that they receive through the group membership. The fourth element is shared emotional connection, which they explain as the commitment and belief that members have shared and will share similar experiences, common places, time together, and history. A common place in which to share time, experiences and

form a history together is what the atrium communicore space can provide for the Levin College of Law campus.

Authors K.H. Klein and T.A. D'Aunno (1986) explain, in their research on community in the workplace, that

the psychological sense of community at work refers to a worker's sense of membership, participation, an identification with some work or work- related group, whether the group is as small and concrete as the company softball team or as large and amorphous as the population of lawyers across the country. (Klein, & D'Aunno, 1986, p. 366)

Their theoretical framework has three components relating to the psychological sense of community: determinant factors, anchor points (friendships, subgroups, etc.), and mechanisms that underlie and explain the relationship between the determinants and *sense of community*. In their list of possible determinants, they have admittedly omitted what they term some obvious ones, including the physical environment, and focus more on the organizational factors.

However they do hypothesize that the impact of all the determinants can be explained by one of three underlying mechanisms. These mechanisms are: 1) the determinant increases the perception that a community exists, 2) the determinant increases the positive appraisal of the group and 3) the determinant fosters the sense of actively being involved in a group. By providing the physical setting for community interaction within the Levin College of Law, the atrium communicore space may increase the perception that a community exists. By increasing the aesthetic appeal of the LCoL campus, the atrium communicore

space may increase the positive appraisal of the group in relation to the place in which they interact daily. And finally, by placing the behavior setting for the group in a public place, the atrium communicore space may foster the sense of being actively involved in a group.

Architectural Theory

Creating Identity of Place

Pierre von Meiss, (1990), a professor of Architecture at l'Ecole

Polytechnique Federale de Lausanne, stated in *Elements of Architecture* that,

where place is concerned, space and time assume a precise, unique value: they cease to be a mathematical abstraction or a subject of aesthetics: they acquire an identity and become a reference for our existence: sacred space and secular space, personal space and collective space, nature and town, street and house, ruin and rebuilding. (Von Meiss, 1990, p. 135)

The site of the LCoL campus changes with the movement of the sun, as a place it changes with the movement of human beings. In the overwhelming campus environment, there are certain portions of space that assume the value of place because they are used for different purposes. What was only a building or a courtyard before becomes charged with human values. The spaces assume these values because the users act in a certain way there or stop to take a mental break in a particular spot. The users identify places where they move together and exchange information.

Places like the breezeway under Holland Hall and the steps in the courtyard are identifiable, because others can point them out, and suggest

someone meet there to talk. Others places speak to us of solitude, like the seats under the trees on the northeast corner of the LCoL campus. Von Meiss suggests that the act of constructing a building is composed of a collection of physical tasks that are not sufficient by themselves. As designers we must ask ourselves the purpose of the construction in the totality of the urban fabric, in the case of the LCoL campus. Von Meiss relates this to the classical architect Alberti who wrote,

The importance of the mastery of aesthetics and construction is seen in what Alberti calls 'commodity'. By this he means a way of treating forms and spaces which respect the objective purpose of a place and the subjective attribution of this place to the patron commissioning the work. (Von Meiss, 1990, p. 137)

Von Meiss instructs that we must unite the elements of aesthetic principles, utility, and geometric, or constructional rules in order to sustain the idea of place.

Christopher Alexander (1987) discussed an experiment done in 1978, with a large group of graduate students over a period of five years. The project involved a large tract of land on the San Francisco waterfront and the design of its development using a single centering process. Seven rules governed the growth of the area, all with the aim of creating wholeness in the city fabric. The addition of buildings was proposed and accepted by a committee, which helped to oversee that the individual projects were in accordance with the rules. All the participants discussed all the projects together as they were being conceptualized to make sure that what was added could work together to make the site into an arrangement of larger wholes. An important stipulation was that each project

must be whole in itself, and its placement, size, etc had to work with what was already there on the site.

Another of Alexander's rules was that construction must occur slowly in incremental growth, so that large, medium and small projects are in about equal quantities. The addition of infrastructure support (like roads, parking sites) was to be considered and provided for but only after all the other considerations were dealt with satisfactorily. This kept the transportation structure from assuming undue importance in the design. Alexander stated that adherence to a rigid grid of fields and streets was one reason for not attaining an organic quality in U.S. cities like that which is found in the older European cities.

Most importantly, (Alexander stated) is the requirement that the buildings should first be experienced as a human vision. Developments of today are not human in origin; they are abstract, lifeless, and incapable of exciting us, or moving us. Alexander states

this vision is not merely an idea, but a thing seen and felt in the mind's eye as in a dream, . . . as a result it has intense personal feeling, and it carries us on a wave of life, makes us feel life, black, gray, or brilliant. (Alexander, 1987, p. 57)

This vision is vital, not just because it is of humanity, but also because it more accurately produces what is needed to conceive wholeness in a site development, than any kind of intellectual process has done. The process is not an intellectual one, but has a much deeper level of human meaning, genuinely based on human visions. Vision must be born of what is already there on the

site, in the project requirements, and in its needs; as a result, it will be deeply related to the existing structures in a healing way.

Frank Lloyd Wright (1939) was in accord with this view. He stated “Architecture is life, or at least it is life itself taking form and therefore it is the truest record of life as it was lived in the world yesterday, as it is lived today, or ever will be lived” (Wright, F. L., 1939, p. 70). Wright’s celebrated private residence for the Kaufman family, Falling Water, is a successful mating of indigenous and modern that could never have existed in any other place. Wright has stated that he conceived all of his works of architecture as an entire entity in his mind, before he put it into a drawn plan form.

Vitruvius, in *Ten Books on Architecture*, (the third book) wrote of the harmony of the design and construction of temples. In his book, this Roman architect of antiquity describes how the outstretched limbs of a well-formed man circumscribe the circle and the square. (Interestingly, the circle and the square are respectively diagrams of the subject territories of the Roman Empire and the Roman Military camp.) He illustrates harmony in the designs of temples as follows:

There is a symmetrical correspondence between the members separately and the entire form of the body in accordance with a certain part selected as standard. We can have nothing but respect for those who, in constructing temples of the immortal gods, have so arranged the members of the works that both the separate parts and the whole design may harmonize in their proportions and their symmetry. (Vitruvius, 1960, p. 75)

The desire for wholeness and harmony in our built environment is obviously an enduring concept.

Application to Model Development

A study that pulls together many components of the research reviewed above is that of David G. Saile (1988), of the School of Architecture and Urban Design at the University of Kansas. In his research on culture and architecture, Saile identified significant roles of architectural and spatial organization in community settings. He stated that all communities have the composition of both social bonds and relationships with places or localities. These roles can be explored under several different categories: 1) settings for behavior and communal activities, 2) shelter and provision of security, 3) mnemonic agents, 4) social communication, and 5) components of identity. First of all, the built environment acts at a basic level as settings for behavior and activities of the community. “ Daily behaviors are repeated over the years in patterns of settings so that the daily environment becomes a part of the activities of a community and may come to represent its way of life. Activities are properly undertaken in the proper places” (*Triglyph 6* 1988, pp. 16,17). Secondly, built environments offer shelter as the community’s attempt to adapt to the climate, to other people and processes, and to support feelings of security. The third category is mnemonic function. Environments can remind people of appropriate behaviors and may help as agents to store the memory of common patterns for ritual and routines of a community. Equally important is the fourth category,

communication. The environment communicates by association. It can make clear the ideas regarding family relationships and larger constructs of social and religious order. The level and gradations of privacy can be “read” by those in the community who share the knowledge of the rules of association. The fifth category is identity. This is perhaps the most powerful and inclusive role that the built environment can play and it is subsumed as a part of the other roles. “Buildings and spaces can be integral parts of individual, social, and cultural identities and are therefore very closely tied with the identities of communities” (*Triglyph 6*, 1988, p. 18).

Another important role that our society has generally ignored is the cosmic role. The three societies that Saile uses to illustrate these concepts in his article are traditional Southwestern communities, but the functions of the built environment may be successfully applied to our own modern cities and settlements. For all three of these societies, there is an underlying emphasis, which distinguishes their environment-community relations from our modern urban communities. For each one, the community is built upon and integrated with the sacred powers of the earth and landscape. Whether it is the surrounding mountains and river that flow through a site, or a network of lakes, springs, caves, and hills, the influence of earth and sky in the landscape is an integral part of the formation of the community. Saile discusses how our own communities appear to have lost in large measure their connections to the sacred landscape. The landscape has become a resource for exploitation, for recreation,

and speculation. Saile stated that though many major architectural schools include the landscape as an important part of their design curriculum, as designers we have largely neglected nature's influence in our present modern built environments.

The roles that Saile listed are related to all of the previously discussed researchers studies. For example, Scott's perceived spaciousness (vertical and horizontal) is associated with our instincts for shelter and security. The different types of enclosures, varying levels of vantage points, wayfinding, and textural complexity are related to security and social communication, as well as to settings for behavior. Components of identity are involved with von Meiss' discussion of place and its relation to our repetition of daily activity, and to C. Alexander's idea of human vision being an important part of what gives life to a building. Mnemonic agents are related to our perception of our environment and Tuan's explanation of place as involved with our memory is very relevant. The connections are clearly identifiable between Saile's architectural and spatial roles and the selected theories. All of these factors may be important to the creation of the built environment of our communities, and deserve consideration so that we do not end up with isolating environments that fail to support the formation of communities.

Application of Theories to Guidelines

Planning for the community activity space on the LCoL campus required consultation with the Facilities Planning Committee, the faculty, staff, and students to get an overview of the necessary purposes of the space. Gathering the necessary information involved conducting extensive interviews with the LCoL end-users to determine their needs and patterns of campus life. Participating in the prior studies of the site and its buildings, traffic flows, and remodeling needs also contributed important information. I combined all of this information together to help design a place for the LCoL campus that will facilitate bringing their campus together as a community that has a sense of identity as a College of Law. The current members reported a lack of wholeness in their campus environment and were very cooperative in discussing their visions for their present and future needs.

A three-dimensional model of the communicore activity space was created, guided by reviewed theories. The on-site research study utilized this model, along with a survey instrument, to obtain user preferences for the perceptual attributes, which were incorporated in the model spaces. In Chapter 4, user preferences for the perceptual attributes are incorporated, along with information from the selected theories, into a set of recommendations for other designers to test for validity in their own projects. The guidelines are presented so they can be tested and improved over time as they are repeatedly applied to a wide range of designs.

CHAPTER 3 METHODOLOGY

Design of the Three-Dimensional Model

The idea of creating a community place for the Levin College of Law (LCoL) arose from the culmination of a project this researcher was a part of for 18 months. This project explored alternatives for the remodeling of the existing structures and planning a new building addition to the LCoL campus. This in-depth study of the campus via the multiple interviews and site analyses completed, provided and informed understanding of the users' needs for an improved facility. All of the end-user groups requested a place where they could gather to develop a *sense of community*, and to give their campus more life and meaning. These needs are incorporated into the following list:

- Internet availability in a more natural setting;
- comfortable places available for studying, eating or talking;
- places available with varying privacy levels for group discussions;
- provision for meeting places for the student organizations, and simulated courtroom practice;
- availability of comfortable attractive places for meals with a good food selection;
- places available for playing games for recreation;
- places available just for relaxing and people watching.

This list of requests required a very complex space, which could facilitate a number of different activities. A literature search was performed of architectural and interior design journals and books, looking for the kinds of places that could facilitate the multitude of requirements. Immediately the idea of an atrium space with multiple levels which incorporated a new building for large group meetings and student activities offices began to take shape in this researcher's mind. The atrium could be a space filled with sunlight and green foliage, with the sound of moving water echoing through it.

Theories from the fields of interior design, architecture, landscape, psychology, sociology, and biology ¹ that dealt with human behavior and the physical environment, and the relationship of built environment to the *sense of community* and the *identity of place*, provided a foundation for the initial designs of the atrium. Several three-dimensional scale models that were suggested by the theories as being attractive and conducive to human involvement were explored. These designs incorporated the preferred perceptual attributes proposed by Scott (1993), Lynch, Gimblett, 1990; Herzog, 1984, 1987; R. Kaplan, 1973; S. Kaplan, R. Kaplan, & Wendt, 1972; and Wohlwill, 1976:

1. **Spaciousness:** perceived spaciousness -vertical and horizontal expansiveness.
2. **Multi-level Vantage Points:** spaces with different levels of vantage points.

¹ Theories presented in Chapter 2.

3. **Levels of Complexity:** spaces with levels of complexity to intrigue the viewer and encourage exploration.
4. **Coherence** (Wayfinding): spaces with coherence that enhance the impression that wayfinding is possible.
5. **Refuge:** partial enclosures with some degree of concealment (utilizing different levels of transparency).

Preliminary design guidelines were developed and utilized to create (through multiple iterations of designs) a three-dimensional model of the atrium communicore space. The detailed model was created of substantial portions of the existing Holland and Bruton-Geer Halls at 1/8"=1'0" scale, with the connecting second story walkway and the open courtyard space between them. The new design of the atrium model was developed in six sections and arranged like an interlocking puzzle between the representations of the existing buildings. The purposes of the new sections were related to the existing campus environment so they could function well together. The placement of the new model sections in the context of the existing built environment provided a sense of the overall scale of the project.

The metaphor of community was identified as the central theme for the project. Based on observations of the existing plan of the LCoL campus, the current locations for socialization were identified. These locations were the courtyard between the two existing buildings, the open breezeway under the southeast end of Holland Hall, and the cafeteria and lounges in Bruton-Geer Hall. The second story walkway is not currently a place for social interaction, as

it is unbearably hot most of the time. Since the courtyard is the most central space and was the most intersecting space of all the paths taken within the campus, it was chosen as the site for the new multiuse activity center. This space became the central node of interaction, surrounded by peripheral spaces of campus activity.

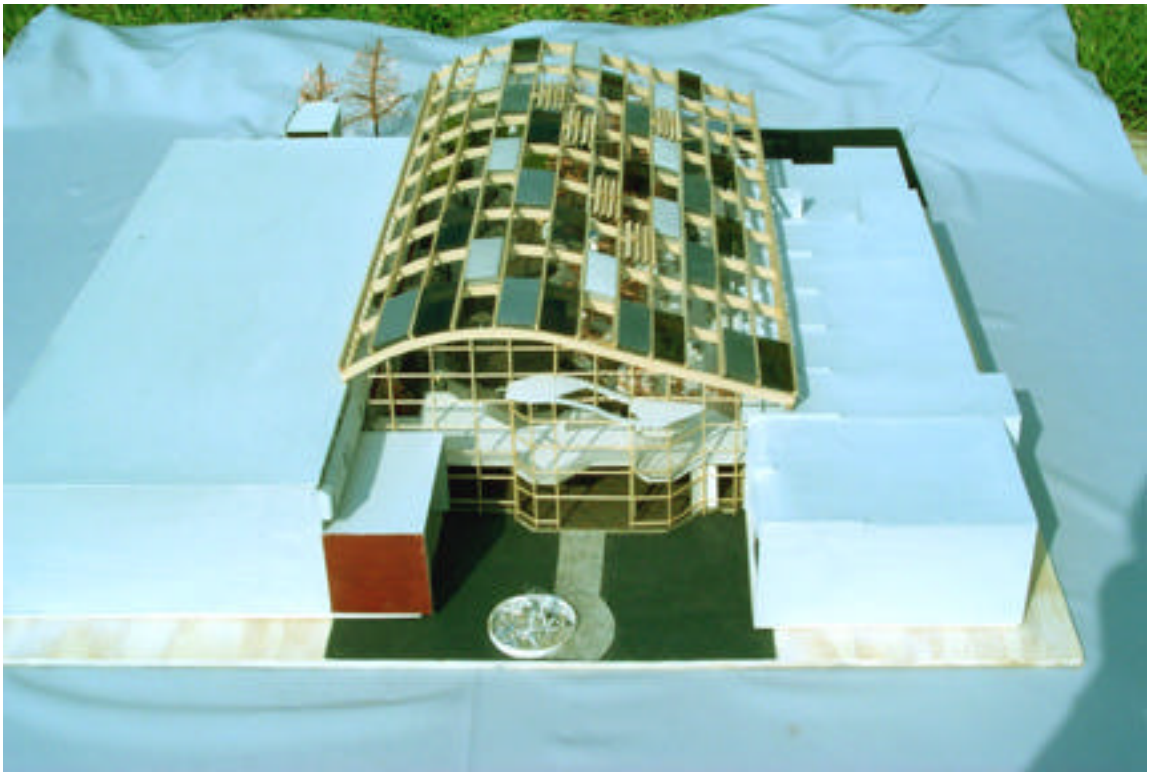


Figure 3-1 Study Model—Holland Hall on the left and Bruton Geer Hall on the right. West Entrance of Atrium.

Model Construction

The three dimensional model was created at $1/8"=1'0"$ scale in six different sections that fit together like puzzle pieces. The two existing buildings formed the north and south walls of the atrium, and the east and west walls were

formed of transparent glass with steel framing. The atrium size was 60' high X 100' wide X 228' long, with an additional 72' for the attached activity center building. This model construction enabled easy disassembling and transporting of the large (3' x 4') model to the different survey and model viewing places on campus. The atrium model was filled with trees, shrubs, and a simulated gently flowing waterfall/stream system. The main central area was left open (no second story). A partially transparent roof protected the atrium. (See figure 3-1.) In each new section, different levels of social space were included in the design, i.e. public, semi-private, and private. Use of the perceptual attributes in each model section (described in the next portion of this chapter) are indicated by keywords that describe them in parentheses, for example, spaciousness.

Lobby/Walkway/Stair

Since the entrance to the LCoL campus needs to be recognized by first time visitors and the second level walkway is the most uncomfortable space in the area, the first model section designed was the **Lobby/Walkway/Stair** section. A new lobby entrance was added to the west end of the courtyard, under a replacement for the existing second floor connecting walkway. (See figures 3-1 & 3-2) The lobby consists of a two story high space, which then drops to a 12' height because of the walkway on the second floor above (spaciousness).

The entry lobby contains places for signage and a receptionist to direct newcomers (coherence). A new elevator is placed close to the main entrance. The width of the current second story walkway was expanded and multilevel

balcony spaces were added so that users can move out of the main path and pause to talk with friends or colleagues. Benches were added near a group of trees, where the ceiling level drops lower under the new balcony additions, to give a place of rest apart from the walkway on the first floor in the lobby area.



Figure 3-2 Study Model--Lobby View at West Side Entrance

An open staircase with a large landing was added to the walkway on the north end of the lobby, so that users can overlook the atrium space when moving between floors on the stairs (complexity, vantage points).

Octagonal Spheres Walkway Model Section

The next model section designed consisted of the **Octagonal Spheres Walkway**. Students currently gather on the breezeway under the southeast corner of Holland Hall to talk in groups and study together on the three fixed concrete tables provided there. One of the students' major requests was a comfortable place for group study activities. The study spaces needed self containment and acoustical isolation. A number of octagonally faceted spheres became rooms of 14' circumference for group study spaces (spaciousness). According to Lillian Too's Chinese Feng Shui theory, in the *Complete Illustrated Guide to Feng Shui*, (1996), the octagonal shape is auspicious and balanced. (See figure 3-3.) This has to do with the room having a side that faces the eight main directions on the earth. The octagonal shape was selected as being conducive to harmony for the group discussions, as all members are able to face each other, with no hierarchy suggested.

The design of the group study spaces utilizes steel and glass framing, with panels of texture for privacy (complexity, refuge). The study spaces have acoustical isolation for privacy, a round table with comfortable chairs, good task lighting, and Internet connections to the Law Library. This shape can be stacked



Figure 3-3 Study Model-- Octagonal Spheres and Waterfall

like children's building blocks, allowing the group study spaces to be arranged into small bi-level clusters.

These clusters began under the edge of the existing breezeway of Holland Hall, and also stack up along the side of the existing brick building (reminiscent of the ancient cliff dwellings of the Pueblo civilization). To retain the free flow of pedestrian circulation through the study area, the octagonally faced spheres were

stacked on two separate levels, and had a connecting second story walkway (vantage point) to the lobby/walkway/ stair section. This arrangement allowed free circulation between the spheres, gave another edge layered with activities and extended the second level of the atrium.

Terraced Dining Model Section

The next space created was the **Terraced Dining** model section. The current dining space of the cafeteria, in Bruton-Geer Hall, is a gloomy open space with the only internal division being between the private Faculty Dining Section on the south side and the main student dining space. The present cafeteria is not large enough to accommodate the entire LCoL faculty, staff, and students. Therefore the function of the dining space was extended out through the dark glass walls of the cafeteria into the atrium, with a series of cascading, multilevel dining platforms proposed, with steps and accessible ramps (coherence). These platforms begin with the lowest at the southeast end of the cafeteria entrances, where a new restaurant was added, and have the highest terrace near a protecting stand of trees, which separates it from the second story walkway. (See figure 3-4) The cascade of platforms provides a public yet intimate space for dining, small group meetings, study, or just relaxing and people watching (vantage points, complexity). In order to provide a natural outdoor feeling and to reinforce the feeling of refuge, trees and plants were positioned along the edge of the platforms. Seating in this area provides a perimeter interactive space along the south edge of the central node of the atrium space.

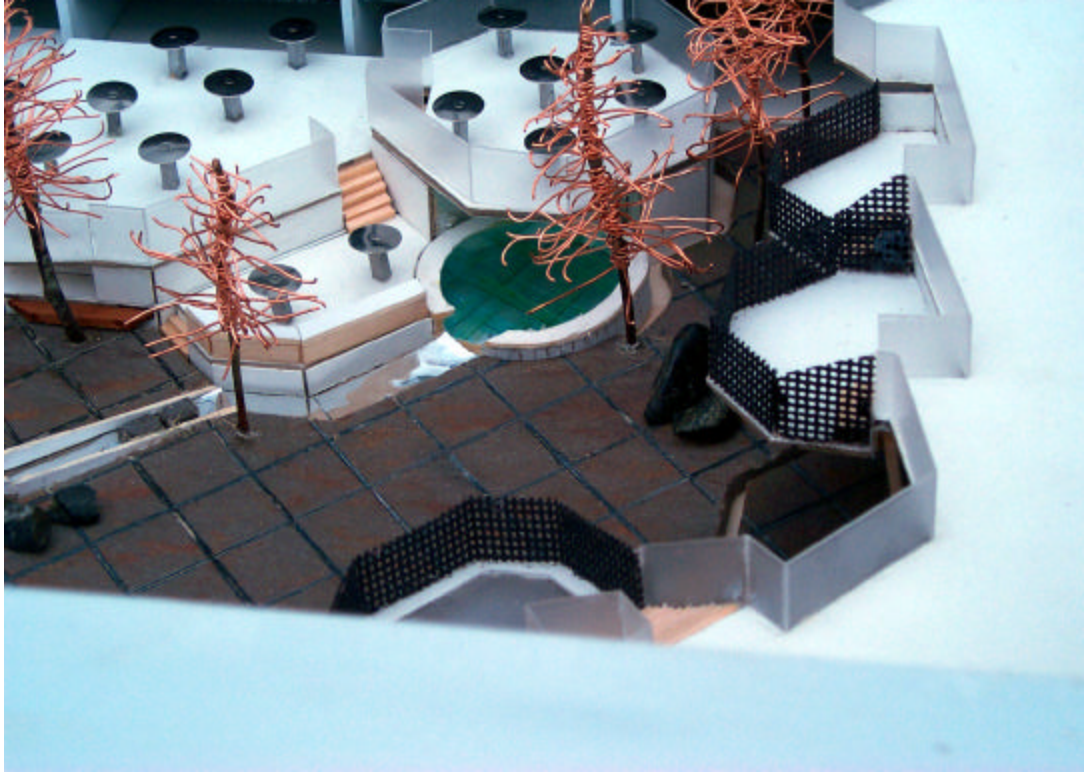


Figure 3-4 Study Model--Terraced Dining and Walkway Balconies

Waterfall/Stream Model Section

The **Waterfall/Stream** model section was added to provide the atrium space with the relaxing sound of water. Many of the spaces in the reviewed literature included flowing water as an attraction for people of all ages. A waterfall and pool was added at the northeast end and another pool at the southwest end of the atrium, along with a meandering stream and criss-crossing bridges to connect the system (coherence). The presence of a stream flowing gently from northeast to southwest is auspicious Feng Shui design, according to Lillian Too (1996). The stream is edged with trees, plants, and boulders, to give it

a natural appearance (complexity). Boulders and trees next to the waterfall, pool, and atrium wall form a secluded space with several benches (refuge).



Figure 3-5 Study Model--View of Restaurant, Terraced Dining, and Stream

The stream's position in the atrium creates several differently scaled courtyard spaces, with seating facing and along the walls of the stream. These courtyards, bridges, and seating along the stream system provide the central atrium space with the physical framework of multiple nodes for interaction, studying, or relaxing.

Activities Center Model Section

The **Activities Center** model section includes student activities offices on the ground floor and a large gathering space (55' square) for meetings or courtroom practice on its second floor (spaciousness). (See figure 3-6) There is access to the balconies on each of the four sides of the new building. The west balcony became the entrance on the second floor, connecting to the Octagonal Spheres walkway (vantage points). There is a natural open space among the trees adjacent to the existing courtyard on its Northeast side.



Figure 3-6 Study Model—East Entrance by Activity Center

The activity center was designed to visually blend the building into the trees, by using green tinted and clear glass with steel framing and black mesh railings. Transparent panels are interspersed with opaque panels for privacy (refuge, complexity). There are multiple views to the outdoors to allow enjoyment of the surrounding trees and to allow the users to stay oriented to the outside for wayfinding (coherence). (See figure 3-7) The activity center was located to give the atrium a physical corner on the northeast edge, and a high place from which the waterfall can cascade.



Figure 3-7 Study Model—N.E. Corner Holland Hall with Activity Center

Roof Model Section

The **Roof** model section, along with portions of the existing Holland and Bruton-Geer Halls, completed the model. The roof overhead shelters the atrium from the force of the sun's heat and glare and adds protection from rain on stormy days. The roof design is an aerodynamically curved bowstring shaped of steel, which spans the differences in height between the two existing buildings. It has a pattern of tinted, opaque, and clear panels to provide dappled shade and light. The patterning provides a shading effect similar to being under a canopy of high trees. (See figure 3-8) The roof also has louvers above the glass in specific places. The louvers respond to the movement of the sun and are

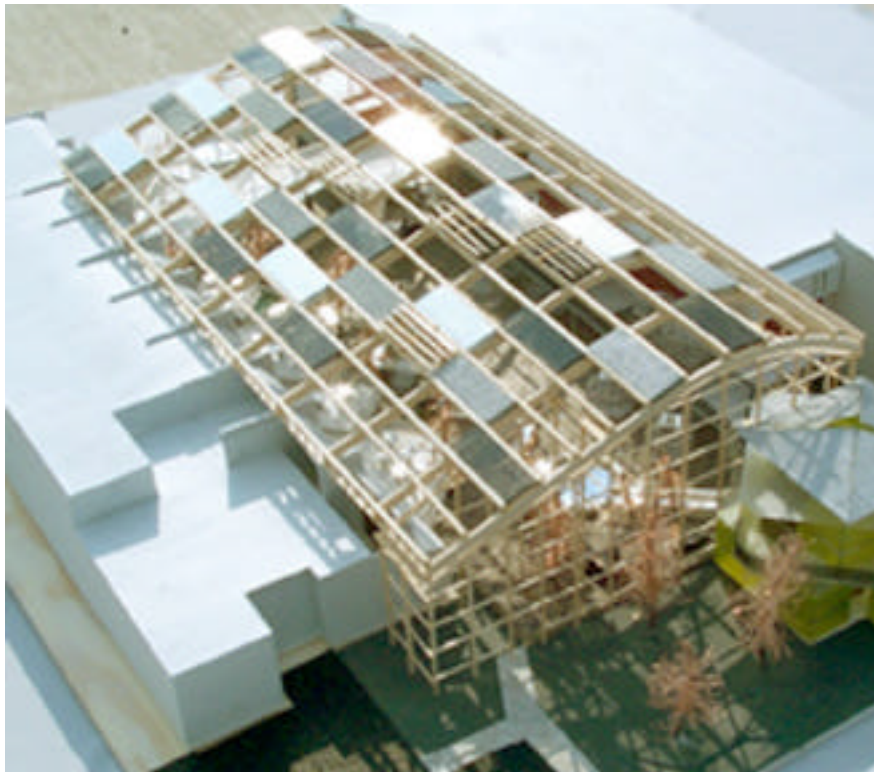


Figure 3-8 Study Model—Roof View

programmed to close automatically to reduce glare and heat transfer. The pattern of panels, louvers, and tinted glass supplies the space with shelter and security from the elements and provides visual texture for the interior space (refuge, complexity). The east and west walls of the atrium are constructed of steel framing with insulated self-ventilating glass construction. There are multiple window sections in the framing that can open automatically to ventilate the space and let the wonderful breezes (beloved by the sites' users) continue to flow through the site.

On the southeast corner of the existing courtyard there is currently a major pedestrian traffic entrance. In the proposed atrium, this area was designed as the main entrance on the east wall and has a covered porch that is surrounded by the steel lattice structure, which remains open to the breeze. The roof protects the users for full enjoyment of the elements. All the entrances and the majority of the atrium spaces comply with the Americans with Disabilities Design guidelines. (See figure 3-9 for plan.) Additional elevators are located in the new Lobby/ Walkway/ Stair section and in the new Activities Center building at the opposite end of the atrium, completing the model.

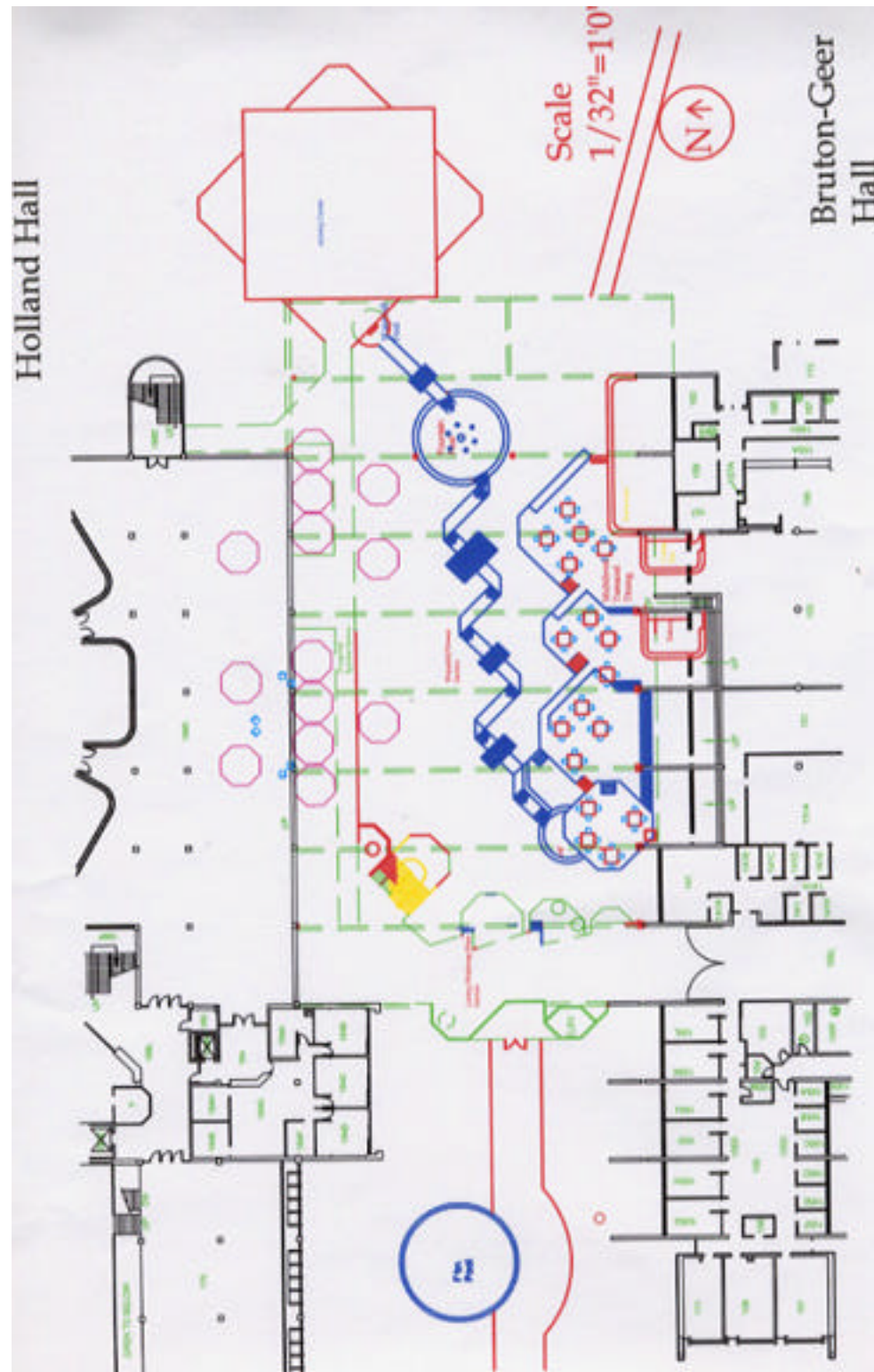


Figure 3-9 Atrium Site Plan

Survey Instrument

The convenience sample of respondents for this study was elicited from members of the Levin College of Law (LCoL) community as volunteers. The faculty, staff, and students were contacted by email about the study and thirty agreed to participate in the study. The additional eighty- two respondents volunteered for the study as they walked by the model when it was set up in the various locations on the LCoL campus for viewing. A total of 112 men and women participated, including 24 faculty and professors, 23 staff, and 65 students. A survey instrument was administered to ascertain whether or not the respondents recognized the qualities of the selected perceptual attributes in the six sections of the three-dimensional scale model. (See Appendix for the Survey Instrument.)

Each section of the survey targeted one of the six model sections and had questions about the appropriate perceptual attributes for that section of the scale model. Respondents were asked to report on how they would use various spaces if the model were actually constructed as a real space, to evaluate how they perceived the model's visual affordances. Scale human figures were placed throughout the model to assist the respondents in understanding the size of the model. A short section was included in the survey to determine their current *sense of community* and their overall response to the model. The questionnaire also asked for the respondents' impressions about the quality of the existing campus environment.

Model Survey

The use of three dimensional scale models by researchers to identify user preferences of interior spaces is a well-accepted method of research practice (G. J. Hardie, 1983; R. Kaplan, S. Kaplan, and J. L. Deardorff, 1974; C. T. Mitchell,



Figure 3-10 Researcher Answering Questions -- Study Model under Holland Hall Breezeway

1983; M. J. Hasell, F. D. Peatross & C. A. Bono, 1993). In this study the model was used as a test to see if the participants could identify the preferences in a three-dimensional model form as opposed to the previous study by Scott where she used two-dimensional photographs of spaces to collect preference data. The atrium model was set up in locations where maximum pedestrian

traffic occurred and the questionnaires were attached to several clipboards, available at all times. (See figure 3-9)

Respondents received a verbal tour of the model from this researcher as an orientation to the project. (See figure 3-11) They then were given the self-



Figure 3-11 Survey Held with Multiple Respondents Simultaneously.

administered questionnaires to complete. Additional questions from respondents about the model and research project were answered as the survey was completed. Most of the respondents required 20-30 minutes to complete the model tour and questionnaire. As many as four or five respondents answered the survey questionnaire at one time. (See figure 3-10) By having multiple copies of the survey being completed simultaneously, the survey phase of the

model study was completed within one week's time. The demographics of the respondents were collected and included the respondent's affiliation with the LCoL, age, gender, and length of time on campus. Questions were included



Figure 3-12 Initial Tour of Model

relating to each of the six sections of the model that incorporated the five perceptual attributes: Spaciousness, Multilevel Vantage Points, Levels of

Complexity, Coherence of Space (Wayfinding), and Refuge. This researcher freely gave explanations to respondents as questions arose. (See Figure 3-11)

Ordinal response variables asked the respondents to rate the perceptual attributes in the models on a scale of 1 - 4 with 1 being the least positive and 4 being the most positive (Likert type scale). Each model section had its own



Figure 3-13 Respondent with Survey Instrument

designated page in the survey instrument (see figure 3-12) with space for written comments about possible changes to the model section at the bottom of each page.

The octagonal spheres group study spaces were used as a negative test for the attribute concerning partial enclosure with some degree of concealment.

When constructing the octagonal spheres, the intention was to place texture for privacy over every other clear glass wall panel at eye level, so the clear panels were operable windows for viewing out. Since one of my advisors disagreed with the placement of texture on these octagonal sphere spaces, it was decided to leave them totally clear and put the question to the potential users of the spaces to decide the issue of enclosure/concealment.



Figure 3-14 Model Survey Respondents

Observations During Model Survey

The model was placed in the context and orientation parallel to the existing space where the proposed atrium would actually be constructed, and in several different areas of the LCoL campus. The survey was first administered in

the existing cafeteria space, then taken in the third floor lobby of Holland Hall; next it was moved to the breezeway of Holland Hall beside the existing courtyard, (see figure 3-13), and finally completed in the second floor atrium space in Bruton-Geer Hall. Locations and the orientation of the model were selected so the respondents could accurately comprehend the spaces in the model. Each respondent was informed that each page was about a different section of the model, so they could focus on the section referred to by those questions. Each section was named for them in the verbal tour of the model in order to avoid confusion. Nevertheless almost all of the participants were observed looking at the entire model space very frequently. At first this researcher was concerned that they misunderstood the section of the model to which the questions referred. The respondents explained that they understood, but were looking at how the parts all worked together. It seems apparent that the participants were ascertaining if the model pieces meshed well with the existing building functions and with the other model sections, based on the questions they posed.

The respondents appeared to have a need to view the model as a whole space, not just a collection of different sections. The urban planning theories of C. Alexander (1987) noted the same findings. He believes that everyone has an innate desire to produce wholeness in a complex world. The respondents reported evaluations of its harmonious quality without being asked to do so, and

several respondents termed it a mystical space in their comments.² Architect Eliel Saarinen, stated “Always design a thing by considering it in its next larger context -- a chair in a room, a room in a house, a house in an environment, an environment in a city plan” (Saarinen, 1977, p. 2).

² When something appears mystical to us, it is usually an illusion created by being surrounded by a world that seems totally convoluted. When a space is orderly and harmonious we perceive it as out of the ordinary.

CHAPTER 4 RESULTS AND DISCUSSION

Introduction

In this chapter, the main objective is to relate how the survey and the model functioned together to test the design guidelines. In questioning the respondents overall impression of the present atmosphere among the members of the LCoL, forty-nine percent perceived the level of interaction as being interactive or very interactive. However, forty-seven percent found the campus atmosphere only slightly interactive, and four percent stated it was not at all interactive. (See figure 5-1 for example of socialization area.)

When respondents were asked if the present LCoL environment impressed them as being a community where the goal is learning about Law together, twenty-eight percent answered *positively*, thirty six percent answered *maybe*, and thirty-seven percent answered *no*. Comparing the responses about the present level of interaction at the campus to all the perceptual attributes in cross-tabulation and Chi square tests, there was again no significant association reported by the tests. These responses correlate with the impression given by the LCoL Facilities Planning Committee that the campus needs to have *improved interaction* and a *sense of community*. The first section relates the model's evaluation by respondents in the survey.



Figure 4-1 Socializing in the courtyard in front of Bruton-Geer Hall.

Recognition of Perceptual Attributes in the Atrium Model

This research study involved design of a three-dimensional model of the atrium communicore space and administration of a survey instrument designed to report responses regarding the perceptual attributes from the end-users. This researcher combined the results of this survey into Table 1: Percentage of Responses to Perceptual Attributes, for general comparison. Table 1 is an overview of all the responses to the selected five perceptual attributes that were incorporated into the three-dimensional scale model. The survey questionnaire used by respondents was composed of seven sections. The first six sections each had a group of specific questions related to a different activity area of the atrium

model, (i.e., the Lobby/ Walkway/Stair model section, etc.) and the seventh section related to respondents' perceptions of the existing LCoL campus environment. Each question in the six groups was keyed to one of five different perceptual attributes that were tested: Spaciousness, Level of Complexity, Multilevel Vantage Points, Level of Coherence (Wayfinding), or Refuge. (See Appendix for the survey instrument.) The survey was designed with ordinal questions about the perceptual attributes using a Likert type scale and additional open-ended questions. During the coding and analysis process, the open-ended responses were also categorized into the same Likert type scale as the closed-ended responses. Open-ended questions regarded the activities that appeared plausible (affordances) in the six model areas (roof excluded). Responses were analyzed with frequency tests. (See Table 1.)

Gender responses were compared using cross-tabulation and Chi square tests for differences against all the variables. There were no significant differences between males and females for any of the perceptual attributes. There was also no significant difference when age was compared against all the variables using the cross-tabulation and Chi square tests. This appears to support the findings of the theories of environmental cognitive perception, that the attributes are preferred instinctive responses, as no gender or age difference was visible among these respondents.

Table 1: Percentage of Responses to Perceptual Attributes

PERCEPTUAL ATTRIBUTES	Definitely	Maybe	Not at all	Missing
Spaciousness				
Lobby/walkway/stair	87	11.5	1.5	0
Terraced seating spaces	45	42	6	7
Waterfall/Stream	71	20	6	3
Octagonal Spheres	49	36	15	0
Activity Center	73	24	3	0
Roof Section	93	5	1	1
Multilevel Vantage Points				
Lobby/walkway/stair	91	8	0	1
Terraced seating spaces	83	14	3	0
Octagonal Spheres	63	24	12	1
Activity Center	78	19	3	0
Levels of Complexity				
Lobby/walkway/stair	75	20	4	1
Terraced seating	88	10	2	0
Waterfall/Stream	87	8	4	1
Octagonal Spheres	65	28	5	2
Activity Center	84	13	2	1
Roof Section	81	12	6	1
Coherence (Wayfinding)				
Lobby/walkway/stair	85	14	1	0
Terraced seating	93	5	1	1
Waterfall/Stream	86	10	3	1
Octagonal Spheres	61	32	5	2
Activity Center	86	14	0	0
Refuge				
Lobby/walkway/stair	65	32	2	1
Terraced seating spaces	61	28	8	3
Waterfall/Stream	83	14	3	0
Octagonal Spheres	59	21	20	0
Activity Center	70	30	0	0
Roof Section	84	10	4	2

Table 2: Averaged Percentages of Responses to the Perceptual Attributes, reports an overview of responses to the entire model. Responses to the perceptual attributes in each model section are averaged as percentages for each perceptual attribute. (In other words, the Combined Spaciousness category is an average of the all the responses about the Spaciousness attribute in each of the six sections of the six model sections. (See Table 2.) As evidenced by Table 2, over seventy percent of respondents recognized each of the perceptual attributes and positively responded to approved of the perceptual attributes overall in the atrium model.

Table 2: Averaged Percentages of Responses to Perceptual Attributes

AVERAGED PERCEPTUAL ATTRIBUTES	Definitely	Maybe	Not at all	Missing
Spaciousness	70	23	5.5	1.5
Complexity	80	15	4	1
Multilevel				
Vantage Point	79	16	4	1
Coherence				
(Wayfinding)	82	15	2	1
Refuge				
	70	23	6	1

The averaged responses to the three-dimensional scale model of the atrium were actually more significant than the separate responses to each perceptual attribute. The model incorporated the five perceptual attributes into the design along with other theoretical influences. A more detailed theoretical

discussion about responses to each perceptual attribute and the relationship of that attribute to the other theoretical characteristics of the atrium model follows in the next section.

Spaciousness Attribute

The Spaciousness attribute refers to the perceived spaciousness in each model section. Scott's study results show that people prefer vertically and horizontally expansive spaces, which are visibly subdivided into smaller spatial areas. The questionnaire addressed the Spaciousness attribute in every atrium model section to obtain an impression, first of all, of the respondents' perception of spaciousness in each area, and secondly, to observe where the design guidelines may need adjusting for others to use.

The Lobby/Walkway/Stair, Waterfall/Stream, Activity Center, and Roof sections were all positively rated as having the perceptual attribute of spaciousness (seventy-one to ninety-one percent). A discussion of these follows.

There are two Lobby/Walkway/Stair section questions and their responses were averaged together for one combined percentage score in the results. The first question referred to the perception of spaciousness upon entering the lobby (a two story ceiling changes to a twelve foot high ceiling) and whether the respondents noticed that the height changes conveyed an impression of entering a special place. Eighty percent of respondents responded positively (definitely, or very definitely). The second question related to perceptions of the second floor walkway (a 16' wide space) as ranging from

narrow to expansive; ninety-three percent of respondents gave positive responses (comfortable, or expansive). Surprisingly, one respondent replied that the walkway was too narrow and explained that he was imagining placing tables and chairs up on the second floor walkway edges, as well as on the balcony areas. His involvement with the model signifies an ability to immerse himself into the spaces of the model.

The Waterfall/Stream section, relating to spaciousness, asked the respondents to imagine themselves in the area where the stream divides the central area of the atrium into smaller spaces. The respondents described the spatial feeling given by the various areas created by the stream and boulders dividing the space. Seventy-one percent of respondents gave positive responses (very intimate, or intimate). Spaciousness recognition is important because the stream area was planned as the central node in the atrium model where the end-users sit, as well as cross paths, most frequently, and use intimate spaces for interaction.

Questions about the Activity Center section asked the respondents to relate their impression of the spaciousness of the large gathering room on the second floor of the building (its size was apparent from viewing the outside of the building.) A total of seventy-three percent of the respondents answered positively that it appeared to be spacious. End-users definitely need an indoor gathering space to facilitate meetings of different size groups and functions.

Respondents were positive (ninety three percent) about the feeling of spaciousness that was perceived in the atrium as enclosed by the Roof section. . A few respondents told me they wanted it to be even taller than the planned sixty feet. This finding was important to the atrium design because people tend to avoid areas that do not have a spacious feeling. The purpose of the atrium is to draw people together.

In the Terraced Dining Seating section, respondents were asked to relate how hanging overhead screens changed the quality of space. Forty-five percent gave positive responses that the presence of the screens made the space appear more close and intimate, forty-two percent gave the response of maybe. This is in contrast to the usual feeling of intimacy that people express when placed in an actual dining space with a lower ceiling treatment (Pile, 1995). The attempt to create an intimate seating space is important to help build attraction and facilitate interaction within the space.

In the Octagonal Spheres Section, forty-nine percent of the respondents gave positive responses to the perceived level of spaciousness of the study spheres, i.e., that 3-5 people could fit inside the spheres along with them, and thirty-six percent felt that only 2-3 people would be able to sit comfortably inside with them. At this small scale it was difficult for many respondents to imagine the 14' width of the study spaces, even with the scale human figures beside the spaces, as evidenced by their verbal comments during the survey. A larger scale

three-dimensional model (at 1/4"=1'0" or larger) of the study spaces would need to be built to allow end-users to evaluate them appropriately.

The Terraced Dining Seating section and the Octagonal Spheres section were the only two sections that were under 60% in positive responses to the Spaciousness attribute. In both cases, I would like to test their actual responses in the real constructed spaces, to see if the respondents actually report the way the theories suggest or in the same way. The hanging screens could be further adjusted for the desired feeling of intimacy in the Terraced Dining Seating section and a prototype test of the study spheres would yield a more accurate reaction to the approximate number of people fitting comfortably inside.

Multilevel Vantage Points

The Multilevel Vantage Point attribute refers to places that are not all completely perceivable at first view (conveying mystery) in each model section. These places suggest further exploration, with the prospect of different levels of vantage points from which to view the area. The balconies and the large staircase landing in the Lobby/Walkway/Stair section are high places to observe the atrium space without being immediately observed by lower level users. Ninety-one percent of respondents answered positively that they would utilize these areas for viewing over the atrium. The Terraced seating spaces also incorporated this perceptual attribute. Eighty-three percent of respondents answered positively that they would utilize the semi-secluded spaces with the 42" frosted glass railings. The Octagonal Spheres study spaces on the second

floor level had sixty three percent of respondents answering positively to using the spaces to overlook the atrium. Seventy eight percent of the respondents answered positively to using the balconies of the Activities Center to overlook the trees on the Northwest end of campus. These places also function as secondary or tertiary nodes where interaction can occur in the atrium (seating available and close to pathways.)

Levels of Complexity

The level of complexity attribute refers to multiple pieces, layers or richness of pattern in each model section. Scott's (1993) study found spaces with certain levels of complexity intrigue the viewer (dynamic patterns and planes) and are more arousing and involving to the user. In the Lobby/Walkway/Stair section, eighty-eight percent of the respondents perceived the balcony additions to the walkway positively as a more interesting design. Sixty-three percent were intrigued by the layered effect of the glass railings combined with the steel mesh railings. Eighty-eight percent of the respondents were attracted to the smaller sized dining spaces on different terraced levels as a more complex design, inviting exploration.

When asked if the sound and visual sparkle of the stream transformed the space by adding intrigue and mystery, eighty-seven percent of respondents responded positively. This adds another level of visual and auditory texture, and a relaxing water sound is very beneficial in lowering respondents' stress levels. The respondents felt that the octagonal spheres were complex in design;

sixty-five percent had their curiosity aroused by their presence in the atrium, twenty eight percent replied maybe. The view of the activity center at the east end of the atrium intrigued eighty-four percent of the respondents to explore further into the space of the atrium. The Roof design with its varying textures and hanging mobiles was attractive to eighty-one percent of respondents.

Use of texture and complexity in the design of the atrium space was very attractive to the respondents. This finding appears to confirm Scott's theory that occupants search for mystery in the environment when it is missing. Creating a comfortable level of texture that holds our attention is an important design feature.

Level of Coherence (Wayfinding)

The Level of Coherence attribute refers to the perception of spaces with visual coherence that enhance the impression that wayfinding is possible, in each model section. It is the process of structuring an environment so that wayfinding is enhanced and one can predict what is likely to occur in a particular setting. Visual access to adjacent areas and destinations as users move through areas is an important part of enhancing the legibility of a place. Seventy percent of respondents answered positively about the overall Level of Coherence of the atrium space. Eighty-five percent of respondents deemed the location of the lobby doors and staircase as being prominent enough to be remembered in an emergency exit situation, and that they could navigate easily through the atrium space.

The multiple entrances and ramps to the Terraced Dining Seating Area were viewed as a positive design feature by ninety-three percent of the respondents, as facilitative to wayfinding. The multiple bridges and stepping-stones across the stream system were considered facilitative of wayfinding by eighty-six percent of respondents. The ability to view between the octagonal Spheres to a distant space on the first level was positive for wayfinding according to sixty-one percent of the respondents, and thirty-two percent thought it might help them find their way. Eighty-six percent of respondents answered that the transparent wall panels interspersed through the activity center structure are positive orientation devices for wayfinding in the building.

Refuge

The Refuge attribute refers to the features of the environment that provide opportunity for concealment in each of the model sections. Zoned spaces which provide users with partial enclosures with some degree of concealment, give them a feeling of security. The balcony spaces, as well as lobby seating under the balconies (by the trees) appeared secluded enough for private conversation in the Lobby/Walkway area by sixty-five percent of respondents, and thirty-two percent responded possibly. The terraced dining seating spaces were considered as intimate and secluded by sixty-one percent of respondents, and possibly so by twenty-eight percent. Eighty-three percent of the respondents chose to sit in the two higher terrace levels, which gave a better view of the atrium, and more concealment. The glimpse of a waterfall surrounded by boulders (with available

seating) at the east end of the atrium definitely increased the level of curiosity for exploring into that space for eighty-eight percent of respondents. Also, the secluded area by the waterfall held an attraction for seventy-nine percent of them. This appears to confirm Scott's theory that we search for mystery in our environment when it is missing. This should be interesting to note for designers wanting to attract people into a space.

The most interesting finding in reference to the refuge attribute was the Octagonal Spheres response. When the respondents were asked if texture placed over parts of the glass walls of the study spaces made them think it would be a more comfortable space, fifty-five percent answered positively, thirty-one responded with maybe. When asked in an open ended question to explain why they thought it would make them more comfortable to have the texture on the walls, a total of sixty-four percent consistently stated their reason was to have more privacy and ten percent stated the addition of texture would make them feel claustrophobic (twenty-six percent did not answer the question).

Of all the open-ended questions, this one was most consistently answered; it appears to show that the respondents are subconsciously aware of the need for refuge. Some respondents suggested that the presence of the clear glass octagonal spheres was the only feature they didn't like in the model. When they were shown the addition of texture on the walls was possible, a total of sixty-two



Figure 4-2 Respondents shown an Octagonal Sphere with Texture on Walls

percent of respondents responded they would enjoy being inside of the octagonal sphere study spaces. (See figure 4-2.) Seventy percent of respondents observed the activity center as secluding enough inside to enhance interaction, with the combination of transparent, translucent, and opaque panels. Eighty-four percent of respondents felt the sense of enclosure provided by the roof made

the space feel comfortable. The overall sense of refuge was positively perceived by seventy percent of respondents in the atrium model.

Presence of Nature

Scott found that people prefer settings with the presence of nature in the form of natural light sources and plants to settings that were lacking these characteristics. The atrium space is a setting with abundant natural light and trees, plants, and a waterfall/stream system. The respondents stated that if nothing else were changed about the existing courtyard space, except for the addition of the trees, plants, and the stream system, they would be happier with the space. Overall, eighty-two percent of the respondents were regarding the stream system as definitely positive.

Summary

In summary, the perceptual attributes were overall very close in their attraction for the respondents of the study. This sample of respondents universally was able to recognize all the perceptual attributes regardless of gender, age, affiliation with the LCoL community, or number of years associated with the LCoL. The respondents had no difficulty recognizing the perceptual attributes incorporated in all of the various different forms of the atrium model! The overall positive approval of the attributes would suggest that all of them are important for designers to consider including in interior activity spaces whenever possible.

Projected Possibilities related to Atrium Model

Analysis was done of the respondents' opinion as to whether interactions among LCoL members might increase as a result the addition of a place like the atrium space. Eighty-eight percent of respondents answered positively.

Respondents were asked if they thought that interacting as a group within the proposed atrium spaces would enhance networking within the campus, and seventy-five percent responded yes. A large majority of respondents appear to think that the atrium space may help increase the interaction level among the users of the college of law, thereby helping to foster the growth of an *identity of place* and a *sense of community*.

Use of Three Dimensional Model

User Involvement

Overall, end-users appeared to have no difficulty understanding, evaluating, and being involved with a three-dimensional scale study model. It does not appear that the use of two-dimensional drawings of plans and perspectives would enable these users to understand the space as fully as did the three-dimensional model.

Respondents commented enthusiastically about the inclusion of trees and shrubs, and a small waterfall with a flowing stream in the space. This appears to support findings of the biophilia theory, which extended the biophilia hypothesis from merely a preference for the natural environment into the restorative aspect of natural settings. Respondents are very aware that they are cut off from views

of nature. On this site, respondents reported that the existing buildings, Holland and Bruton-Geer Halls, have many rooms that lack adequate windows with views. Not blocking the flow of wind through the site was one of the first impressions of this researcher of a way to keep the present identity of



Figure 4-3 Study Model—View from S.E. Corner

place intact. The members of the LCoL are aware that one of the redeeming features of their campus is the nearly constant breeze that flows through their courtyard. Since the courtyard is poured cement, the breeze and several shade trees help to keep it cool. All respondents were concerned that a natural ventilation of the atrium space would be planned for and were happy to know that the design had incorporated this feature already. Another feature of the site preserved was its quality of being accessible from all sides. Many respondents asked if the doors to the existing cafeteria would remain intact in the new plan, and if they would still continue to be able to enter the atrium from all sides. (See figure 4-3 for full view of Study Model.)

Respondents in this study reported being able to imagine themselves inside of the model space, with the aid of the small-scale human figures that were placed on the model sections. Respondents did have difficulty perceiving some of the characteristics at such a small scale ($1/8''=1'0''$). The $1/8''=1'0''$ scale model was too small to adequately represent shrubs, and the some of the respondents were unable to imagine their presence well. Based on this experience this researcher would have to recommend using the $1/4'' = 1.0'$ (or larger) scale to any designer using a model to explain a three dimensional space. Time was spent with many users helping them to understand the scale, by comparison of the sizes of the spaces to familiar places. It is interesting to note that respondents perceive three-dimensional objects in this model with differing

levels of clarity. Further research studies utilizing models of designed spaces with end-users to explore the possibilities of this method are recommended.

Identification of Affordances

The respondents were able to envision and suggested numerous activities they thought possible in the different model sections, just as Gibson's affordance theory suggested. (Gibson, J., 1979). For example, in the dining terraces seating section, forty-six percent of respondents listed four or more different activities



Figure 4-4 Study Model—N.E. Corner with Activity Center

(eating, studying, meetings, relaxing, sunning) they would do in the space, and thirty-four percent listed three activities (eat, study, meetings). These respondents involved themselves in the model space and appeared to view the different sections as flexible places for many different activities. (See figure 4-4 for view of Activity Center.)

The respondents were questioned if they thought the present LCoL campus environment needed changing, and forty-six percent replied yes. Twenty-four percent of respondents thought it should be demolished and start over, and twenty nine percent of them did not respond to the question. This correlates with the LCoL Planning Facilities impressions of a definite need for change in their physical campus framework. When asked if the respondents would be proud to bring a visitor to the new atrium space if it were built as presented in the model, an overwhelming ninety-four percent responded yes. This is positive support that the model design works for this sample of end-users. Therefore, I present the following design guidelines as a successful result of this research study.

Guidelines for Designing Multiuse Interior Community Spaces

The following Guidelines are included here for use by other designers who wish to create large interior multiuse community spaces, which may increase the users' interactions and facilitate a *sense of community*. The Guidelines were developed from all the theories researched in this study and were used to design the three-dimensional model of the large multiuse interior activity space used with the survey instrument in this study.

Data Gathering/Inclusion

1. Performance of in-depth interviews of a representative sample of potential end-users of the space to ascertain their needs and desires for the space; allow the information obtained from observation of the rhythm and flow of the daily activities and celebrations of the

users to help shape the new space being formed, to enhance the existing identity of place.

Site Awareness

2. Create the new space with the whole site in mind, so that it is an improvement of the space and works as a whole with what is there, to preserve identity of place and not cause irreparable harm.

Environmental Cognition Theory

3. The preferred perceptual attributes discussed in the theory section and again here are important to consider for use in the designed space. The perceptual attributes tested appear to be tied to our basic survival responses and we respond positively to them.

Perceptual Attributes

- a) Spaciousness: perceived spaciousness -vertical and horizontal expansiveness
 - b) Multi-level Vantage Points: spaces with different levels of vantage points
 - c) Levels of Complexity: spaces with levels of complexity (textural and spatial) that will intrigue the viewer and encourage exploration.
 - d) Coherence (Wayfinding): spaces with coherence that enhance the impression that wayfinding is possible
 - e) Refuge: partial enclosures with some degree of concealment (possibly utilizing different levels of transparency)
4. Whenever possible, provide for different levels of social space in every section of a large interactive multiuse space: Public, Semi-Private, and Private. Different users will seek all three types of social space at varying times for spatial comfort.

Circular Loop (Alexander's Urban Design Theory)

5. Allow the new space to be designed incrementally, one section at a time, each followed by reassessment of design as a whole, in a

circular pattern, to ensure that the sections function well together. The incorporation of each new section will suggest what is needed next to a designer who is fully knowledgeable about the purpose and needs of the user and the site.¹

6. Begin designing the space with a concept, but allow human vision to guide it through each addition to the design. Human vision is more accurate at supplying the needed parts than any intellectually abstract process.

Community Behavior Settings

7. The inclusion of a central node, with maximum visual access, plenty of seating (possibly availability of food and drink) and peripheral activities, where users will cross paths with face-to-face contact in their daily routines, is key in fostering a sense of community; inclusion of symbols that are important to the community is reinforcing of meaning.

Biophilia/Biorhythm

8. If possible include the presence of gently flowing water because it is calming to the senses, as well as providing attraction and relaxation for people of all ages. (Heerwagen, J., & Hase, B., 2001).
9. Incorporate natural light, trees or plants since an increasing percentage (up to 80%) of our time can be indoors. The experience of the different seasons and daily light changes keeps our diurnal and biological rhythms in balance (Krauz-Poray, & Branislaw, J., 1976), enriches our daily lives, and provides a sense of mystery and complexity in a place.

Summary

In exploring the literature, building the study model, and composing the survey questionnaire, there was one major question that I had about

¹ The present professional practice of design is entirely different from this method, and often results in buildings that are uncomfortable and do not function well for the user.

incorporating the selected perceptual attributes into the design of the atrium space. Could an atrium multiuse activity space that was designed to elicit these human survival responses be attractive to potential users? An overwhelming ninety-four percent of respondents to the survey said yes. The combination of providing what the users need in an environment, considering the site context, and incorporating the preferred perceptual attributes into the interior space, appears to be very successful. It appears evident that all the theories I researched, and the knowledge from the previous study at the LCoL, played an important role in making the three-dimensional scale model of the atrium space an appealing environment.

CHAPTER 5 CONCLUSION

In summary, the study results suggest that people do make choices in regards to perceptual attributes as theorized by Scott, Gimblett, 1990; Herzog, 1984, 1987; R. Kaplan, 1973; S. Kaplan, R. Kaplan, & Wendt, 1972; and Wohlwill, 1976. Attraction responses to all the perceptual attributes were significantly positive, above sixty-nine percent when combined: Spaciousness--seventy percent, Multilevel Vantage Points-- seventy-nine percent, Levels of Complexity-- eighty percent, Coherence-- eighty-two percent, and Refuge-- seventy percent. The most interesting response regarded the Refuge attribute: a question concerning privacy of the group study spaces in the plan had consistently the same response, i.e. privacy, from seventy-three percent of those who answered the question. This finding suggests that people are very aware of privacy needs, even if it is not consciously related to the response of refuge. The design of the multiuse atrium space was positively received by ninety-four percent of the end-users. With such a wide range of appeal, the success of this study appears to show the researcher is in contact with a design process that is very important. It is this researcher's belief that the utilization of the multi-field theories I researched, as well as the prior knowledge gained from my involvement with the previous study at the LCoL was important in making it successful.

If this study were repeated, it is recommended to change the model scale to $1/4"=1.0'$, because this may eliminate some of the difficulty participants had in perceiving the size of the spaces at $1/8"=1'0"$ scale. Apparently people do not visualize three-dimensional objects with the same degree of comprehension. It is important to use scale figures to aid participants in relating the model to human scale. It would also be useful to construct a model of the space exactly as it is currently and have those parts removable that are being replaced by new design features. By replacing the existing sections with the new sections, the user might better visually understand what is being changed in the space.

It is suggested that designers consider utilizing the list of guidelines¹ developed from the theories reviewed. Further studies of human behavior and our responses to these perceptual attributes in an interior environment, utilizing end-users and three-dimensional models [at $1/4"=1.0'$ (or greater) scale] as part of the design process, are recommended. Application of these guidelines by other designers will help us further understand the impact of these theories on interior spaces and provide opportunities to refine the design guidelines for use in additional environments. There needs to be more research in the design field about improving our built environment so that it is more supportive of a *sense of community and identity of place*.

¹ Explanation of included attributes is in Chapter 2 Review of Literature.

The experience of planning a design by utilizing what is present on a real site, with a thoroughly informed view of the purpose of the project, and interacting with the needs and desires of the actual end-users, was very informative for both this designer and the end-users. In reviewing the literature to locate designers who use this process completely, I encountered Alexander's text *A New Theory of Urban Design*, 1977, which appears to correspond very closely with the process I followed. After reviewing the data supplied by the previous study I was involved with at the LCoL, I developed an initial goal. The goal was to combine the two existing campus buildings into a functional whole, supply the present needs of the users, give them more exposure to nature 's rhythms on a daily basis, and provide a place where an *identity of place* and a *sense of community* could grow.

Discovering this supporting framework for my design process was the most important result of the literature review in this study. I suggest Alexander's framework is a design process whose results are more supportive of human environmental behavior and of creating a built environment that supports and facilitates the existing structures than any intellectually abstract design process experienced by this researcher so far. This process has its roots in antiquity, as related in Vitruvius' and Alberti's writings, yet remains very relevant in today's design world. By combining this design process with the multi-field theories, which were researched for this study, designs that are

supportive of human behavior may be more intentionally developed and focused for the benefit and comfort of the users.

APPENDIX SURVEY INSTRUMENT

The research included in this study was conducted utilizing the following survey instrument. The survey consists of the demographics of the respondents, questions relating the six sections of the model with the five preferred attributes (Spaciousness, Multilevel Vantage Points, Levels of Complexity, Coherence of Space (wayfinding), and Primary Refuge), and concludes with a short section to determine the perceived level of community interaction and the overall response to the model and the existing built environment of the campus. Ordinal response variables asked the users to rate the attributes in the models on a scale of 1-4 with 1 being the least positive and 4 being the most positive (Likert type scale).

STUDY QUESTIONNAIRE

COLLEGE OF LAW ATRIUM MODEL

Name_____

Demographics Information

1. What is your affiliation with the College of Law (CoL)?
Student Professor Staff
2. How many months/years have you been involved at the CoL?
3. What is your age range? (20-30) (30-40) (40-50) (50+)
4. What is your gender? M F
5. How many hours a day do you spend at the CoL when it is in full session?

The model in front of you is a section of the CoL campus, between Holland Hall and Bruton- Geer. Please circle the response to the question that describes your first impression to that model section.

Connecting Lobby Walkway/Stair Model Section:
Imagine you are in that space.

Spaciousness

1. Do the different ceiling heights (very lofty - normal) of the entry lobby make it feel as if you have entered a special place?

4) very definitely 3) definitely 2) maybe 1) not at all

2. How do you perceive the size of 3D space around you on the 2nd Floor walkway between the two buildings?

4) expansive 3) comfortable 2) somewhat narrow 1) very narrow

Multilevel

1. Would you move out into these spaces on the edge of the walkway to observe the atrium space?

4) very definitely 3) definitely 2) maybe 1) not at all

2. When walking on the staircase, would you sometimes stop on the landing to observe the atrium?

4) very definitely 3) definitely 2) maybe 1) not at all

Complexity

1. Do the edge spaces on the 2nd floor walkway make the design interesting to you?

4) very definitely 3) definitely 2) maybe 1) not at all

2. Does the use of translucent layers of frosted glass and steel mesh railings appear intriguing to you?

4) very definitely 3) definitely 2) maybe 1) not at all

Way-finding

1. Are the locations of the entry doors and staircase of enough prominence to remember them?

4) very prominent 3) prominent 2) slightly 1) not at all prominent

2. Do you think you can navigate your way through the atrium to the adjacent buildings?

4) very easily 3) easily 2) somewhat easily 1) not easily

Refuge

1. Do you feel secluded enough to privately converse in the edge spaces above and below?

4) most definitely 3) definitely 2) maybe 1) not at all

Other

1. Is there anything you would add to or take away from the design of the lobby, walkway, or stair section?

Multilevel Dining Spaces Model Section: there are tables/chairs for sitting at on these levels.

Spaciousness

1. How do the overhead screens above the terraced seating areas enhance the mood of the space?

4) very intimate 3) intimate 2) somewhat intimate 1) not intimate

Complexity

1. Does the positioning of separate spaces on varying levels intrigue you?

4) most definitely 3) definitely 2) maybe 1) not at all

Way-finding

1. What effect do the multiple entry points have upon your willingness to utilize the terraced spaces?

4) very confident 3) confident 2) somewhat hesitant 1) hesitant

Multilevel

1. Are you intrigued to use these semi-secluded levels on the edge of the atrium space?

4) most definitely 3) definitely 2) maybe 1) not at all

2. What CoL activities do you think you would feel comfortable doing sitting there?

Refuge

1. Which of the areas for sitting among the terraced seating levels appeals the most to you?

4) most high level 3) high level 2) medium level 1) lowest level

2. What effect on the feeling of seclusion do the frosted glass partitions give you?

4) very intimate 3) intimate 2) somewhat intimate 1) not intimate

Other

1. Is there anything you would add to or take away from the dining space section to make it more comfortable?

Waterfall/Stream Model Section: Imagine you are walking through this space.

Spaciousness

1. What feeling do you get from the stream dividing the central space of the atrium into smaller areas?

4) very intimate 3) intimate 2) somewhat intimate 1) not intimate

Complexity

1. At what level does the sound and sparkle of the stream system transform the mystery of this space?

4) Very intriguing 3) intriguing 2) slightly intriguing 1) not at all

Way-finding

1. How hard do you think it will be to find your way among the streamside spaces?

4) very easily 3) easily 2) somewhat easily 1) not easily

Refuge

1. Does the glimpse of a waterfall at the end of the atrium increase your curiosity to explore?

4) Very intriguing 3) intriguing 2) slightly intriguing 1) not at all

2. Does the area close to the waterfall promise a comfortable space of seclusion/view for you?

4) most definitely 3) definitely 2) maybe 1) not at all

Other

1. Is there anything you would add to or take away from the stream system to make it more comfortable?

Octagonal Spheres Model Section: Imagine that the octagonal spheres have a doorway, are sound proof, have a round table, flexible chairs, internet connections, task lighting, and that you are inside.

Spaciousness:

1. In your opinion, how many people will fit inside with you?

4) 1-2

3) 2-3

2) 3-4

1) 4-5

Complexity

1. Does the addition of these glass spheres arouse your curiosity?

4) most definitely 3) definitely 2) maybe 1) not at all

2. Are they complex enough to make it motivating to use them as interactive places?

4) most definitely 3) definitely 2) maybe 1) not at all

Multilevel

1. Would you enjoy being in the 2nd floor spheres overlooking the atrium space?

4) most definitely 3) definitely 2) maybe 1) not at all

Way-finding

1. Does having a view between the glass spheres to the spaces beyond help you to find your way?

4) most definitely 3) definitely 2) maybe 1) not at all

Refuge

1. If some of the glass panels were textured and opaque, would you feel more relaxed while interacting there?

4) most definitely 3) definitely 2) maybe 1) not at all

2. Could you please explain why?

Activity Center Model Section:

Spaciousness

1. What is your perception of the size of the square space on the 2nd floor of the activity center?

4) very spacious 3) spacious 2) slightly spacious 1) not spacious

Complexity

1. When you see this structure at the end of the atrium, are you intrigued to explore further?

4) very curious 3) curious 2) slightly curious 1) not at all

Way-finding

1. Considering its transparency do you think you can find your way around this building?

4) very easily 3) easily 2) somewhat easily 1) not easily

Multilevel

1. Will you utilize the outside terraces to view the outside spaces?

4) most definitely 3) definitely 2) maybe 1) not at all

Refuge

1. Are the transparent/opaque partitions secluding enough to enhance the interaction inside?

4) most definitely 3) definitely 2) maybe 1) not at all

Other

1. Is there anything you would add to or take away from this structure to make it more comfortable to use?

Roof Model Section:

Spaciousness

1. What kind of feeling do you get about the space with the roof in place?

4) very lofty 3) lofty 2) slightly lofty 1) not lofty

4) very expansive 3)expansive 2) Slightly expansive 1)not at all

Complexity

1. Is the roof design appealing to you?

4) very appealing 3)appealing 2) slightly appealing 1) not at all

1. Does the combination of different textures and hanging mobiles in the roof structure intrigue you?

4) Very intriguing 3)intriguing 2) slightly intriguing 1) not at all

Refuge

1. Is the feeling of enclosure in the atrium space comfortable with the addition of the roof?

4) very comfortable 3) comfortable 2) semi-comfortable 1)uncomfortable

Other

1. Is there anything you would add or take away from the roof?

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BIOGRAPHICAL SKETCH

I am a native Floridian, originally from Lakeland, Florida. I obtained the degrees of Associate of Arts in education, and Associate of Science in nursing at Polk Community College in Winter Haven, Florida and was employed as a Registered Nurse. Having an affinity to art and design, I attended the University of Florida, in Gainesville, and obtained a Bachelor of Fine Arts in sculpture. During that time I realized how interested I had become in the built environment of our world. I enrolled in the Master of Architecture program at the University of Florida, and when I realized that my interest truly was the interaction of the user with the interior space, I transferred to the Master of Interior Design Program. In completing this master's thesis and research project, I realize I have utilized all the prior education and experiences of which I have had the pleasure of being a part.