RESEARCH IN PUBLIC SPACES

: Safety & Human Behavior

Sruthi Atmakur

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Approved by:

Patrick A. Miller, Committee Chair

Diane L. Zahm

Brian F. Katen

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“Public space is for living, doing business, kissing, and playing. It can’t be measured with economics; it must be felt with the soul”.

- Enrique Penalosa

ABSTRACT

Sruthi Atmakur

This thesis is a study of public spaces with a focus on personal safety and human behavior in public spaces. It establishes literature in the realm of public spaces, safety standards, and behavioral research and aims to identify common ground or conflicts between people behavior in public spaces and safety standards of public spaces. Research is supported through detailed on-site analysis and various techniques of behavioral research of two plazas in a campus setting.

The first part of the research focuses on literature to understand origin of public space, importance of safety, and evolution of safety standards in the context of Crime Prevention Through Environmental Design (CPTED). The later part of this thesis is based on preliminary site investigations, which help in identifying two public plazas on the Virginia Tech campus to provide a platform to conduct research and help identify common grounds or conflicts between safety standards and human behavior. The research also aims to help revise techniques of safety evaluation of public spaces, based on human needs and behavior. The research is primarily qualitative in nature supported with a concise quantitative data analysis to ascertain participant demographics and social needs.

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1. INTRODUCTION

Passionate about architecture and design, I continue my journey, following the footsteps of a landscape architect and learn how distinct architecture and landscape architecture are.

When designing buildings or interior spaces, physical design fulfilling human ergonomics and behavior is taken for granted. Architects and interior designers emphasize on aesthetics and functionality to suit human needs. Physical structures are designed to cater to a specific client, or a purpose, such as design of libraries, hospitals, residential homes, churches, recreational areas, commercial and retail space and similar type-design spaces. Designing specific type-design spaces needs specialized study and knowledge in specific subjects.

In the field of landscape architecture, designing is intertwined by many factors. Landscape architects and urban designers design for a larger scale, and a much varied demographic. Designing public spaces such as parks, streets, boulevards, and waterfronts cater to a varied section of people. But, specific type-based or context-based designs exist as well, such as children's parks and therapeutic gardens, which demand in-depth study of specific subjects. Indeed, greater is the challenge faced by many outdoor designers such as landscape architects and urban designers who design public spaces for people with varied preferences.

Public spaces intrigue me.

Some public spaces function beautifully, while others do not. This very thought, has motivated me to conduct research in the realm of public spaces. My thesis primarily revolves around understanding the different factors, which contribute to making effective public spaces. As one is aware, there are many factors that contribute to making a public space, a success. All factors contributing to great public spaces will be discussed in great length in the literature section of the thesis. Amongst many factors, one of the most important criteria to achieve a successful public place is to make it safe for users at all times. This is a challenging task for landscape architects and urban designers. Without a sense of security and safety, ensuring activities or any socializing amongst people, is close to impossible. Thus, I focus my thesis in understanding factors that influence safety in our everyday environments.

THE PROBLEM & RESEARCH QUESTIONS

In the process of understanding safety, and factors influencing safety in our environments, only a few theories to reduce crime in our environments exist in the literary and practical world. Crime Prevention Through Environmental Design (CPTED) is a well-known theory, which provides planners and designers an approach to problem-solving that considers environmental conditions and the opportunities they offer for crime or other unintended and undesirable behaviors (Zahm, 2007). Three overlapping CPTED strategies listed in the famous book, Crime Prevention Through Environmental Design by Timothy Crowe are Natural access control, Natural surveillance and Territorial reinforcement (Crowe T. D., 1991). The concept of CPTED and the three strategies are discussed in detail in the literature section of the thesis.

Natural surveillance urges clear sight lines and to achieve the same, physical design of a space is greatly influenced. For example, CPTED urges to have clear visibility between 2'-00" and 8'-00" to make sure the sightlines are clear for a person to see from one end to the other. To achieve this, should designers follow the rule and design all spaces to make sure there are no physical design elements which might act as visual barriers? Would this ensure safety in our environments? The problem here is not just about how to deter crime or harden the target by making sure everything is clear between the specified numbers or following CPTED's rule. The problem is even if everything is clear and visible, will people come? What do people want a place to be? What do they need in a place to enjoy the built environment? As famous writer Jane Jacobs emphasizes, eyes on the street ensures safety, bringing more people out, which in turn makes a place livelier and hence, safer. Do physical features blocking views have an impact on how many people use a space, thereby impacting the idea of natural surveillance of 'eyes on the street' ? Do people realize the importance of clear sight lines when using a space? What do people really expect a place to be? Do they prefer clear sight lines ensuring safety, over creative programming by designers?

The real problem here lies in understanding if CPTED's guidelines are in tandem with what people want? The different tools of CPTED such as the safety audit checklist by METRAC offers to only check if the physical design of the place is safe according to CPTED guidelines. The checklist does a great job to help an outsider scrutinize the safety of a place in terms of the physical setting, but does not help in defining the needs of a space based on usage of people. CPTED advocates how spaces should be designed, but the 'user element' is lost in the whole process. For instance, Timothy Crowe advocates sitting rails instead of seating walls in public spaces when explaining CPTED applications. The author insists that instead of expensive walls, if sitting rails are used then natural surveillance is increased and prevents any chance of unwanted activities involving crime or property vandalism, while still meeting the functional and aesthetic demands of the open space (Crowe T. D., 1991). But, are sitting rails comfortable and inviting for people to use? Are CPTED strategies monotonous? Do CPTED guidelines, lack the element of 'user needs', which is important in a design process? In the design process, designers creatively programme a place based on how people use the place and what they want.

In recent literature, CPTED advocates 'engaging stakeholders in problem-solving', as an important part of the assessment. Diane Zahm describes stakeholders as individuals, departments, organizations and agencies impacted by the problem; with resources to commit to understanding and solving the problem; who make decisions about funding or other priorities; or that have some interest in the outcome (Zahm, 2007). Clearly there is a need to bridge the existing gap between user preferences and CPTED guidelines.

The following chapters will aim to address the questions posed above. I draw upon the literature and establish a methodology based on the questions posed above, which comprise my research inquiry. A scholarly research process will help me solve the above mentioned questions.

WHAT NEXT?

To provide the reader with a background about public spaces and thorough understanding of CPTED, my thesis undertakes the following course: a strong body of literature describing factors, which contribute to making great public spaces, with an emphasis on safety, and a comprehensible study of CPTED strategies and applications. Amongst the three strategies of CPTED listed earlier, natural surveillance will be given importance in the thesis owing to the nature of the strategy to influence physical design of a space.

Once the theoretical context from the literature is established, the chapter on methodology describes research methodologies used in this study. Since my study focuses on bridging together CPTED strategies and people's preferences of using a space, two plazas; Cowgill Plaza and D2 plaza on the Virginia Tech campus, are studied and analyzed. The reasons for choosing the sites will be discussed later in the thesis. A safety audit checklist by METRAC to evaluate safety in a place is used. All three CPTED approaches are studied carefully at both sites. For the purpose of this thesis, natural surveillance is given more importance as the physical design of a space is affected more by surveillance, sight lines and visibility. As a researcher interested in human behavior in public spaces, I am curious to compare what CPTED advocates and what people want. To understand people's preference of using the place, behavioral research is conducted.

Behavioral research uses people observation, interviews and site analysis to help one understand how people behave, use and what they prefer in public spaces. The book, "A Practical Guide to Behavioral Research" stresses the importance of using four techniques in behavioral research: observation, experiment, questionnaire, and interview. The four techniques of behavioral research will be discussed in great detail under the section; methodology. To watch how people behave in public, the authors foster the technique of systematic observation. Apart from people observation, conducting interviews will greatly help in understanding preferences of social use by people in public spaces (Sommer & Sommer, 2002). The procedures and protocol of the interview will be discussed in great depth, in the chapter of methodology.

Both, CPTED analysis and behavioral research is conducted in both plazas. Once the place is analyzed based on CPTED guidelines, content analysis and basic statistics are applied to analyze the findings of the surveys and interviews. The gathered results and analysis can be overwhelming to understand at this stage. In order to clearly explain analyzed data, first people's responses are documented and later compared with CPTED results.

The analysis outlines comparisons of CPTED guidelines and people's reactions, helps in understanding if people's preferences, are in tandem with what CPTED advocates or otherwise. The study will help clarify the importance of user preferences as an integral part of safety evaluation if needed. The research conducted will provide a direction to planners and practitioners in the design and analysis field, about people's preferences of safety with respect to physical features in public spaces.

PURPOSE OF RESEARCH STUDY

The purpose of this thesis is to identify a common ground or conflicts between how people use the plaza and what CPTED advocates, people's opinion on safety in the plazas, and based on a comparative analysis presents a case for understanding if CPTED tools need revisions to include people's usage preference while evaluating a place. Would inclusion of people in the evaluation process help better existing CPTED standards and practices? CPTED advocates safety and crime prevention through both design and use. Hence, the study also focuses on understanding the balance between design and use in a public place.

2: LITERATURE

The literature chapter of my thesis has three broad sub-chapters; Public spaces, Safety & Crime Prevention Through Environmental Design, and Research methods.
Each sub-chapter has various sections to help the reader understand literature drawn from various sources. Books and journal articles on public spaces and CPTED help compose this chapter. The following questions broadly outline the course of both the sub-chapters:

Sub-chapter 1: Public Spaces

i. What is a public space?
ii. What are the different types of public spaces?
iii. What factors contribute to making successful public spaces?

Sub-chapter 2: Safety and Crime Prevention Through Environmental Design

i. Why is safety important in a public space?
ii. What is CPTED?
iii. What are the different approaches by CPTED to deter crime?

Sub-chapter 3: Research methods

i. What are the tools to evaluate safety in a given place?
ii. What are the behavioral research methods for evaluating human behavior in public spaces?

Sub-chapter 1: Public spaces

i. What is a public space?

Amongst many definitions, the word, “public” as defined by Webster’s Dictionary means, accessible to or shared by all members of the community. One can clearly gather public space as a place, which is accessible to everyone and is shared by a community. But, what does one do in a space which is accessible to all? How is this space used? These immediate questions are addressed, drawn from a body of literature from various sources, such as books, journal articles and the internet. Project for Public Spaces (PPS), a non-profit organization, which has contributed significant work in the realm of public space, describes public spaces as parks. Parks, where children play and learn a new sport, where ceremonies and parties are held, a mixer for people from myriad cultures, and where people witness the change in seasons (Wiley-Schwartz, 2005). PPS describes public spaces as places where people meet, greet each other, make memories, gather for ceremonies, play together, and indulge in a myriad form of activities. In short, public spaces can be described as a platform where people mark, share and exchange moments of happiness, grief, and change.

The significance of public life is stressed by much published literature. Public spaces are an essential counterpart to the monotonous and mundane life of work and home. These spaces make available channels for movement, and nodes for communication (Carr, Francis, Rivlin, & Stone, 1992). Apart from providing the community a space for social interaction and celebration, many other factors, which establish a great public space come into play. From the

literature, inferences can be drawn to reflect public spaces as centers, which offer cities an identity of a place, economic benefits, contribute to the environment, and provide a stage for cultural activities. This chapter progresses to explain the contributions of public space in our living environments.

PPS expresses, “Without great public spaces, there would be no great cities” (Wiley-Schwartz, 2005, p. 14). Strengthening the earlier thought, Rockefeller Center’s skating rink, Penny harvest, and other public spaces provide living proof as some of the most-visited tourist attractions in New York City (Wiley-Schwartz, 2005). Great public spaces build identity and give meaning to a city. Smaller communities, have great social spaces which build identity over a period of time. For instance, local cafes and local art on display in neighborhood parks build identity, add value, and meaning to a place. Apart from identity, these spaces also add economic value to the city. Well-designed public spaces, add identity to a place, thus pouring in tourists from all over the world. For instance, Ghirardelli square in San Francisco Bay, is a great tourist attraction. The famous plaza is rented out for weddings, and likewise ceremonies. Needless to say, economic benefits pour in all round the year. If not family ceremonies, then the market and retail establishments surrounding the square bring in revenue. Apart from the Square housing stores and cafes, which bring in revenue, there is also a sharp increase in the real estate value of surrounding areas.

After careful studies and observations undertaken by PPS, the following is documented:
Public spaces have many real and measurable economic benefits. For example, parks can contribute significantly to the land values in a city. In New York, the real estate values around Bryant Park, Central Park, Prospect Park and Riverside Park are the highest in the city.

Environmental benefits are the biggest advantage of public spaces in a city defined by concrete blocks. Parks and open green spaces give relief to busy work life and also enable people appreciate natural habitat. Parks, waterfronts, trail systems, and wildlife areas supply breathing areas in urban jungles. In this respect, PPS cites Brooklyn’s Prospect Park, emphasizing how the park is home to more than 200 species of birds (Wiley-Schwartz, 2005).

Stephen Carr makes a powerful statement in the book, “Public Space” that communal life unfolds in public spaces. Public spaces are places which are open to people of myriad cultures and settings. A platform of such kind offers people a chance to celebrate festivals of different backgrounds. For instance, many neighborhood parks in the city of Baltimore, celebrate cultural events such as Greek festivals or local festivals in popular neighborhoods such as Hampden. Also, many piers at San Francisco Bay offer mixed platforms for many talents to surface. One of the most popular free events in neighborhood parks are Shakespeare plays. One can experience people dancing, playing music, and displaying art. Thus, public spaces are great places

which offer a platform to expose various cultures, bring economy and most important, and offer identity to the place to let other factors come into play. Clearly, a successful public space is rich in culture and brings in great social and economic value. Apart from the rich environment offered by the place, a sense of safety is achieved in such spaces. This sense of safety is achieved due to the sheer presence of people who involuntarily offer natural surveillance. Hence, natural surveillance of a place is comfortably achieved in socially rich environments.

The images below depict some successful public spaces.

Figure 2.1: Plaza above the Apple store, New York City, NY

Figure 2.2: Green space outside the Graduate School, Virginia tech, Blacksburg, VA

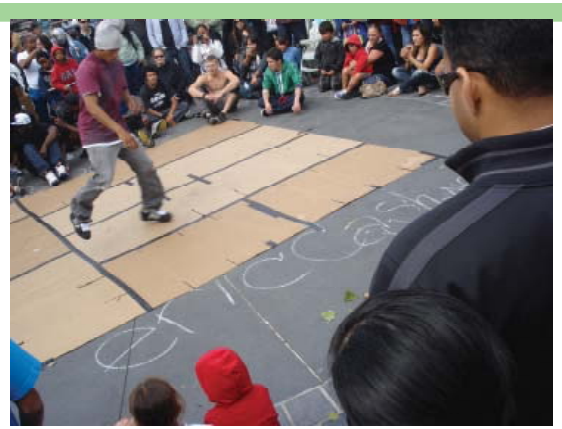

Figure 2.3: Fisherman's Wharf, Bay Area, San Francisco, CA

Figure 2.4: Street performance near Central Park, New York City, NY

Figure 2.5: Ghirardelli square, Bay Area, San Fransisco, CA

ii. What are the different types of public spaces?

From ancient Greek and Medieval ages, many spaces namely markets, plazas etc all contribute to the broad category of public spaces. Not just plazas and parks fit the category of public spaces but there are many spaces in our environment which can be categorized as public spaces. The small alcove off the walkway, the abutting sill of a bay window, a local café, or an extended curb on a street all qualify as places for meeting and interaction.

The comprehensive list below is adapted from the book “Public Spaces” by Stephen Carr et al. Public spaces can be broadly categorized as:

a. Public parks
b. Squares and Plazas
c. Markets
d. Streets
e. Playgrounds
f. Community spaces
g. Greenways and Parkways
h. Atrium/Indoor marketplace
i. Found/Neighborhood spaces
j. Waterfronts

For all the public spaces listed above, the factor of public safety is integral for proper functioning and success of a space. Safety concerns are different for the different types owing to physical design, nature of usage, and social and economic conditions of the place. The scope of this thesis does not discuss the safety problems associated with each of the places listed above. The reason to list types of public spaces is to understand the significance of the vast list of different typologies which constitute our environment. The list above clearly constitutes a majority of our developed environment, which further emphasizes the need to understand theories and strategies of public safety in our environments. The following section will address the factors that contribute to making a public space a successful one, with an emphasis on public safety.

iii. What factors contribute to making successful public spaces?

Creating physical spaces and allocating them as public, private or semi-private is achievable. What is hard to understand and achieve is what makes a space a successful public space? As expressed earlier, public spaces intrigue me. I am always eager to explore what makes a space a successful public space. The following section gives an insight to curious readers like me who wonder what makes public spaces successful. Adapting from PPS's illustration by Annie Bissett (Wiley-Schwartz, 2005), the flowchart below explains clearly the major factors that contribute to making great places.

Figure 2.6: Factors contributing to public spaces

The above figure clearly contributes four factors: sociability, uses and activities, access and linkage, and comfort and image, to making great spaces. Each of these four factors has many sub-factors, which contribute to making successful public spaces.

a. SOCIABILITY:

• Cooperation	• Gossip	• Interactivity
• Neighborliness	• Story Telling	• Pride
• Stewardship	• Friendliness	• Welcoming
• Diversity		

b. USES & ACTIVITIES

• Realness	• Usefulness	• Specialness
• Sustainability	•Celebration	• Uniqueness
• Affordability	• Indigenousness	• Fun
• Homegrown quality	• Vitality	• Activity

c. ACCESS & LINKAGE

• Reliability	• Connectedness	• Readability
• Continuity	• Convenience	• Walkability
• Proximity	• Accessibility	

d. COMFORT & USAGE

• Safety	• Cleanliness	• Sittability
• Charm	• "Green"-ness	• Spirituality
• History	• Walkability	• Attractiveness

The various factors listed earlier contribute effectively to making great spaces and resurrecting older ones. Amongst the many factors, safety is an important contributing factor in making public spaces successful. Though other factors are Important as well, to discuss each of the other factors, would broaden the subject of thesis. This thesis limits to study only factors that influence safety and what can be done to ensure safety in public spaces. The next subchapter deals with safety and the theories that help ensure safety in our environment.

Sub-chapter 2: Safety & Crime Prevention Through Environmental Design

The following section focuses on safety in our environments and will elucidate the concept of crime prevention through environmental design, which is the focus of my thesis.

i. Why is safety important in a public space?

Without a sense of security and safety, it is not possible to build a place which would encourage activities or any socializing amongst people. There is much literature and theories on how to achieve safety in our environments. Before addressing the theory of crime prevention, it is important to understand why ensuring safety is important in our surroundings.

The need for safety and security in a public environment arises out of fear. The oxford dictionary defines fear as, an unpleasant emotion caused by the threat of danger, pain, or harm. Fear is thus an emotion, a feeling that needs to be tackled. It is a challenging task for designers, planners all over the world to completely eliminate fear from our cities. But over a period of time, many planners and architects have been doing considerable research on how to lessen fear of crime in the new urban environments. Jane Jacobs is one of them, who has devoted much time into understanding cities by linking the fear of crime to urban design and acts of incivility in daily life (Wekerle, 2000).

Many people invoke the phrase “there must be eyes on the street,” attributed to Jane Jacobs, to make arguments about the relationship between urban safety and design. Jacobs’ views on urban safety were, in truth, far more complex and nuanced than this phrase suggests, and they were widely reviled and dismissed when her book, The Death and Life of American Cities, was published. Nonetheless, they have become the basis of a worldwide movement to foster safe cities (Wekerle, 2000).

Author, Nan Ellin, in the book, Architecture of Fear, writes a series of essays describing broad historical strokes on the evolution of fear in the western world along with corresponding changes in urban design. She describes, the ways in which contemporary landscape is characterized by gated communities, personal or private spaces, zoning regulations, large public parks has created disjointed communities. Other authors in the same book explain how such disjointed efforts in fact exacerbate than reduce the sources of fear and insecurity (Ellin, 1997).

While there are many contributions by researchers and scholars to the origin and reasons for the feeling of fear in our environments, fear of crime can be partly attributed to the new suburban development and new planning policies which allow for vast unusable open spaces which in turn exacerbates fear (Ellin, 1997). Earlier, practice of zoning encouraged separate land allotment for residential, commercial and public areas, which resulted in the shift of economic hub to downtown areas in the cities and residential areas to suburban areas. This shift of residential areas to suburban areas led to many side effects in the urban fabric. One of them being, the growth of large unused open spaces which were not well patrolled, easily accessible by many people and eventually became hot spots for crime over a period of time.

Today, there is fear experienced in public spaces and our environments. How do we tackle fear? Researchers, designers and planners for a long time have worked on several theories that focus on achieving a sense of safety in our environments. Crime Prevention Through Environmental Design (CPTED) is one such theory which is widely recognized in our world today and focuses on achieving safety in our environments. Before understanding the various concepts and strategies of CPTED, it is important to understand the origin and history of public safety. The earlier sub-chapter on Public spaces briefly lists the timeline of the development of the idea of public safety during the mid 20th Century. The following section will elucidate the theory, history and evolution of CPTED, which is important to understand the significance of public safety in our environments.

ii. What is CPTED?

Literature sources above clearly demonstrate the need to ensure safety in public spaces and our environments. Crime Prevention Through Environmental Design is a theory which provides approaches to prevent crime in our environments and is derived from a variety of disciplines concerned with human behavior and interaction with surrounding environments. Controlling human behavior through design is reflected as early as the Sumerian settlements in 4000 B.C. by the application of codes defining property rights. While the Romans built fortresses to protect their cities and establishments, the concept of fencing and protecting once space and to identify territory is evident from early human settlements. The Chinese in the eighth century emphasized on harmony in design from the smallest structure to big cities built. Dwellers on North American plains extended community identity and protection through design of living spaces through the eleventh century (Crowe & Zahm, 1994). In the most recent century, written codes and ideas describing human behavior and their relationship with the environment has been discussed. Jane Jacobs brought to light in a casual writing of her personal observations of planning theories, safety measures and human behavior in a phenomenal book titled, 'The Death and Life of Great American Cities' (1961). Her book stirred discussions and led to more formal writings and encouraged researchers and practitioners such as Ray Jeffery to elucidate the concept of Crime prevention Through Environmental Design in 1971. Jeffrey steered a new thought in the criminology world, which focused on the circumstances surrounding a crime incident rather than the criminal offender.

In 1972, Oscar Newman in his book, 'Defensible Space' made popular the concept of crime prevention through environmental approaches. His study focused on New York City and St. Louis where he broadly discusses safety in buildings and cities. The author outlines four factors in crime prevention and defensible space:

- Territoriality
- Surveillance
- Image
- Safe areas and Streets

As early as 1972, these principles were applied in the field of safety and design. As time progressed the concept of CPTED by Oscar Newman has been incorporated by many professionals. Newman outlines defensible space as creating territorial areas with through streets which make access and surveillance easy. A clear demarcation of private, semi-private and public spaces through variation in color, materials, surface textures will define spaces, making intruders understand that they do not belong in a certain place. According to Newman, defensible space means to control interior public space which is potentially dangerous: lobbies, elevators, stairwells, and corridors. Newman's approach to crime prevention does not involve design of the environment to prevent crime. His primary focus relies on structural building components such as doors, windows, interior lighting, exterior lighting, closed circuit television (CCTV), intercom systems, security devices and other target-hardening techniques (Jeffery, 1977). But, CPTED is beyond just target hardening and deals with the design of the environment impacting human behavior.

Author Timothy Crowe, describes CPTED program in relation to environmental design in his book Crime Prevention Through Environmental Design. He opines environmental design is rooted in the design of the man/environment relationship. CPTED involves design of physical space in the context of the needs of users of the space (physical, social, and psychological needs), the normal and expected (or intended) use of the space (the activity or absence of activity planned for the space), and the predictable behavior of both the users and offenders. Crowe explains design to be proper if only design recognizes the designated use of the space, the crime problem incidental to and the solution compatible with the designated use, and incorporates crime prevention strategies that enhance the effective use of space (Crowe T. D., 1991).

Diane Zahm, who teaches and practices CPTED widely in the United States in various states such as, New York, Kentucky, Florida, and Virginia wrote a handbook titled, 'Problem-Oriented Guides for Police' a project supported by the U.S. department of Justice. The handbook gives a layman a quick and easy guide to understanding the various approaches and basic principles of CPTED. She states that CPTED is different from other security measures as it focuses on the design of the built environment. She explains how other security measure focus only on target hardening, (i.e., denying access to a target using locks and bars, or using sensors and cameras to detect and identify an offender), supported by security guards. Whereas CPTED focuses on the physical design of a place and encourages prevention of crime. (Zahm, 2007)

Various practitioners in the field of safety in the environment have written several books and published many papers on safety, importance of safety and what can be done to ensure safer places. Amongst the many books written, one book written for Sarasota, Florida, describes CPTED as a tool which assists in the creation and maintenance of the built environment that increases the perception of safety for a normal user and increases the perception of risk for the offenders (Plaster & Carter, 1993). One can clearly understand from literature above, that CPTED theories were written many years ago and require constant revision. Many papers currently focus on research in public safety, but revising CPTED tools and techniques is important. To revise the techniques, a thorough understanding of CPTED strategies is necessary, which is explained in the following section.

iii. What are the different approaches by CPTED to deter crime?

Three core strategies in CPTED are:

a. Natural Access Control
b. Natural Surveillance
c. Territorial reinforcement

Each of the three strategies will be discussed in this section. Crowe describes each of the strategies in great depth in his writings (1991). Most recent publication by Diane Zahm (2007), which uses CPTED for problem solving provides information on CPTED strategies.

a. Natural Access Control:

Access control is a design concept which is directed at reducing opportunities for crime. The primary idea is to deny access to a crime target and to create a perception of risk to offenders. Crowe organizes access control as:

- Organized (e.g., guards)
- Mechanical (e.g., locks)
- Natural (e.g., spatial definition) (Crowe T. D., 1991)

Supporting Crowe's concept of access control author Zahm in her handbook of problem solving outlines, "the environment must offer cues as to who belongs in a place, when they are supposed to be there, where they are allowed to be while they are there, what they should be doing, and how long they should stay." She also advocates that users or guardians can help determine who can stay and not stay in a place by reporting unwanted activities to concerned authorities (Zahm, 2007, pp.7).

Some examples to control access are:

- To define site boundaries, tree lines, fences, hedges, or berms could be used.
- To guide site movement for a visitor/user, drives, side walks, paths and gardens are helpful.
- To control access to a site or building, doors and gates help keep unwanted people away.
- Signage helps direct movement, provides information and lists out what is allowed or restricted in a certain area or a place.
- Creating identity by the use of colors or materials.
- Traditional ways of locks and alarm systems can help control access (Zahm, 2007, pp 7-8).

Research has shown significant reduction in crime by regulating access control. For instance, in a research study in Birmingham, England, 80% of burglaries were committed from rear alleys. An alley-gating project which enforces lockable gates at the end of alleys and passages, reduced the burglary rate by 53% with the help of few simple changes such as erecting 62 alley-gates, steel fencing, and distributing newsletters (Ekblom, 2002). Reinforcing the concept of target hardening, another study on New York subways and safety outlines, the installation of new security gates at transit stations in the city has led to significant reduction in arrests in and around the areas (Weidner, 1997).

b. Natural Surveillance

Surveillance as described by Crowe is primarily a concept to keep intruders under observation. The primary thrust of a surveillance strategy is to facilitate observation, although it may accomplish the effect of an increased perception of risk. The basic idea is, if offenders perceive that they are being watched, even if they are not, then they are less likely to commit a crime. The author classifies surveillance in the following ways:

- Organized (e.g., police patrol)
- Mechanical (e.g., lighting)
- Natural (e.g,. windows) (Crowe T. D., 1991)

Similarly author Zahm in her handbook describes surveillance as an opportunity to be able to see from adjacent properties or the site perimeter onto the site, and possibly to see parking areas and buildings; opportunities to see from one part of the site to another; and opportunities to see parking, walkways, and other areas of the site from various locations inside the building. Several design elements on the site influence surveillance. Physical design elements such as lighting, windows, orientation of building, furniture arrangement, surveillance cameras, location of landscaping elements such as plants, trees, shrubs all influence vision of potential observers in any given place (Zahm, 2007). Clearly, open places allow for more visibility in spaces and help surveillance for users/visitors. Studies show spaces that have light, open space, and access are deemed safer than those in which these features where absent (Loewen, Laura, Steel, Daniel, & Suedfed, 1993).

Other studies clearly establish relationship between landscape features as a physical design element and safety. One of the studies in an urban campus setting related fear and insecurity in a place to the presence of trees, shrubs, and walls which provided concealment, limited prospect and blocked escape. The results highlight the importance of the role of uncertainty in environmental response and suggest that reductions in fear and opportunities for crime may be achieved through a change in the character of the outdoor spaces (Nasar, Fisher, & Grannis, 1993). Based on studies above, one can conclude that concealment, poor visibility and blind spots in the physical environments contribute to fear and also serve as places for potential criminal activity.

The concept of physical design elements influencing surveillance in our environments is the crux of my thesis and will be discussed in-depth with the help of CPTED evaluation and behavioral research in the next chapters of this thesis: Methodology & Analysis.

c. Territorial reinforcement

The idea of territorial reinforcement was first introduced by Oscar Newman in his well known book, Defensible Space. He advocates, when adjoining areas are well demarcated, then boundaries are more salient, and defensible. The concept of territoriality as explained by Crowe suggests that physical design can contribute to a sense of territoriality. The idea is a physical design can contribute to a sense of ownership and mark boundaries, which can make potential offenders perceive that territorial influence (Crowe T. D., 1991). The author at the same time also recognizes that both surveillance and natural control contribute to a sense of ownership or defining territorial boundaries. Diane Zahm reinforces Crowe's idea of territorially as a factor contributed by surveillance and access control. She outlines, "the design should provide cues about who belongs in a place and what they are allowed to do". (Zahm, 2007, p. 7). Administrative and maintenance rules are critical to the third approach of CPTED (Zahm, 2007).

Physical design elements which demarcate areas such as planter boxes, tree lines, fences, hedges, surface material changes, or changes in elevation are a great way to draw boundaries and keep potential offenders away. Signage is also a great way to establish ownership and define boundaries. Over the years, schools, commercial, residential, and transportation areas clearly have succeeded demonstrated the concepts of Crime Prevention Through Environmental Design.

After in-depth study about CPTED strategies and importance of personal safety in public spaces, the following section briefly describes CPTED tools used to evaluate safety in a place, and also describes the methods used in behavioral research to understand how people behave in public spaces.

Sub-chapter 3: Research methods

i. What are the tools to evaluate safety in a given place?

In order to evaluate safety of a given place, safety audit checklists, observations, documentation through photographs and site analyses are widely used by professionals.

One such checklist widely used by CPTED professionals is METRAC's safety audit checklist to evaluate safety for indoor and outdoor spaces. METRAC is a Toronto-based group popular for their ground-breaking work on safety audits. METRAC offers a safety audit checklist widely used by practitioners and experts in the field of crime prevention and safety design (Toronto, 1998-2009). This safety audit checklist helps practitioners in the field to evaluate safety of a place. The checklist encompasses many physical design criteria which influences safety in a place such as planting, surveillance, landscape features, lighting, emergency call booths, visibility, physical features, signage etc. Few evaluated checklists used in this research study are attached at the end of the thesis to better understand the scope of the checklist. (See Appendix I and II). The checklist offers clear guidance to where the safety problems exist in a given place. Thus, METRAC's checklist is the primary research tool used in this thesis to evaluate safety in a place. This thesis uses photographs, personal observations, site analysis are other techniques to document and understand influence of physical design on safety in a place.

ii. What are the behavioral research methods for evaluating human behavior in public spaces?

Research can provide deeper insight into a topic, better understanding of a problem, more clearly defined opportunities for and constraints on possible action, measurement of regularities, and ordered descriptions. Useful research solves already recognized problems and identifies new ones. (Zeisel, 1997) Many tools and techniques exist to conduct and analyze research studies. Qualitative research studies are more holistic, open ended and descriptive in nature, unlike quantitative research which is based on figures. (Groat & Wang, 2002)

Miles and Humberman describe qualitative research as a, “holistic approach: systematic, encompassing, and integrated”. “Qualitative research is conducted through an intense and/or prolonged contact with a ‘field’ or life situation.” (Miles & Huberman, 1994, pp. 9-11). In qualitative research, the researcher is treated as the foremost ‘measurement device’ of the study. In qualitative studies, tools such as survey questionnaires are considered as relatively low standard of measurements. The authors also claim on descriptive numerical measures and inferential statistics are eschewed and instead focus on analysis through words and narratives (Miles & Huberman, 1994). Norman Denzin and Yvonne Lincoln, authors of ‘Another Handbook for Qualitative Research’, sum up qualitative research in the following words:

Qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials. (Denzin & Lincoln, 1998, pp. 3-5)

The setting used in my research study relies on prolonged field work and participant interviews, which calls for a qualitative approach. To understand how people behave in public spaces, behavioral research is encouraged. Behavioral research can be both quantitative and qualitative.

The book, a practical guide to Behavioral Research describes behavioral research as research conducted in accord with scientific research, where the subject matter is observed or made so with direct representation such as surveys and interviews. Validity and reliability are important to address in any research as scientific in nature. The degree to which the procedure measures to what it should is described as internal validity. External validity refers to the generalizability of the findings. Reliability is the repeatability or replicability of findings (Sommer & Sommer, 2002). Sommer and Sommer further discuss techniques and research tools to help conduct behavioral research in various settings.

Out of the many techniques in behavioral research, Sommer and Sommer discuss observation, personal documents, psychological testing, content analysis, archival research, laboratory experiment, simulation, mapping and trace measures, case study approach, interview, questionnaire, and attitude scales. The authors advocate observation to understand how people behave in places and identify interviews and questionnaires as tools that can be used, to learn how people behave in public. (Sommer & Sommer, 2002).

The techniques of observation, interview and questionnaire are implemented in my thesis to learn people's preferences and how they behave in public spaces. I adopt a combined research technique weaving together the techniques of interview and questionnaire to encompass one broad category. The techniques are discussed in the following section.

a. Observation:

Observation is an economical procedure, which consumes time and produces unexpected and surprising findings. Two observational methidsa re discussed below, which allow the researcher to stay away from the participants, and give the flexibility to come, watch, and record happenings on the site. Casual observation and Systematic observation are two types suggested by Sommer and Sommer to learn how people behave in public spaces. Casual observation does not have any scoring system or definite pre-arranged categories and refers to eyeball inspection of what is happening in a place. On the other hand, systematic observation is a consistent method, which utilizes a scoring system and prearranged categories (Sommer & Sommer, 2002).

The technique of casual observation is either used as an accompaniment to other procedure or is generally used at early stages in the research process. (Sommer & Sommer, 2002). Since, interviews and questionnaires also constitute my research study; the scope of my research is limited to casual observation. Reliability is difficult to accomplish in the technique of observation. Hence, I maintain a record of personal observations by taking personal notes and photographs to learn how people behave in both plazas. I use the insight gained from these observations in my conversations with the participants while conducting interviews.

b. Interview and questionnaire:

Complex topics, beliefs, opinions, and personality characteristics are well explored in interviews. Most researchers have found interviews as an effective way to gain accurate information in different settings. Interviews allow the researcher to pursue half-answered questions and to encourage more thorough and detailed responses. Interviews can be either structured or unstructured. A set of specific questions in a specific manner comprises a structured interview, whereas, an unstructured interview is one where the interviewer uses a protocol that includes questions based on a general understanding of the topic and the research questions, which are used to generate additional questions based on the respondent's answers. When a structured interview is probed to ask specific questions about a topic, then the nature of the interview is in-depth or intensive. (Sommer & Sommer, 2002). In the present scenario, I use a structured interview format. During the interview process, when needed, I ask specific questions to the participants about how they feel about the place with respect to safety and comfort. The length of the interview depends on the protocol and structure of the interview. The complete procedure of the interview and the protocol are described in the Methodology chapter.

A precise transcript is necessary when participant's reactions will aim to answer the research questions. Recording the interviews is a best way to accomplish accuracy in the information shared in the interview process. (Sommer & Sommer, 2002) Many research techniques advocate either tape or video recording the interviews, as accuracy of the information would be retained.

Authors, Sommer and Sommer encourage tape or video recording the interview as it increases accuracy of the respondent's information. Though, they also mention the lengthy process of manually transcribing the interview, which takes more than four or five times the actual length of the interview itself. Despite the lengthy procedure, the process of recording and manually transcribing is far more accurate than note-taking while conducting an interview.

Many researchers adopt a basic technique to analyze transcriptions: content analysis. Content analysis involves determining the importance of certain features or characteristics of a text, and then carrying out a search for them in the text. (Forbes, 2000) My research uses the technique of content analysis to analyze the transcripts. I do not use a software program to carry out search for any specific text, I manually code the transcriptions.

The thesis will adopt both interviews and questionnaires as tools to understand human behavior and importance of safety in public spaces. To understand how they use the plazas, a questionnaire method is approached. Questionnaires are widely used in behavioral research and are different from interviews as the respondents' written opinions are noted. (Sommer & Sommer, 2002). The scope of the questionnaire in my thesis is restricted to gathering demographic data of the participants and data on social usage of the plaza.

The next chapter explains step by step procedure of the application of the research methods discussed above, in the context of my thesis, whose aim is to identify a common ground or conflicts between how people use the plaza and what CPTED advocates.

3. METHODOLOGY

Literature provides a clear understanding of public spaces, factors contributing to successful public spaces, importance of safety, CPTED strategies, and an introduction to the research methods used in the study. Amongst the three CPTED strategies discussed earlier in the literature section, natural surveillance has potentially the biggest influence in the physical design of a place, which is the central focus of my thesis. Physical design of a place influences sightlines of a place. For example, if landscape features such as retaining walls are higher than usual, then they are in the way of one's line of vision and it is hard to achieve good natural surveillance in a place, as those areas (behind retaining walls) can act as potential hiding places for offenders. This chapter explains the context I chose for my study and provides a detailed account of the research procedure I adopted,

i. Context for research

As mentioned in the introduction chapter, the purpose of this thesis is to identify a common ground or conflicts between how people use the plaza and what CPTED advocates. A comparative analysis is needed, which will help me present a case to understand if any further revisions are needed in the use of CPTED tools, based on usage preference of people. To conduct research, a context or a site is needed, where I can evaluate the place and also study how people behave and use the space.

ii. Criteria for choosing the site

The site chosen should be a public space, preferable a plaza, which is open and accessible to all and is used often, at most times of the day. This would allow the researcher to be able to visit the site multiple times at different times of the day and study how people use the space. Apart from the site qualifying as a public space, the physical features on the plaza would be of concern in order to fit the research study. The plaza chosen should preferably have changes in elevation, landscape or physical features on the site which act as visual barriers and dampen clear sight lines in the plaza.

I chose my context for my research study in the Virginia Polytechnic Institute and State University Campus. The Virginia Tech campus is filled with many public spaces used by students, faculty, and visitors at all times, and provides an apt setting for my research. The university has many spaces which are publicly accessible and is used all round the year. Also, as a student researcher, site accessibility is another factor which plays an important role. Living close to campus, and as a student of this university, I chose the campus as a perfect setting to conduct my research study.

For the purpose of this study, I chose two campus plazas: Cowgill plaza and D2 plaza in the Virginia Polytechnic Institute and State University campus. The two campus plazas are typically used by students and both are located in two busy central areas of the campus, namely residential and academic cores. I chose these specific plazas as they are both different from each other in the physical design and layout, and both are located at different locations in the

campus. Here, it is important to note that both the plazas have food courts and are widely used by students. In order to justify the choice of both plazas, I conducted preliminary site investigations.

iii. Justification for choice of site:

Preliminary Site investigations

a. Cowgill plaza:

Cowgill plaza, located in the academic core of the Virginia Tech campus is one of the many plazas, which is used frequently by students from the Business, Science, Engineering and Architecture schools (Figure 3.1 and 3.2). The plaza is surrounded by buildings which have different architectural projections and wide windows. The purpose of choosing this public place on campus is due to sheer presence of windows on different building typologies and the unique architectural projections, i.e.; glass pyramids that exist on the plaza, which break continuous flow of the plaza as one large space. (Figure 3.3 and 3.4)

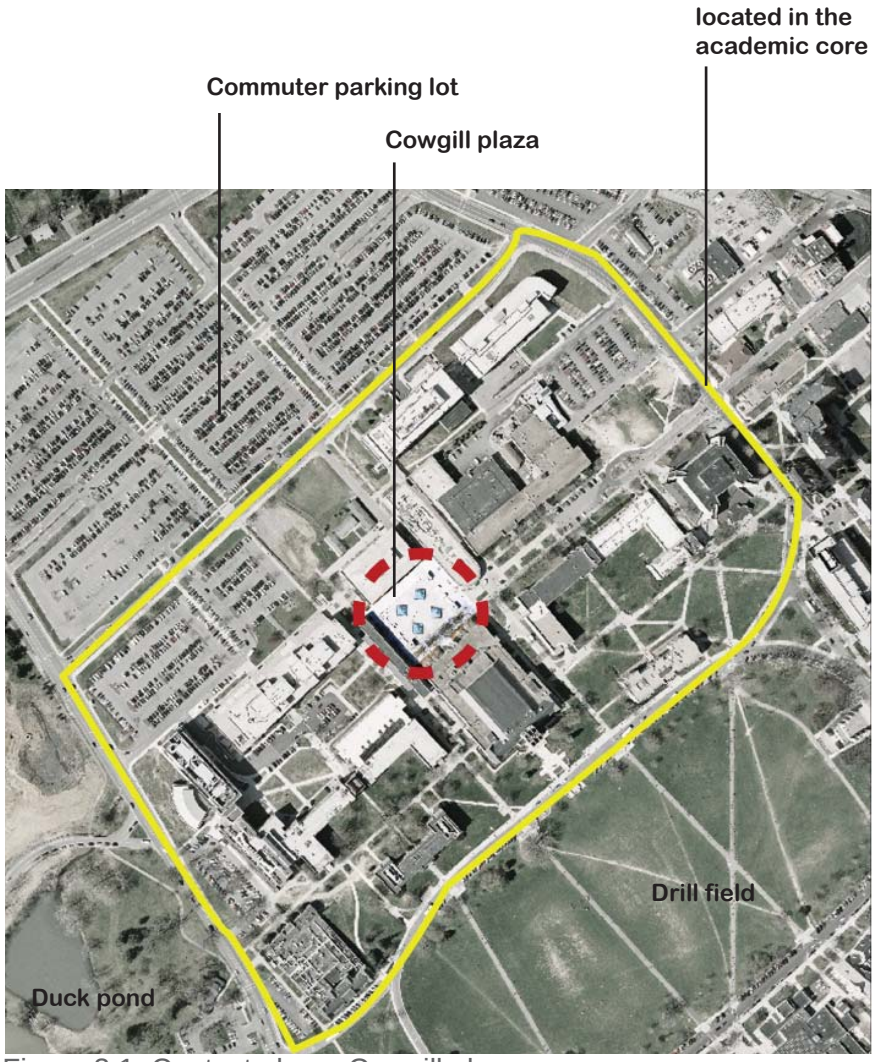

Figure 3.1: Context plan – Cowgill plaza

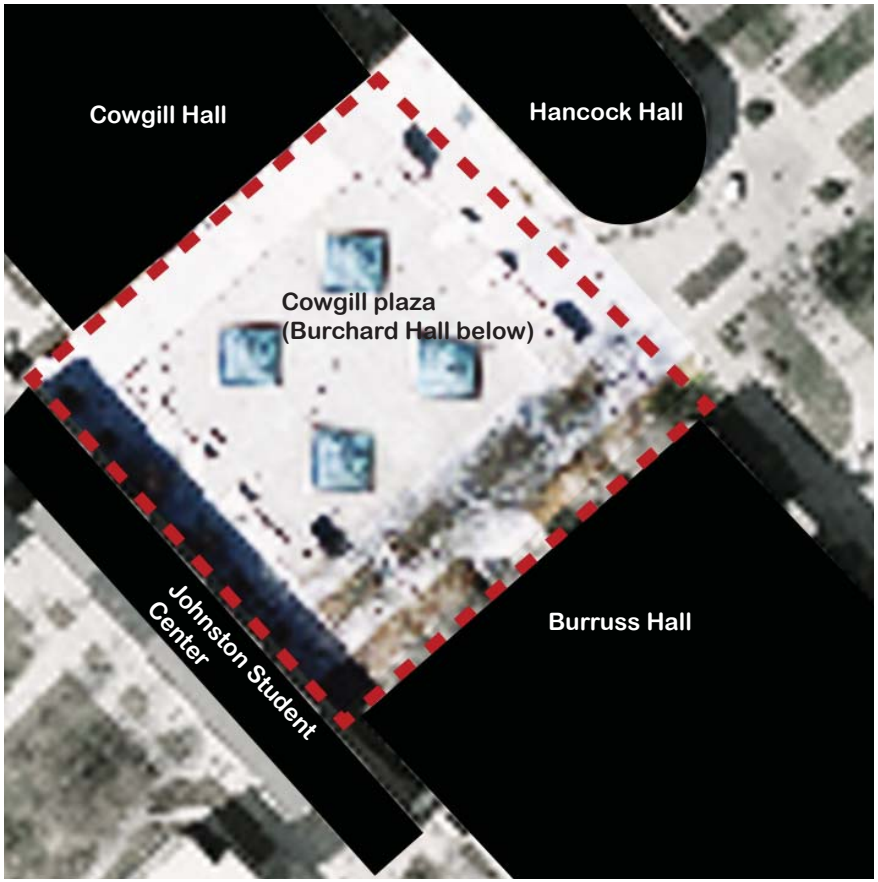

Figure 3.2: Surrounding buildings – Cowgill plaza

Physical features on the plaza, make it an interesting case to evaluate safety with respect to visibility

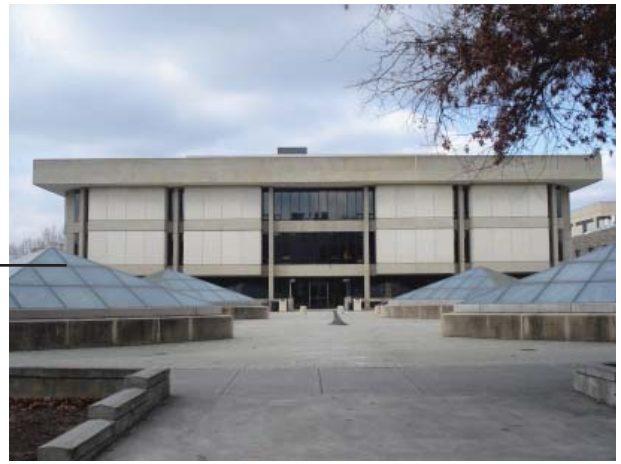

Figure 3.3: Glass pyramids – Cowgill plaza

Figure 3.4: Glass pyramids and concrete structures – Cowgill plaza

b. D2 plaza:

D2 plaza, located centrally in the residential core of the Virginia Tech Campus is mainly used by students living in the residential halls (Figure 3.5 and 3.6). The plaza is linear and different from Cowgill Plaza and does not have any physical features on the plaza such as pyramids or other architectural features which deliberately break the flow of the plaza. But, the plaza is a popular spot on campus and is identified by the presence of huge windows on the physical structure of the plaza and huge vertical columns, which divide the linear space, from open to sky and sheltered spaces. (Figure 3.7 and 3.8)

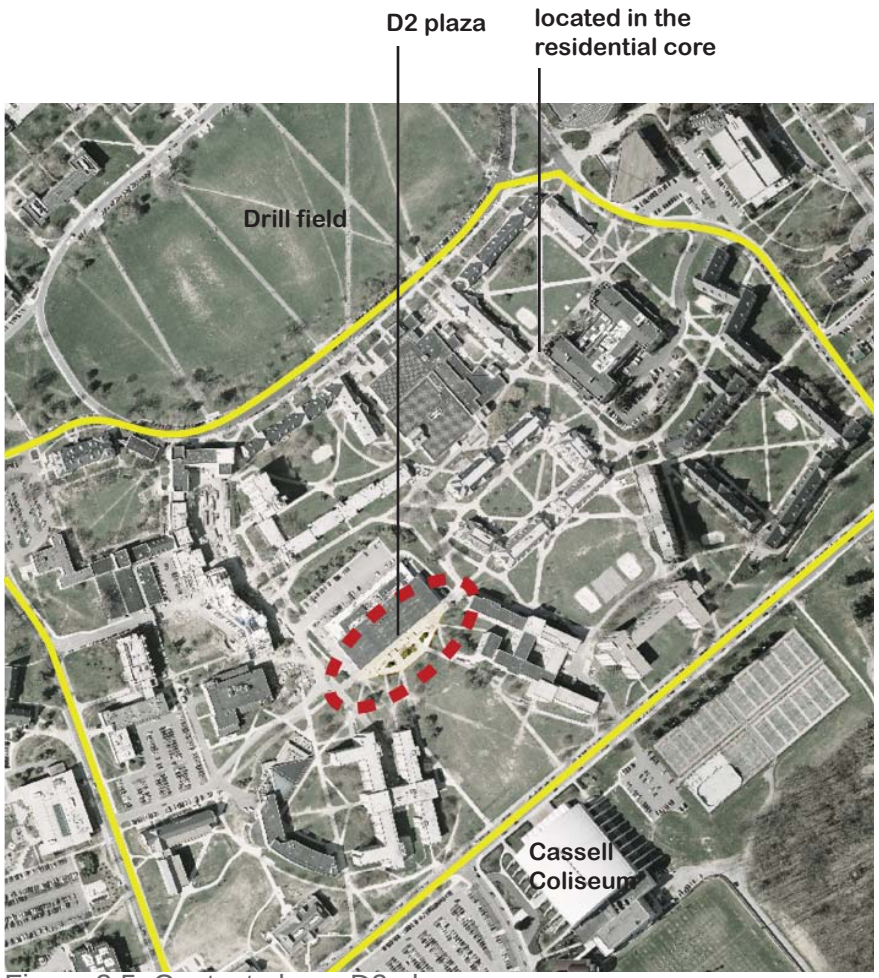

Figure 3.5: Context plan – D2 plaza

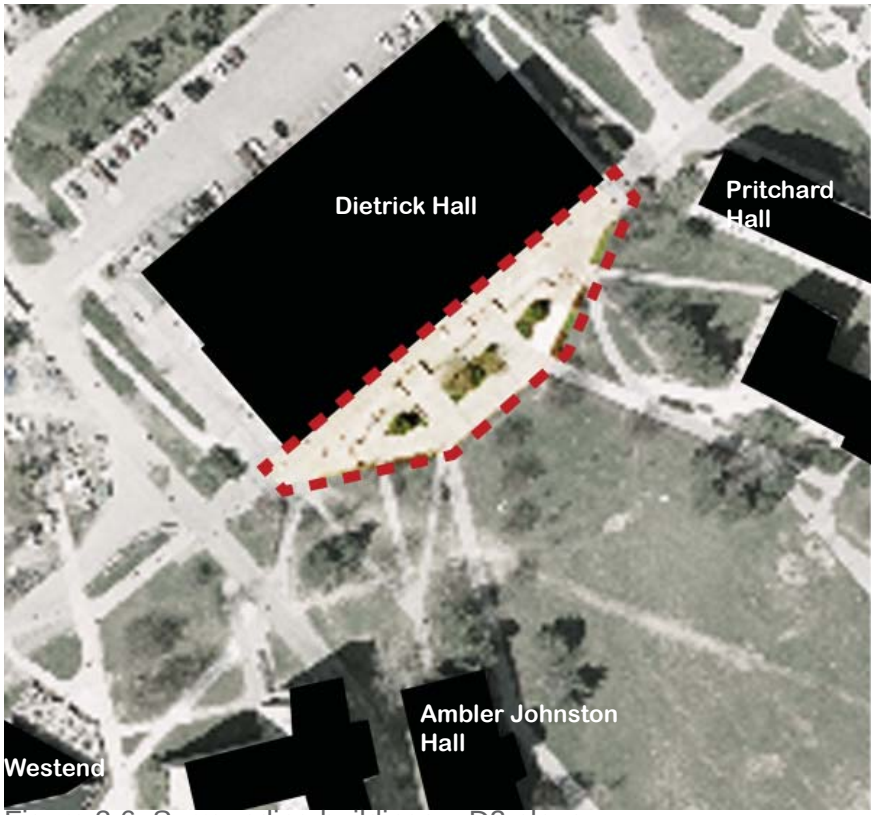

Figure 3.6: Surrounding buildings – D2 plaza

Figure 3.7: Presence of huge windows and vertical columns

Figure 3.8: Linear view of the plaza

From the preliminary site investigations above, both plazas are popular campus spots and are interesting to study, as the physical characteristics of both spaces are different. Clearly, both plazas provide an excellent platform for a comparative research study on safety and study of usage preferences.

iv. CPTED evaluation, pre-tests, and behavioral research procedures

After primary site investigations, I thoroughly evaluated both plazas using METRAC's safety audit checklist. The evaluated safety audit check lists are attached at the end of the thesis for reference (See appendix I and II). I supplemented my research study on safety with photographs, plans, and hand-drawn sections. Out of the three strategies of CPTED, my thesis focuses on the strategy of natural surveillance, emphasizing on the physical design elements, which influences natural surveillance in any given place. After thorough evaluation of each plaza, I assimilated a set of problems/concerns, which influence the design of each plaza. These concerns are discussed in the analysis chapter of my thesis.

Afterwards, I conducted research to understand usage preferences of the plazas by casual observation, interviews and questionnaires. Since, this part of the research study involves human subjects, IRB approval is mandatory. After obtaining approval from IRB (See appendix III for IRB approval), I conducted two pre-tests in both the plazas, where I interviewed the participants, conducted interviews, and requested them to complete the questionnaire to help me conduct research. I approached users of the plazas, who were either using the space for leisure, or were involved in conversation with another person, or were in groups. I had no specific criteria to choose a participant who is using the plaza in a specific way, as my results on usage preferences could be biased. But to maintain uniformity in demographics, I deliberately chose students or a younger population over faculty members and also included an equal number of both genders in my study. Once approached, I casually asked the participants if they would be interested to be a part of a research study and I used a formal verbal consent script (See Appendix IV for verbal consent script).

The length of the interview was limited to 8 -10 minutes. Set of 20 interviews at each plaza: Cowgill and D2 plaza, summing up to a total of 40 interviews at both plazas were conducted. The 20 participants were interviewed at different times of the day, to ensure there is no biasing of data gathered. 5 participants were interviewed at different time of the day. The times below are times of morning, noon, evening, and night times of usage of the plazas. Choosing to interview at different times of the day ensures consistency in the research data derived. Data is collected at the following times of the day:

- Morning (8.00AM to 11.00AM)
- Afternoon (12.00PM to 3.00PM)
- Evening (5.00PM to 7.00PM)
- Night (8.00PM to 11.00PM)

The interviews were recorded using a digital voice recorder and audio files were manually transcribed at the end of the day including a side note of personal comments. My research used the technique of content analysis to analyze the transcripts. The transcriptions were manually coded.

The interview focused on issues concerning safety and understanding what makes people feel safe in the specific plazas in relation to physical features. To understand how they use the plazas, I adopted a questionnaire method.

Thus, the Interview protocol is structured in three sections (See Appendix V for Interview Protocol). The first section is the actual interview recorded using a digital recorder. The interview protocol is designed to ask specific questions with respect to safety in the plaza. People's reaction to safety concerns and their opinions were recorded and transcribed later. The remaining two sections include a questionnaire on social usage and demographics, which needed participants to complete it manually. The second section comprises of closed questions based on social usage of the plaza. The list of activities was formulated after careful observation of how people use both plazas and also understanding human behavior from well grounded literature such as "The Social Life of Small Urban Spaces" by William H. Whyte. The following is a list of activities used to understand the social use of both plazas:

a. Sitting	(SIT)
b. Leisure/Relaxing	(LEI)
c. Eating	(EAT)
d. Reading	(READ)
e. Listening to Music	(LS.MSC)
f. As a place to meet a person or group of people	(PLC)
g. Having group meetings	(GR.MTG)
h. Having private conversations	(PR.CV)
i. Passing through	(PASS)
j. Use as a place to attend private phone calls	(PHNE)
k. Other	(OTHER)

In the third section, I gather general demographic information about the participants, which I later compare with Virginia Tech demographic information to ensure external validity. Demographic data includes age, gender, living status, and purpose at Virginia Tech. The identity of the participants is anonymous and participation is voluntary (See Appendix V for Questionnaire).

4. ANALYSIS

The literature chapter earlier discusses a wealth of information on public spaces, what composes them, safety in public spaces, CPTED strategies and various research tools and research methodologies in the field of CPTED, and behavioral research. The methodology chapter outlines the research procedure and methodology used to gather data. This chapter analyzes the data gathered in a step by step procedure.

First, CPTED analysis of both the plazas is discussed. Second, how people use each plaza is discussed. In this section, the demographic nature of the participants and their usage preferences are described with the help of histograms and tables. The final section describes people's attitude toward safety in the plaza based on interviews conducted and content analysis of the transcriptions. This section is critical to the thesis as the basic research question of my thesis is best answered here. The section will help identify a common ground or conflicts between how people use the plaza and what CPTED advocates. The comparative analysis of both plazas will also help me address if the inclusion of people in the safety evaluation process help better existing CPTED standards and practices.

Sub-chapter 1: CPTED Analysis of both the plazas

The following CPTED analysis evaluates both plazas based on the concept of natural surveillance as indicated in Chapter 3. Both plazas were evaluated according to CPTED, using METRAC's safety audit checklist. This was supplemented by casual observation, photographs, and analyzed plans. The evaluated safety audit checklists for both plazas are attached at the end of the thesis. (See Appendix I and II). Key CPTED observations in both plazas and how it affects safety are as follows:

i. D2 plaza: CPTED observations and impact on safety

a. Vertical columns block views:

The vertical columns along the linear dimension of the plaza blocks views. The vertical columns are wide enough and can serve as potential hiding places for offenders.

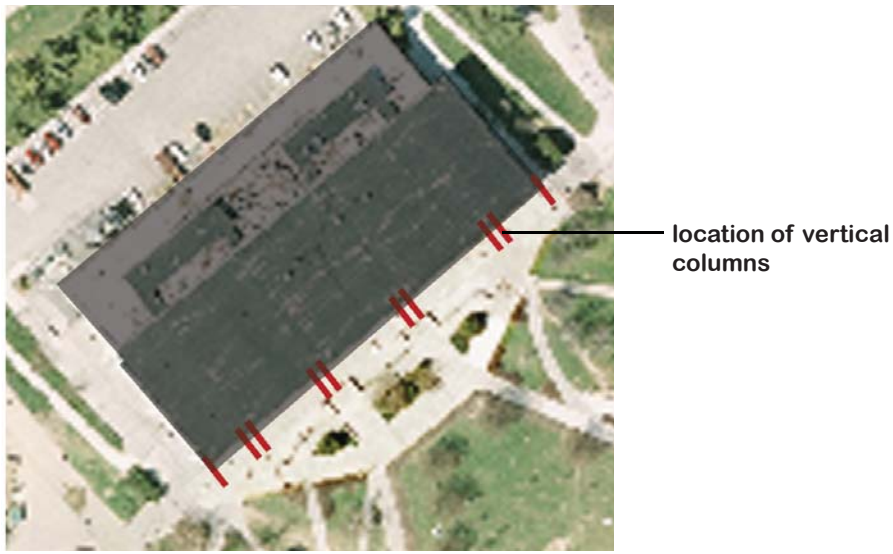

Figure 4.1: plan highlighting location of vertical columns

Figure 4.2: Vertical columns

Figure 4.3: Vertical columns depicting a possibility of how easily people could be hidden

b. Poor maintenance:

The area is very busy during the day, owing to the food courts and is not well maintained. The plaza is often not clean and gives an impression that it is not cared for. Below is an image, reflecting the state of the plaza on a regular weekday. According to CPTED, spaces which appear as un-cared for give an
impression of unsafe spaces to potential users.

Figure 4.4: Unclean plaza

c. No emergency call booth:

There is no emergency call booth in the physical boundary of D2 plaza. As shown in the plan below, there is one located at a distance, but is not easily accessible. The change in grade makes both, accessibility and visibility of the call booth difficult. In case of an emergency, the nearest call booth is not easily reached.

Figure 4.5: Plan highlighting the location of emergency call booth on the plaza

Figure 4.6: Emergency call booth

Figure 4.7: Poor visibility of emergency call booth

d. Poor lighting:

Lighting along the parapet wall is poor and not very bright. Clear from the picture below, the tree canopies hide lighting and the place is poorly lit. Poorly lit areas give scope for intruders and offenders to hide or escape easily after an incident. However, the space under the overhang is well lit.

Figure 4.8: Poorly lit plaza

e. Too much access:

The plaza has no restricted entry or exit point. The plaza offers easy access to many people. Located in the residential core, the plaza has many access points along the linear walkway, which can be difficult to track the movement of an offender if there is an unfortunate incident. Also, adjoining construction area allows easy access to people currently working in the area as well.

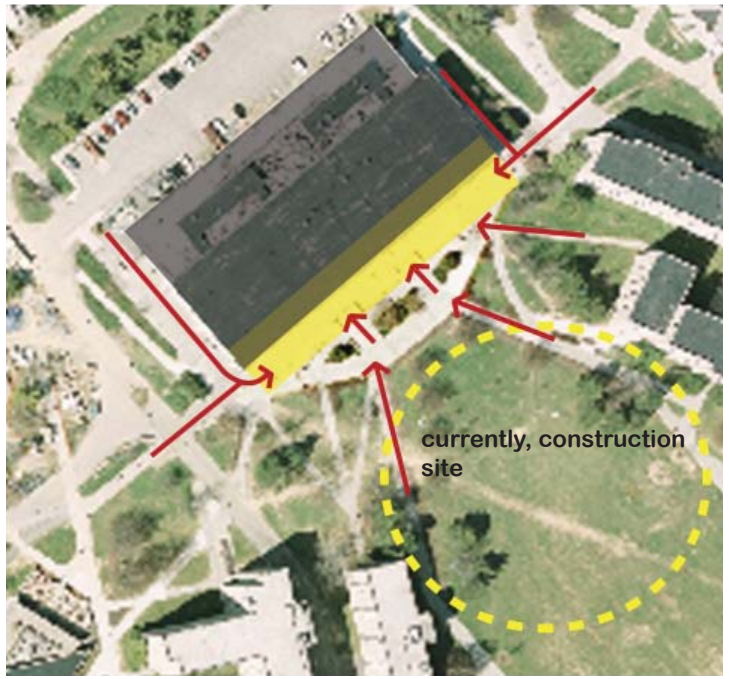

Figure 4.9: Plan depicting accessibility of plaza

f. Good natural surveillance:

Social usage of the plaza (discussed in the next sub-chapter) clearly defines the main purpose of the plaza as a place used for eating, as it houses a dining hall, convenience store and coffee shop in the adjacent building. The store is open until midnight on most days of the week, encouraging many students to use the plaza during late hours. Apart from students just using the outdoor plaza, one can easily look down at the plaza from the indoor dining area above, and spot any unwanted behavior. (Refer Figure 4.10 and 4.11). The linear design of the plaza and clear visual connection to the dining area above helps in good natural surveillance. Thus, more the people use the place, safer the place is, as there are always students to watch out for anything inappropriate in the surroundings. Natural surveillance provided by students using the plaza is the greatest strength of D2 plaza to function as a safe place at most times of the day. In this case, the physical design of the plaza has very little to do with the feeling safety in the plaza.

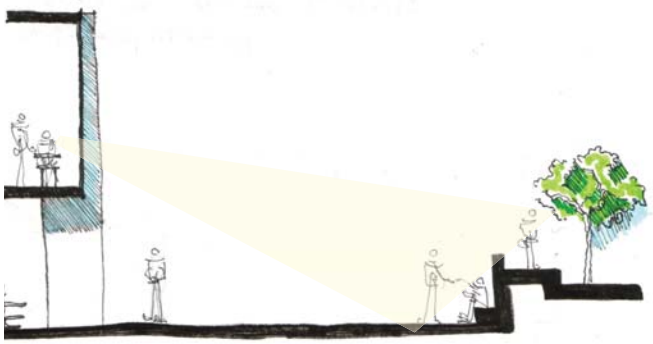

Figure 4.10: Sketch-section of plaza, depicting clear sight lines

Figure 4.11: Image of building depicting huge windows

g. Good signage:

The plaza's sign is obscured by planting as shown in the figure 4.12) but the adjacent building has signs directing a newcomer to the convenience store, making the whole place, identifiable and easy to navigate. (Figure 4.13) In CPTED, signage helps define territory and discourages unwanted people from lingering in defined spaces. This observation is not of concern in the current study as the users of the plaza are students of the University who are well aware of their territorial space.

Figure 4.12: Poor signage hidden by plants

Figure 4.13: Good signage of surrounding buildings

ii. Cowgill Plaza: CPTED observations and impact on safety

a. Pyramids and concrete structures block views

In the figure 4.14, the four yellow diamonds (labelled p1, p2, p3, and p4) in the plaza are glass pyramids. Out of the three remaining yellow squares surrounding the plaza, two of them, labelled 'A' and 'B' are stairwells that connect to Burchard Hall below. The other yellow square, labelled 'C' is a service room.

The pyramids are skylights which serve the architecture studio beneath the plaza. The plaza possesses glass pyramids which are about 10' in height. These pyramids certainly give the plaza an identity, but they obstruct views from parts of the plaza. Thus, creating unsafe spaces which are not in the range of visibility from the plaza. The pyramids and other architectural structures affect the visibility in the following ways:

- No clear views towards the center of the plaza. (refer Figure 4.15)
- No clear views towards the outside of the plaza. (refer Figure 4.16)

Such architectural projections, create smaller spaces which are not visible to other areas. Thus, creating an opportunity for offenders to hide. The images at eye level clearly represents the visual obstructions in the plaza.

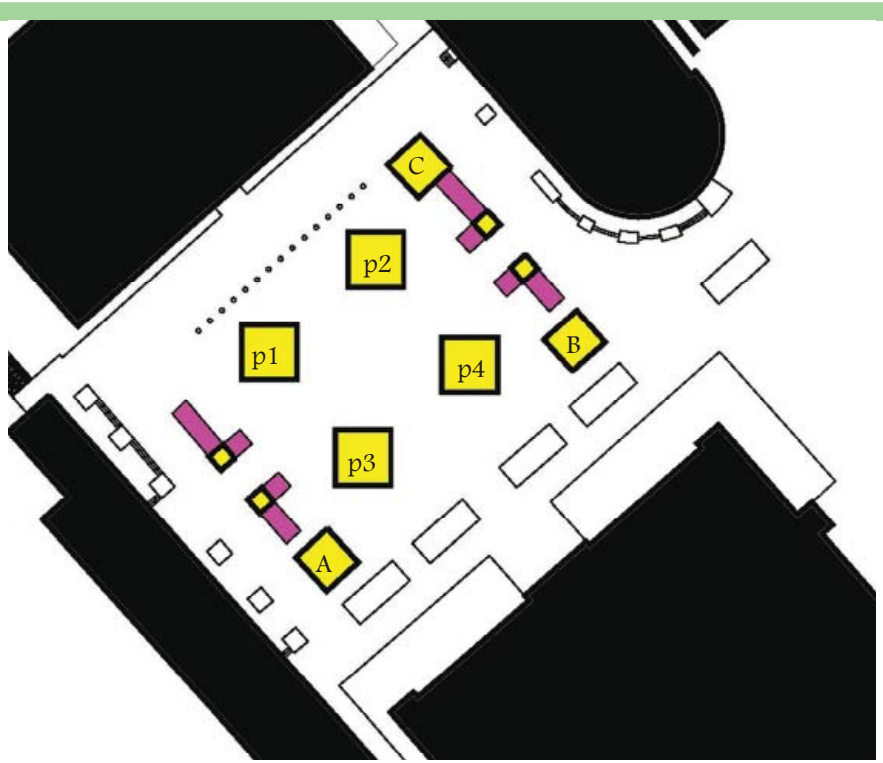

Figure 4.14: Plan highlighting architectural projections

Projection height: up to 10'-00"

Projection height: up to 2'-00"

b. Good maintenance:

The plaza appears clean and is well maintained. This shows that the place is well cared for. A sense of cleanliness adds to providing a feeling of safety in a place. The image below (figure 4.17), is an indication of the cleanliness of the plaza. This CPTED observation is debatable. As described earlier, the physical features on the plaza, limits natural surveillance on the plaza, and social usage also indicates lesser usage of the plaza when compared to D2 plaza. Refer to observation f. Bad natural surveillance for a detailed description on natural surveillance.

Figure 4.17: Image depicting cleanliness of the plaza

Figure 4.15: View looking into the plaza

Figure 4.16: View looking out from the plaza

c. Emergency call booth not visible:

The emergency call booth is located along of the walkways of the plazas, (refer figure 4.18 for location of emergency call booth) but is not visible from all sides of the plaza. The glass pyramids block views and defy the existence of the emergency call booth. Figure 4.20 depicts a view from the center of the plaza from which the emergency call booth is not visible, owing to the pyramids.

Figure 4.19: View of emergency call booth

Figure 4.18: Plan highlighting the location of emergency call booth on the plaza

Figure 4.20: Emergency call booth not visible

d. Poor lighting:

During night times, the lighting around, and especially at the center of the plaza, is very low. The pyramids are lit from underneath, providing the plaza with an aesthetic appeal. The relatively poor lighting of this plaza should cause people to feel the plaza is less safe at night.

e. Too much access:

It is clear from the plan below (See figure 4.21) that there are many different access points to the plaza. There is no one control point for entrance and exit and the plaza is easily accessed by many people from different levels. The most confusing is the disappearance of people who use the place, due to their entering the pyramids, which completely block the views. This ease of disappearing into a pyramid space allows an offender an easy escape route or offers more potential to commit crime.

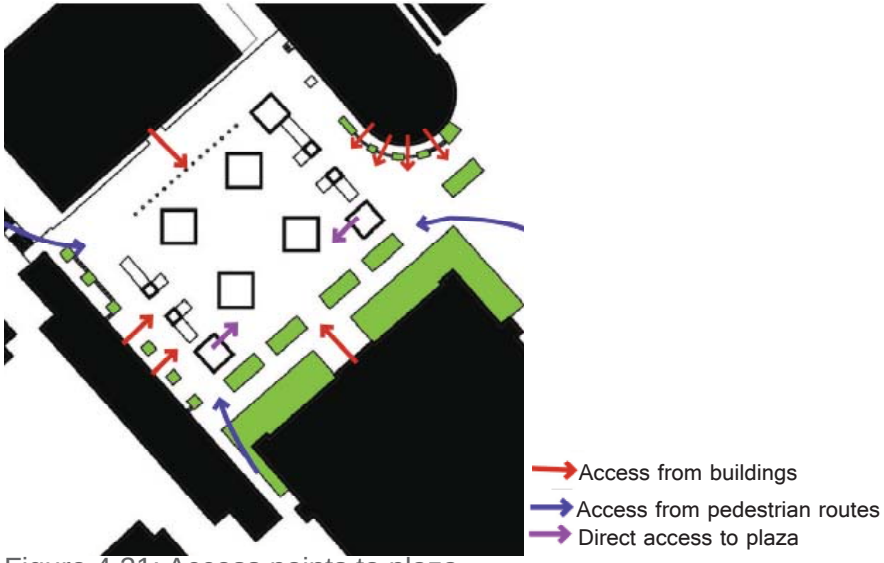

Figure 4.21: Access points to plaza

f. Bad natural surveillance:

The plaza appears deserted and two major factors: social usage and physical design can be contributed. Social usage of the plaza clearly defines the main purpose of the plaza as a pathway to commute from one place to another. The next highest level of activity is relaxation or leisure. The plaza is not widely used as a place to sit outside and eat despite the Subway and the coffee shop in adjacent buildings. The usage of the place is higher in the day for activities when compared to usage at night, owing to the fact that both the eating outlets are closed by 9.00PM on a regular weekday. (Refer to next sub-chapter on Social usage of both plazas)

Apart from social usage as an explanation to the deserted look of the plaza, physical design of the plaza creates an environment not conducive to natural surveillance. The huge pyramids and concrete structures as mentioned earlier block sightlines in the large space. Hence, a lack of sense of safety lurks in the plaza owing to the deserted look of the plaza.

g. Poor signage:

There is no sign on the plaza indicating what the space is, what the space is, or where it is located. The signs to the buildings are much closer, to the entrance of the buildings, and are easily blocked by the pyramids on the plaza. When one is on the plaza, the signage is poor and many times, one is not aware of a huge design studio that lies underneath the concrete floor of the plaza. Again, defining territory is the purpose of signage, which is not necessary in this case as the plaza is located in a University campus and the users are well aware of their territorial space.

The evaluations above provide key concerns which have direct influence on the physical design of both plazas. In both plazas, the physical features such as, vertical columns on D2 plaza and glass pyramids on Cowgill plaza, both have an impact on natural surveillance. They both are a hindrance to clear visual sight lines. Apart from that, maintenance indicates that D2 plaza is not cared for, and hence, not safe. Whereas, Cowgill plaza is clean and well maintained and hence, is safer.

But how do people react to these observations of CPTED? Do users feel the same way? What are the factors that make people feel safe? Before answering these questions, it is important to understand who uses the plazas and how they use these spaces. Data on social usage of both is described in the following sub-chapter. Once social usage of both plazas is established, user responses to safety in both plazas and what changes they wish to see in both plazas is discussed. The final sub-chapter of the analysis section examines user responses and compares them with CPTED analysis of each space.

Sub-chapter 2: Social Use of both the plazas

For ease of understanding the vast data gathered on two different plazas, data from both plazas is simultaneously discussed. First, demographic data of participants interviewed in both campus plazas is described and compared to the Virginia Tech demographics to establish external validity. Second, social use of both plazas is discussed separately. Third, the social uses of both plaza, their times of usage are compared and how they affect natural surveillance of each plaza, is addressed.

Based on 2009 demographic data listed by the Office of Institutional Research and Effectiveness, the ratio of students based on gender, graduate or undergraduate education, living (on-campus or off-campus) is similar to the demographic data of the participants interviewed. (Institutional Research and Effectiveness, 2009) The graphs below depict the demographic data of participants interviewed at both the plazas. An equal number of male and female participants participated in both cases to establish uniformity in the data collected. From the histogram below, D2 plaza has a higher ratio of on-campus housing students when compared to Cowgill Plaza. Users of Cowgill plaza are mostly off-campus housing students. (See histograms below on demographic data). These numbers below also strengthen the existing fact, that D2 plaza is located in a residential core of the campus and Cowgill plaza, in the academic core.

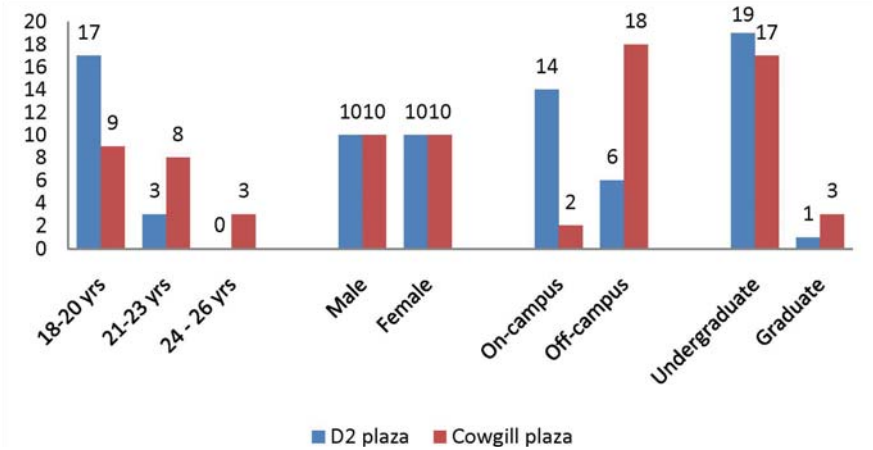

Figure 4.22: Demographic data: D2 plaza & Cowgill plaza

Users of both plazas use the plaza in many ways for leisure, reading, outdoor space to eat, meet people, indulge in conversations et al. The methodology chapter lists all the different types of social uses based on literature and personal observations, which are used in the questionnaire. The questionnaire can be found in Appendix V which includes questions about uses and activities of students who use campus plazas. Below, tables list out the number of participants who use both plazas. The total number of participants interviewed in each plaza is 20.

i. D2 plaza: Social use

Activities/Frequency of Use	Frequently	Rarely	Never
Sitting	13	4	3
Leisure/relaxing	5	6	9
Eating	15	2	3
Reading	2	4	14
Listening to music	3	1	16
As a place to meet another person or group of people	13	6	1
Having group meetings	3	7	10
Having private conversations	7	3	10
Passing through	19	1	0
Use as a place to attend private phone calls	4	0	16
Other	0	0	0

From the table above, one can clearly read that out of the 20 participants who were interviewed, most of them use the plaza as a space to pass through and a space to eat. The presence of food courts in the building adjoining the plaza, and the linear nature of the place, and its location on campus, contributes to the space used as a walkway, as place to meet other people and for eating. Outdoor picnic tables encourage users to sit outside, either for eating, or to meet with other people. The numbers in the table above indicates the plaza as a very busy place primarily used for meeting others, eating or passing through. Not many users indulge in leisure activities such as reading, listening to music, or having any private conversations.

ii. Cowgill plaza: Social use

Activities/Frequency of Use	Frequently	Rarely	Never
Sitting	12	4	4
Leisure/relaxing	11	6	3
Eating	6	5	9
Reading	2	8	10
Listening to music	4	1	15
As a place to meet another person or group of people	10	6	3
Having group meetings	1	3	15
Having private conversations	7	3	9
Passing through	18	1	1
Use as a place to attend private phone calls	6	8	6
Other (Meditate, sleep, hang-out, group activities)	4	0	0

Similar to D2 plaza, out of the 20 participants who were interviewed, most of them use the plaza as a space to pass through. The physical features on the plaza such as the concrete beds and pyramids encourage users of the plaza to relax, sit and enjoy a good weather day. The plaza is barely used by people as an outdoor space for eating in spite of the presence of food courts in the adjacent building. The numbers in the table above indicates the plaza as a relatively quieter place when compared to D2 plaza. Cowgill plaza is primarily used for leisure, relaxing, sitting outside, as a point of meeting, or to pass through. Located in the midst of many academic buildings, the nature of the plaza to serve as a walkway or as a point of meeting is inevitable.

iii. Comparative analysis of social usage of both plazas

A comparative histogram (figure 4.23) below clearly illustrates the various social activities in both plazas. The most noticeable feature in the histogram is the usage of both plazas as a pathway to commute from one place to another. A detailed comparison of all the uses is described below. In the histogram below, D2 plaza is represented in hues of green, whereas, Cowgill plaza is represented in hues of purple.

From the histogram below, it is evident that both plazas are primarily used as a space that users walk through. In other words, both the plazas serve the basic purpose of passing through the space from point A to point B. From the histogram above, the percentage of other activities is close and there is no great difference in how both the plazas are used. One striking difference to note is the considerable difference in percentage of people who use the plazas for eating and leisure.

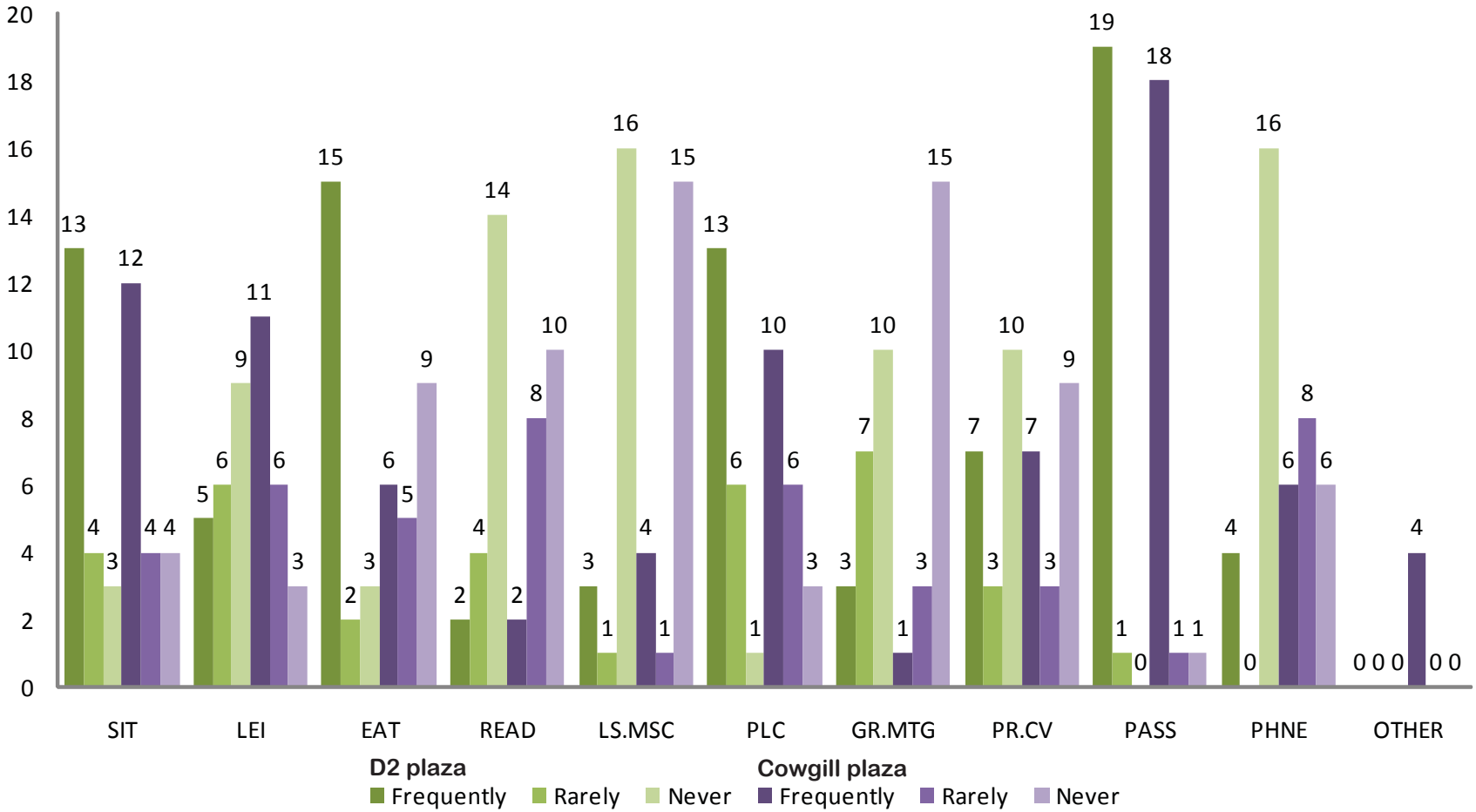

Figure 4.23: Comparative Social Use of D2 and Cowgill plaza

D2 plaza clearly indicates a higher percentage of people who use the plaza for eating when compared to Cowgill plaza. The reason for difference in eating activity can be attributed to the fact that D2 plaza is located in the residential core of the campus, and houses a convenience store open till midnight most times of the day. Whereas, Cowgill plaza is located in the academic core of the campus, and the food courts are not open beyond 9.00pm on regular week days. The following table illustrates the eating activities and time of functioning of food courts in buildings adjacent to both the plazas.

PLAZA	Adjacent eating activities/ food courts	Times of open
D2 plaza	Deets place, Dietrick dining hall, Dietrick general store	7.30AM to midnight
Cowgill plaza	Subway, Seattle's coffee shop	Opens at 7.00AM and closes at 9.00PM

Clearly, the difference in the amount of time these food vendors are open accounts for a higher percentage of students who use D2 plaza for eating. Users using Cowgill plaza, expressed pleasure in relaxing on the warm concrete bed on cold winter days and shade of trees on sunny bright days. A wide range of seating options, from very few benches to concrete beds, parapet walls, makes Cowgill plaza more inviting for students to come out and relax. The physical design of the plaza is a contributing factor to the higher percentage of students using the plaza for leisure and relaxation. Another factor that might add to the higher percentage of students using Cowgill for relaxation is the fact that the architecture and design students from studios below, students from business and engineering schools from adjacent buildings seek a time to move out and relax on the plaza. In a casual manner, most participants who were interviewed expressed that they used the plaza as a space to take a break from their closed studio spaces or classrooms. Also, participants who were interviewed in D2 plaza had no 'Other' activities to mention, unlike participants at Cowgill plaza. Participants at Cowgill expressed the space as a 'playful landscape' where they enjoyed meditating and sleeping on the concrete beds.

View stop motion video here to better understand how both plazas are used.

RESEARCH IN PUBLIC SPACES
: Safety & Human Behavior

Sruthi Atmakur

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of Master of Landscape Architecture

Approved by:

Patrick A. Miller, Committee Chair

Diane L. Zahm

Brian F. Katen

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Blacksburg, Virginia

Keywords: Public spaces, Human behavior, CPTED, Safety

The series of images demonstrated in the stop motion video depicts students using various sections of the plaza for passing through or leisure. D2 plaza is busier than Cowgill plaza and comparatively nosier, as the food courts in D2 plaza are always busy. This can contribute to a lower number of students using the plaza for leisure and relaxation. The plaza serves as a great place to people watch, as there is always a bustle of activity. The pictures below illustrate the bustle of activity in D2 plaza.

The nature of use of both plazas affects the sense of safety in a certain way. D2 plaza is always crowded as students use the space frequently at different eating times of the day and hence, involuntarily offer natural surveillance. This adds to a sense of safety in the space as there are always people in the plaza. This busy nature of D2 plaza lacks in Cowgill plaza, where users prefer more passive activities like leisure and relaxation, which means that the frequency of using the space is less when compared to D2 plaza. In Cowgill plaza, there is no constant activity based on eating times of the day, for users to come and use the space and involuntarily offer natural surveillance. This quality of constant natural surveillance lacks in Cowgill plaza, as the use of the space is dependent on other conditions such as a warm sunny day or whims of the users. This can affect the sense of safety in the plaza, as there is no constant natural surveillance. The next section briefly discusses different times of use of both plazas. This section furthers strengthens the earlier point that natural surveillance is constant in D2 plaza when compared to Cowgill plazas. The histograms in figure 4.26 and 4.27 below illustrate the frequency of activities at different times of the day in both D2 and Cowgill plaza in relation to the activities. D2 plaza has a higher frequency of activities at different times of day and night when compared to Cowgill plaza. The histograms show that Cowgill plaza is used mostly in the day and rarely used in the night. Whereas, there is a constant use of D2 plaza during different types of the day offering natural surveillance at all times.

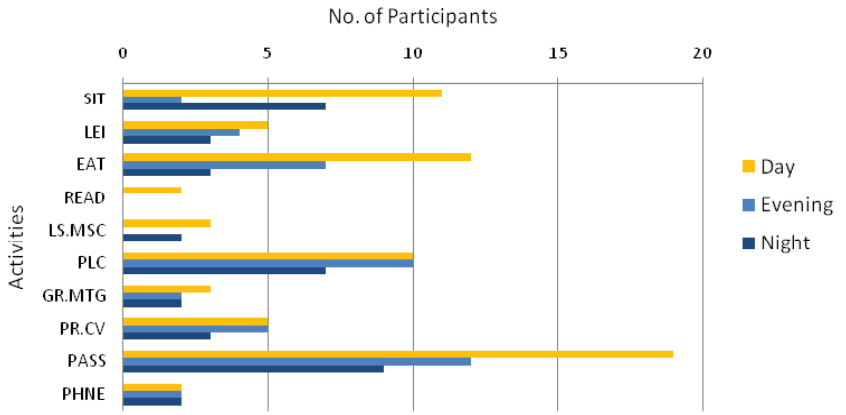

Figure 4.24: Day and night usage of D2 plaza

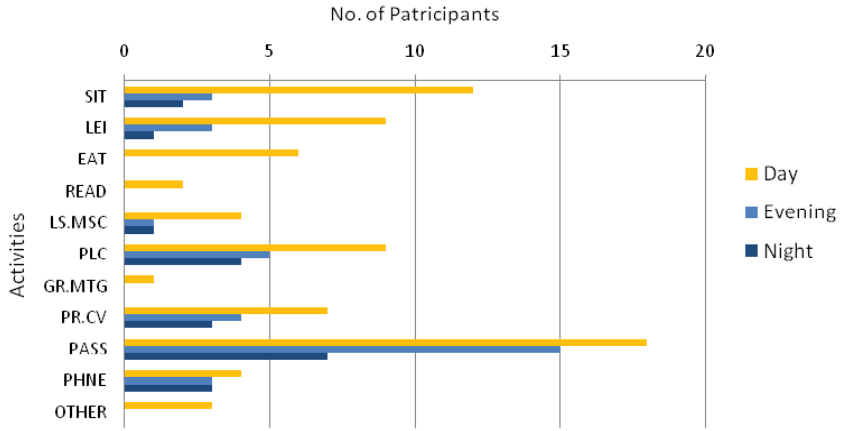

Figure 4.25: Day and night usage of Cowgill plaza

In order to clearly understand the usage of plazas at different times, pie diagrams in figures 4.28 and 4.29 clearly indicate the proportion of usage of both plazas in the day, evening and at nights. Out of the 20 participants who were interviewed in both plazas, Cowgill plaza (70%) is used more in the day when compared to D2 plaza (55%). On the other hand, D2 plaza is used more in the night than Cowgill plaza. This can be contributed to the fact stated earlier, where D2 plaza is used a place to eat at nights unlike Cowgill plaza. Also, the presence of a convenience store open until midnight in a residential core also allows students to linger on in the late hours in D2 plaza. Cowgill plaza's presence in an academic core limits the use of the plaza at night time for any form of social activity or usage.

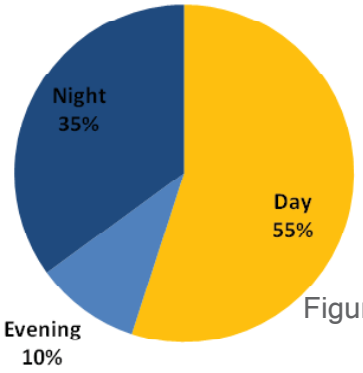

Figure 4.26: % of usage of D2 plaza

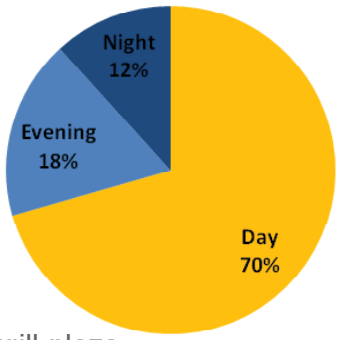

Figure 4.27: % of usage of Cowgill plaza

The earlier section discusses the various uses of plazas, how students use them, at what times of the day and the reasons for doing so and how it has an impact on the natural surveillance of both plazas.

Sub-chapter 3: People's attitudes towards safety

This sub-chapter presents in a narrative format how people reacted to safety issues in both plazas, what changes they wish to see and what CPTED advocates. The structure of this sub-chapter addresses user responses to safety in the plaza and simultaneously compares the responses with CPTED analysis.
Below, participant reactions and CPTED analysis are discussed first in D2 plaza and next in Cowgill plaza. Transcriptions and content analysis derived from the interview help in assessing the percentage of users who feel safe or unsafe on both plazas and the reasons for feeling so.

i. D2 plaza: User response

Out of the 20 participants who were asked how safe they feel in D2 plaza, 12 felt very safe and the remaining 8 of them felt moderately safe. Many reasons were attributed to why people felt very or moderately safe in the plaza.
D2 plaza users who felt moderately safe, when asked what they would like to change in the physical space to make the place safer, they suggested more lighting in the plaza. Few users complained about poor lighting in the plaza at night times, and wished they could add more lighting to make them feel safer. They expressed that the plaza gets darker at nights, and needed more lighting, which would help them feel safer. The safety audit checklist by METRAC suggests the same. User response and CPTED analysis in this case is the same. Participants, who felt very safe in the plaza, attributed the following features to their sense of safety:

a. The users expressed that the plaza is always crowded due to the food courts and convenience store, and constantly has many people using the space at different times of the day. Participants expressed they felt safe as there are always people using the plaza. Here, CPTED analysis aligns perfectly with people's reactions.

b. A few participants who felt safe in the plaza expressed that the emergency call booth is located in close proximity to the plaza, which offers a false sense of security. CPTED analysis outlines the need for an emergency call booth in the plaza as there is none that is easily reachable. Users of the place are students, who are aware of their surroundings, and hence, in this case, the need to locate the call booth on the plaza is not expressed strongly by the users of the plaza.

c. Many participants expressed that they felt safe because they knew they were on campus and that they felt safe at all times. CPTED analysis shows the need to define territories using signage and other landscape features such as change in paving or other material to mark boundaries and to ensure a feeling of safety. This CPTED observation is not applicable to the current scenario, as users feel safe as they are aware of their territorial space.

d. Many participants when specifically asked if the physical design of the plaza had an impact on their sense of safety in the plaza, many replied negatively. Users of the plaza felt safe and did not owe their sense of safety to any physical feature of the plaza. They in fact expressed that that plaza is very open

and has no potential places for people to hide. This reaction of users is in contrast to CPTED's analysis of the place. According to CPTED, the vertical columns could offer as potential hiding places in the plaza. With reference to this observation of CPTED, when users were probed further in the interview if the physical features could obstruct views and if they felt people could possibly hide behind the plaza, many participants replied, "I never thought of that before" or "Even if someone is hiding, there are so many people, someone else would see them".

My thesis focuses on the physical features of plaza and aims to understand if people's reaction to physical features in terms of safety in a plaza is the same as CPTED analysis of the impact of physical features in the plaza. In the case of D2 plaza, users' response differs from CPTED analysis. Users feel the physical features of the plaza had no impact on how safe they felt, but CPTED analysis lists vertical columns as physical features which could offer as potential hiding places.

ii. Cowgill Plaza: User response

Out of the 20 participants who were asked how safe they feel in Cowgill plaza, 11 felt very safe and the remaining 9 of them felt moderately safe. In this section, I will first address the responses of the users who felt very safe in the plaza, why they felt so and compare with CPTED analysis. Later, I compare CPTED analysis with reactions to users who felt moderately safe in the plaza and also outline the changes they wish to see in the plaza.
Participants, who felt very safe in the plaza, attributed the following features to their sense of safety:

• Some participants felt that the plaza is very open and there is a lot of open free space in the plaza. Participants felt that even if a person is attacked, they cannot be narrowed down as the space is open and one could easily escape the scene. Hence, some participants contributed the sense of openness to feeling safe in the plaza.

• Some participants contributed surrounding buildings of the plaza to the sense of safety. Their responses indicated that they had a feeling of being watched and if something had to happen, someone would come to help. Very few participants who felt very safe indicated the presence of people in the plaza, which contributed to a feeling of safety.

• Many participants who use the space mentioned that they knew the space and were familiar with the surroundings. The sense of familiarity contributes to a sense of safety in this case. The scope of my thesis is limited to understanding how physical

features affect safety and if people's sense of safety is affected by presence of physical features.

Remaining users, who felt moderately safe, contributed the following factors to their sense of insecurity in the plaza.

• Users expressed concerns about the pyramids on the plaza offering potential hiding places for offenders. Many complained about the size and layout of the pyramids. They felt strongly on the ability to be able to look from one place to another is important. Most students hoped the plaza could be redesigned to find an alternative way to let light down into the studio, while treating the outdoor space as a unified space. Here, participant reaction reinforces CPTED's primary problem with the plaza of visual obstruction in the plaza. In this case, CPTED analysis is in agreement with user reaction of safety in the plaza. My thesis focuses on the impact of physical features of a place having an impact on visual sight lines and natural surveillance. With respect to physical features and natural surveillance, both user reaction and CPTED analysis concur with each other.

• One of the most striking features noted by many participants interviewed is the lack of people using the plaza. Many people described the plaza as a 'deserted' place and one that 'lacks life.' The deserted look of the plaza was supported by one of the participants who said, "I am sure it is a safe place, but I think when you have a lot of people, it would make you feel safer". Another participant opined, "Bringing in trees and umbrellas brings in shade and you might have more people hang out here during the day. Right now, during these cold days, it is just too open and windy, I think during summer times, there would be more people, which would make it safer, if there are people always". Many participants interviewed expressed concerns about no one to call out to incase of an emergency. They also attributed the lack of people in the plaza to the glass pyramids as they found the pyramids challenging to see through and look for people beyond. CPTED's observation of poor natural surveillance is strengthened by the participants' opinions using the plaza. But there were a few students who felt the plaza was safe and was always under observation owing to the buildings surrounding the plaza. A participant who felt very safe in the plaza strongly opined, "I think the sort of enclosed nature and openness of the place automatically brings in a sense of safety. I think the whole idea of being watched or the comfort of having other institutions surrounding this plaza." The users in the plaza did not seem to be aware of the fact that people in the surrounding buildings do not have a constant eye on the plaza. The buildings are academic and administrative in nature and do not have long working hours, for people to look out to. However, just the sense that someone might be watching was helpful.

The thesis aims to check if people's opinions are in tandem with CPTED analysis with respect to physical features blocking natural surveillance. In the case of Cowgill plaza, unlike D2 plaza, user response is in complete agreement with CPTED analysis.
In D2 plaza, users wished for greener places, but did not feel the need to add anything to make the place feel safer. The users feel very safe in D2 plaza owing to high social usage of the plaza. Whereas, in Cowgill plaza, users wished to see some more outdoor eating areas in the center of the plaza, realignment of the pyramids, a possible way to reduce the scale of the pyramids or maybe even a different way to let the light in to the studios beneath. Users of Cowgill plaza also requested more social programming which would bring people out to use the plaza and hence inevitably offer natural surveillance by those using the space.

5. CONCLUSION and IMPLICATIONS

CONCLUSION

This research started with understanding what makes successful public spaces, discussed importance of safety in public spaces, origin of CPTED strategies and compared two plazas analytically highlighting the need for revision of existing CPTED strategies on the basis of human behavioral research. The purpose of this thesis is to identify a common ground or conflicts between how people use the plaza and what CPTED advocates. CPTED advocates safety and crime prevention through both design and use. Hence, the study also focuses on understanding the balance between design and use in a public place.

Clearly tools, such as the METRAC safety audit checklist, allows a professional to gather information about the physical design and setting of a place, but does not take into consideration how the space is used.

For instance, in Cowgill plaza a few physical features in the plaza do not have a significant impact on people's perception of safety in the plaza. The concrete beds block certain views, but users describe the space as 'playful' in nature. Students use Cowgill plaza for leisure and relaxation. Here, the design of the plaza has more importance than the use of the plaza. But the glass pyramids visually block views, offering potential spaces for people to hide. This feature is reinforced by both CPTED analysis and people's perception of safety. Many users felt the pyramids should be scaled down for clear views.

Cowgill plaza's 'playful' nature has a strong hold on design but lacks 'usage'. The study in Cowgill plaza presents a case for the need to include the type of social programming that people prefer on the site. If there are more activities, then more people tend to use the space and hence there are more eyes in the plaza.

This is further strengthened when we look at D2 plaza, the physical features blocking clear sightlines do not have a significant impact on how safe people feel in a space. People who felt slightly unsafe in D2 plaza contributed poor lighting to their sense of insecurity and never felt that there could be a potential offender hiding behind the vertical columns in the plaza.

Both my studies found that design has a place, and that we need to emphasize on use of a place. The CPTED definition of safety and prevention through design and use still works in both plazas. But the balance between 'design' and 'use' tips towards 'use' of a place in this context.

During the course of my research study, another important feature has surfaced. In my research, I realized that the users in both plazas are well aware of their surroundings, and that their territories are already well defined. The users of both plazas are familiar with the space as it is "their" campus territory. Territoriality and sense of familiarity play important roles in how safe people feel in a space. My thesis is limited to understanding if physical features of a space blocking views have a direct impact on how safe people feel in a space. Clearly, from the studies above, social programming of a place has more impact on how safe people in a place more than physical features blocking views.

IMPLICATIONS

Impact of my research on current techniques of evaluating safety and the design process:
My research emphasizes on the 'use' of place over 'design' of a place. Since the design process occurs before the use of a place, a good designer should not be afraid to suggest changes in a design program that might add activities that would increase safety. The results of this study also suggest a need to a revise the techniques used in evaluating safety of a place and thereby affecting the design process. Current safety audit checklists evaluate the place only in terms of the physical design and do not take account user needs and opinions. Safety audit checklists focus only on the physical aspects and miss out on the social aspects of a place. Integrating a questionnaire section which helps gather information on how people use the plaza and what changes they prefer is an important improvement. An addition to the existing safety audit checklist is required to better evaluate and understand any place. An effective method would be to identify a good sample size composing of participants who use the plaza on a regular basis. For new space designs, people in the neighborhood could be used as participant samples for the survey and feedback on how they would use the proposed design of the space.

Advantage to addition of a new section to existing evaluation:
Better safety evaluations of a place will eliminate unwanted assumptions of safety issues in a given space, thereby also cutting down any additional costs in renovating or re-designing a space based on mere CPTED strategies. For instance, a simple change such as adding an outdoor cafe or a display area for local art can help bring in people increasing use of place and offering natural surveillance instead of renovating the place according to safety or CPTED recommendations. This change to CPTED standards is not restricted to just campus plazas, but any open space in a neighborhood or an urban setting.

Who can make this change possible?
Designers, professionals, and thinkers in fields of architecture, urban planning, and landscape architecture can influence and make this change possible. Creating safe environments is a responsibility of every designer, irrespective of the scale of the project. Integrating CPTED in the design process is needed to avoid any major renovations which crop up due to analysis by CPTED professionals later. But this does not mean that CPTED strategies are applied the way they are. Many times the strategies need tweaking as the context and users always will differ. An understanding of CPTED strategies and focus on user needs is one way to achieve successful social spaces. To make this happen, first, designers need to accommodate CPTED strategies in the design process and should educate their clients about the importance of safe design. Students and learning professionals in design schools should be more aware and sensitive to the concept of safe design.

My thesis opens an avenue for further discussion and research in planning and design fields. Planners follow the rule of CPTED and designers are carried away by aesthetic of a place. The key is to find a middle ground to make it workable. Involving users in the design process is a technique followed by many designers, but user involvement in the safety evaluation of a place can greatly help in making successful and richer social spaces.

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LIST OF APPENDICES

APPENDIX A: Safety audit checklist of D2 plaza
APPENDIX B: Safety audit cheklist of D2 plaza
APPENDIX C: IRB Approval
APPENDIX D: Verbal consent script
APPENDIX E: Interview protocol and Questionnaire

D-2

A CHECKLIST OF SAFETY AUDIT FOR CRIME PREVENTION

☒ OUTDOORS ☐ INDOORS

GENERAL AREA: Plaza / Walkway Area / Outdoor Food Court
SPECIFIC LOCATION: Dietrick Hall
DATE: 08/27/09
DAY: THURSDAY.
TIME: 11.15 AM.
AUDITED BY: SRUTHI ATMAKUR

REASONS FOR AUDITING THE AREA:
Thesis study.
To study impact of physical features on safety.

➳ ***Tips on taking notes:***

- Regardless of how sharp your memory is, you will not remember everything. Therefore it is important to take good notes. Our experience shows that using a checklist and writing notes on it will make it easier to organize your ideas and suggestions later on.

- Write down any questions that you have (even if you don't have the time to find the answers).
- Sometimes a place is so poorly designed that there aren't any real solutions beyond a temporary band-aid. It is still important to note the problem. Identifying and naming a problem is the beginning of changing your surroundings and the way new buildings and spaces are designed.
- Take notes on everything, including your comments on the process of the Audit itself.
- Look over your notes a day or two later to see if they still make sense. Would someone who wasn't on the Audit understand what you mean? If not, try to make your notes clearer.

---

1. General Impressions

a] Describe your first initial reactions to the site:

Walkway
linear space
some seating in shaded area
little dirty
good signage.

b] What 5 words best describe the place?

Slightly dirty
People meeting
Linear plaza
Open
Seems as an interactive street boards, newspaper stand

2. Lighting [good lighting allows you to see the area and what's happening in it]

a] What is your impression of the lighting?

☐ very poor ☐ poor ☐ too dark
☒ satisfactory ☐ good ☐ too bright
☐ very good

b] Is the lighting consistent throughout the space?

☐ yes ☒ no

c] Are any lights out? no.

d] If so, how many? —

e] What proportion of lights are out? —
[e.g. Maybe only two bulbs in your hallway are burned out, but if there are only three bulbs to start with, then a more powerful way to say this is that two-thirds of the lights are out.]

f] Are you able to see and identify a face 25 metres (75 feet) away?

Yes.

g] Do you know where/whom to call if lights are out, broken, not yet turned on, etc.?

☐ yes ☒ no

h] Outdoors: Is the lighting obscured by trees or bushes? ☒ yes ☐ no

i] How well does the lighting illuminate pedestrian walkways and sidewalks?
☐ very poor ☐ poor ☒ satisfactory
☐ good ☐ very good

3. Signage [good signage lets you know where you are, what resources are available, and helps you develop some familiarity with the location]

a] Is there a sign (i.e. room no., building name) identifying where you are? ☒ yes ☐ no

b] If no, are there directional signs or maps nearby which can help you identify where you are?
☐ yes ☒ no

c] Are there signs which show you where to get emergency assistance if needed? not very clear
☐ yes ☒ no

d] Are there signs which direct you to wheelchair access? ☐ yes ☒ no

e] Do exit doors identify where they exit to?
☒ yes ☐ no

f] Is there information posted describing the hours the building is legitimately open?
☒ yes ☐ no

g] What is your impression of the overall signage?
☐ very poor ☐ poor ☐ satisfactory
☒ good ☐ very good

4. Sightlines [clear sightlines are important as they let you see, without interference, what lies ahead]

a] Can you clearly see what is up ahead?
☒ yes ☐ no

b] If no, the reasons may be: (sometimes)
Indoors: ☐ sharp corners ☐ walls
☒ pillars
☐ others_____

Outdoors: ☐ bushes ☐ fences
☐ hill
☒ others planting, columns.

c] Are there places someone could be hiding?
☒ yes ☐ no

d] If yes, where? behind the vertical columns.

e] What would make it easier to see? e.g.:

☐ transparent materials like glass
☐ vehicles moved ☐ angled corners
☐ security mirrors ☐ trimmed bushes
☐ snow cleared

Other comments?
The glass facade allows reflections and though there are huge vertical elements that might allow people to hide, one can easily view their reflection in the glass.

5. Isolation -- Eye Distance [this lets you assess how far away things are from the location and if someone would see you if you were in trouble]

a] At the time of your Audit, did the area feel isolated?
❑ yes ☒ no

b] How many people are likely to be around?

- *In the early morning:*
❑ none ❑ few ☒ several ❑ many
- *During the day:*
❑ none ❑ a few ☒ several ❑ many
- *In the evening:*
❑ none ❑ a few ☒ several ❑ many
- *Late at night (after 10 pm):*
❑ none ❑ a few ❑ several ❑ many

c] Is it easy to predict when people will be around?
☒ yes ❑ no

d] Is there a monitor or surveillance system?
❑ yes ❑ no ☒ don't know

e] Other comments?
Good sightlines.

6. **Isolation -- Ear Distance** [lets you assess if you could be heard in an emergency]

a] How far away is the nearest person to hear a call for help? 10 away.

b] How far away is the nearest emergency service such as an alarm, security personnel, crisis telephone? It's off the plaza. ☐ don't know

c] Can you see a telephone, or a sign directing you to emergency assistance? ☐ yes ☐ no

d] Is the area patrolled?
☐ yes ☐ no ☒ don't know

e] If yes, how frequently?
☐ every hour
☐ once per afternoon/evening
☒ don"t know
Other comments?
Widely used by students, so there is natural surveillance in the given place.

7. **Movement Predictors** [a predictable or unchangeable route or path; this allows you to assess whether or not you can determine the way or direction people will move]

a] How easy is it to predict people's movements? (e.g. their routes)
☐ very easy ☒ somewhat obvious
☐ no way of knowing

The linear plaza is either used as a walkway to travel from point A to point B or students use the building entrances.

b] Is there an alternative well-lit route or path available?
but longer routes and slightly dim lighting!
☒ yes ☐ no ☐ don't know

c] Is there an alternative frequently travelled route or path available?
☐ yes ☒ no ☐ don't know

d] Can you tell what is at the other end of the path, tunnel, or walk?
☒ yes ☐ no

e] Are there corners, alcoves, or bushes where someone could hide and wait for you?
☒ yes ☐ no

f] Other comments?
Sometimes, there is a possibility to see the reflection of the person behind the column through the glass of the building.

8. Possible Entrapment Sites [lets you assess whether or not there are locations which are of special concern]

Indoors:

a] Are there empty rooms that should be locked?
☐ yes ☐ no

b] Are there small, well-defined areas? e.g.:
N/A.
☐ stairwells
☐ recessed doorways or lockers
☐ unlocked closets
☐ elevators
☐ others:_____

Outdoors:

c] Are there small, confined areas where you would be hidden from view? e.g.: YES.
- ☐ unlocked equipment or utility shed
- ☐ alley or lane
- ☐ recessed doorway
- ☐ construction site
- ☐ others: bushes at far end and large shrubs behind.

9. Escape Routes [lets you assess whether or not there are ways to escape should there be an incident]

a] How easy would it be for an offender to disappear?
☐ very easy ☐ quite easy ↔ ☐ don't know

b] How difficult would it be for you to escape to safety if you had to?
☐ very difficult ☐ quite difficult ☒ don't know

10. Nearby Land Uses [lets you assess the impact of how the land is used as it relates to your comfort and safety]

a] What is the surrounding or nearby land used for?

☐ stores	☐ offices
☒ restaurants	☐ factories
☐ heavily treed/wooded area	☐ busy traffic
☒ parking lots	☐ river bank
☒ residential ~~houses and streets~~ dorms.	
☐ don't know	
☐ other: Open areas (grass+trees+bushes)	

b] Can you identify who owns or maintains nearby land? ☒ yes ☐ no

c] What are your impressions of nearby land use?
☐ very poor ☐ poor ☒ satisfactory
☐ good ☐ very good

d] Is the land use in the area changing?
yes.

e] Does its new use make you feel more or less comfortable than its old use?
N/A.

f] What about the land use change makes you feel more or less comfortable?
N/A.

11. Factors That Make the Place More Human [these questions let you assess whether or not the location is used or abused by people]

a] Does the place feel cared for? ☒ yes ☒ no slightly dirty.

b] Does the place feel abandoned? ☐ yes ☒ no

c] What gives you that feeling?
Many students and commercial activity.

d] Is there graffiti on the walls?
☐ yes ☒ no

e] In your opinion, are there racist or sexist slogans/signs/images on the walls?
☐ yes ☒ no

f] Are there signs of vandalism? ☐ yes ☒ no

g] Would other materials, tones, textures or colours improve your sense of safety?
☐ yes ☐ no (may be)

h] Other comments?
They are signs for "no rollerblading skateboarding allowed".

12. Maintenance [these questions help you tell if the area is well looked after and well used by people]

a] What are your impressions of maintenance?
☐ very poor ☒ poor ✓ (depends on time of day)
☒ satisfactory ☒ good
☐ very good

b] Is there litter lying around? ☒ yes ☐ no

c] Is there need for major repair? ☐ yes ☒ no

d] Do you know to whom maintenance concerns should be reported? ☐ yes ☒ no

e] From your experience, how long do repairs generally take? N/A. ☐ yes ☐ no

13. Overall Design [lets you express your overall feeling after you have looked at the site in detail]

a] Describe your impressions of the overall design:
☐ very poor ☐ poor
☐ satisactory ☒ good
☐ very good

b] If you weren't familiar with the place, would it be easy to find your way around?
☒ yes ☐ no

c] Is the entry visible and well defined?
☒ yes ☐ no

d] Are public areas visually protected?
☒ yes ☐ no

e] Does the place make sense? ☒ yes ☐ no

f] Is the place too spread out? ☐ yes ☒ no

g] Are there a confusing number of levels?
☐ yes ☒ no

h] Other comments?
The plaza is a clear space and easy to understand but signage directing where to go and what is at each end would be helpful.

N/A.

14. Social Concerns [this lets you assess whether or not there are groups and organizations in place which add to your feelings of comfort and safety]

a] Are there cultural and social activities occurring in the neighbourhood?

❑ yes ❑ no

b] Describe how this makes you feel more or less

_____

_____

c] Are there organizations and groups in the neighbourhood which are concerned about the neighbourhood and its people?

❑ yes ❑ no

d] Describe how this makes you feel more or less comfortable:

_____

_____

_____

_____

e] Do you have friends or neighbours in the area you could count on in an emergency?

❑ yes ❑ no

f] Is the population of the area changing?

❑ yes ❑ no

g] Describe how more or less safe this makes you feel:

_____
_____
_____

N/A.

h] Are there people with special needs in the area whose needs are not being met?

❑ yes ❑ no

i] Describe who they are:

_____
_____
_____

j] Are there institutions in the area which make you feel more or less comfortable?

❑ yes ❑ no

k] Describe how they make you feel more or less comfortable:

_____
_____
_____
_____
_____
_____
_____

From the Crime Prevention Safety Audit questions that you just completed, identify what can be done to make you feel safer about this location

What improvements would you like to see?

Better signage.

Do you have any specific recommendations?

Signage.

What skills or resources could you contribute to making these improvements?

COWGILL.

A CHECKLIST OF SAFETY AUDIT FOR CRIME PREVENTION

☒ OUTDOORS ☐ INDOORS

GENERAL AREA: Public plaza.
SPECIFIC LOCATION: Cowgill plaza.
DATE: 09/02/09
DAY: WEDNESDAY.
TIME: 11.30 AM.
AUDITED BY: SRUTHI ATMAKUR.

REASONS FOR AUDITING THE AREA:
Thesis study. To understand how physical features impact safety.

➸ ***Tips on taking notes:***

- Regardless of how sharp your memory is, you will not remember everything. Therefore it is important to take good notes. Our experience shows that using a checklist and writing notes on it will make it easier to organize your ideas and suggestions later on.

- Write down any questions that you have (even if you don't have the time to find the answers).
- Sometimes a place is so poorly designed that there aren't any real solutions beyond a temporary band-aid. It is still important to note the problem. Identifying and naming a problem is the beginning of changing your surroundings and the way new buildings and spaces are designed.
- Take notes on everything, including your comments on the process of the Audit itself.
- Look over your notes a day or two later to see if they still make sense. Would someone who wasn't on the Audit understand what you mean? If not, try to make your notes clearer.

---

1. General Impressions

a] Describe your first initial reactions to the site:

Kind of empty / deserted
Used but not much.
Walkway (mostly)
Meeting place.

b] What 5 words best describe the place?

Barren — Shaded on the edges.
Clean — Too open in the center.
Unique - pyramids

2. Lighting [good lighting allows you to see the area and what's happening in it]

a] What is your impression of the lighting?

☐ very poor ☐ poor ☐ too dark
☒ satisfactory ☐ good ☐ too bright
☐ very good

b] Is the lighting consistent throughout the space?

☐ yes ☒ no

c] Are any lights out? N/A.

d] If so, how many? N/A.

e] What proportion of lights are out? N/A.
[e.g. Maybe only two bulbs in your hallway are burned out, but if there are only three bulbs to start with, then a more powerful way to say this is that two-thirds of the lights are out.]

f] Are you able to see and identify a face 25 metres (75 feet) away?
YES.

g] Do you know where/whom to call if lights are out, broken, not yet turned on, etc.?

☐ yes ☒ no

h] Outdoors: Is the lighting obscured by trees or bushes? ☒ yes ☐ no (in some places).

i] How well does the lighting illuminate pedestrian walkways and sidewalks?
☐ very poor ☐ poor ☒ satisfactory
☐ good ☐ very good

3. Signage [good signage lets you know where you are, what resources are available, and helps you develop some familiarity with the location]

a] Is there a sign (i.e. room no., building name) identifying where you are? ☒ yes ☐ no

b] If no, are there directional signs or maps nearby which can help you identify where you are? N/A.
☐ yes ☐ no

c] Are there signs which show you where to get emergency assistance if needed? ☒ yes ☐ no (not visible to m some places).

d] Are there signs which direct you to wheelchair access? ☒ yes ☐ no

e] Do exit doors identify where they exit to? ☒ yes ☐ no

f] Is there information posted describing the hours the building is legitimately open?
☐ yes ☒ no

g] What is your impression of the overall signage?
☐ very poor ☒ poor ☐ satisfactory
☐ good ☐ very good

4. Sightlines [clear sightlines are important as they let you see, without interference, what lies ahead]

a] Can you clearly see what is up ahead?
☐ yes ☒ no

b] If no, the reasons may be:
Indoors: ☐ sharp corners ☐ walls
☐ pillars
☐ others_____

Outdoors: ☐ bushes ☐ fences
☐ hill
☒ others PYRAMIDS and concrete structures.

c] Are there places someone could be hiding?
☒ yes ☐ no

d] If yes, where? behind the pyramids and entrance concrete structures.

e] What would make it easier to see? e.g.:

☐ transparent materials like glass
☐ vehicles moved ☐ angled corners
☒ security mirrors ☐ trimmed bushes
☐ snow cleared

Other comments?
The pyramids are glass, but don't really help.

5. Isolation -- Eye Distance [this lets you assess how far away things are from the location and if someone would see you if you were in trouble]

a] At the time of your Audit, did the area feel isolated?
☒ yes ☐ no

b] How many people are likely to be around?

- *In the early morning:*
☐ none ☒ few ☐ several ☐ many
- *During the day:*
☐ none ☒ a few ☐ several ☐ many
- *In the evening:*
☐ none ☒ a few ☐ several ☐ many
- *Late at night (after 10 pm):*
☐ none ☐ a few ☐ several ☐ many

c] Is it easy to predict when people will be around?
☐ yes ☒ no

d] Is there a monitor or surveillance system?
☐ yes ☐ no ☒ don't know

e] Other comments?
Deserted place. People mostly walk through the space.

6. Isolation -- Ear Distance [lets you assess if you could be heard in an emergency]

a] How far away is the nearest person to hear a call for help? 15'-20'

b] How far away is the nearest emergency service such as an alarm, security personnel, crisis telephone? at the edge of the plaza. (not easily reachable). ☐ don't know

c] Can you see a telephone, or a sign directing you to emergency assistance? ☐ yes ☒ no

d] Is the area patrolled?
☐ yes ☐ no ☒ don't know

e] If yes, how frequently?
☐ every hour
☐ once per afternoon/evening
☒ don"t know
Other comments?
_____
_____
_____

7. Movement Predictors [a predictable or unchangeable route or path; this allows you to assess whether or not you can determine the way or direction people will move]

a] How easy is it to predict people's movements? (e.g. their routes)
☐ very easy ☐ somewhat obvious
☒ no way of knowing

b] Is there an alternative well-lit route or path available?

☒ yes ☐ no ☐ don't know

c] Is there an alternative frequently travelled route or path available?

☐ yes ☐ no ☒ don't know

d] Can you tell what is at the other end of the path, tunnel, or walk? ☐ yes ☒ no too broad a space and pyramids block views.

e] Are there corners, alcoves, or bushes where someone could hide and wait for you?

☒ yes ☐ no

f] Other comments?

PYRAMIDS block views.
Feels people vanish into the space.

8. Possible Entrapment Sites [lets you assess whether or not there are locations which are of special concern]

Indoors:

a] Are there empty rooms that should be locked? N/A.

☐ yes ☐ no

N/A

b] Are there small, well-defined areas? e.g.:

☐ stairwells
☐ recessed doorways or lockers
☐ unlocked closets
☐ elevators
☐ others:_____

Outdoors:

c] Are there small, confined areas where you would be hidden from view? e.g.:
- ☒ unlocked equipment or utility shed
- ☒ alley or lane
- ☒ recessed doorway
- ☐ construction site
- ☐ others: pyramids, concrete structures

9. Escape Routes [lets you assess whether or not there are ways to escape should there be an incident]

a] How easy would it be for an offender to disappear?
☒ very easy ☐ quite easy ☐ don't know

b] How difficult would it be for you to escape to safety if you had to?
☐ very difficult ☒ quite difficult ☐ don't know

10. Nearby Land Uses [lets you assess the impact of how the land is used as it relates to your comfort and safety]

a] What is the surrounding or nearby land used for?
- ☐ stores
- ☒ offices
- ☒ restaurants
- ☐ factories
- ☐ heavily treed/wooded area
- ☐ busy traffic
- ☒ parking lots
- ☐ river bank
- ☐ residential houses and streets
- ☐ don't know
- ☒ other: Academic buildings.

b] Can you identify who owns or maintains nearby land? ☐ yes ☒ no

c] What are your impressions of nearby land use?
☐ very poor ☐ poor ☒ satisfactory
☐ good ☐ very good

d] Is the land use in the area changing?
NO.

e] Does its new use make you feel more or less comfortable than its old use?
N/A.

f] What about the land use change makes you feel more or less comfortable?
N/A.

11. Factors That Make the Place More Human [these questions let you assess whether or not the location is used or abused by people]

a] Does the place feel cared for? ☒ yes ☐ no

b] Does the place feel abandoned? ☒ yes ☐ no

c] What gives you that feeling?
The plaza is empty, hence feels abandoned. But also is clean at the same time.

d] Is there graffiti on the walls?
☒ yes ☒ no

e] In your opinion, are there racist or sexist slogans/signs/images on the walls?
☐ yes ☒ no

f] Are there signs of vandalism? ☐ yes ☒ no

g] Would other materials, tones, textures or colours improve your sense of safety?
☒ yes ☐ no

h] Other comments?

12. Maintenance [these questions help you tell if the area is well looked after and well used by people]

a] What are your impressions of maintenance?
☐ very poor ☐ poor
☒ satisfactory ☐ good
☐ very good

b] Is there litter lying around? ☐ yes ☒ no

c] Is there need for major repair? ☐ yes ☒ no

d] Do you know to whom maintenance concerns should be reported? ☐ yes ☒ no

e] From your experience, how long do repairs generally take? N/A ☐ yes ☐ no

13. Overall Design [lets you express your overall feeling after you have looked at the site in detail]

a] Describe your impressions of the overall design:
☐ very poor ☒ poor
☐ satisactory ☐ good
☐ very good

b] If you weren't familiar with the place, would it be easy to find your way around?
☐ yes ☒ no

c] Is the entry visible and well defined?
☐ yes ☒ no

d] Are public areas visually protected?
☐ yes ☒ no

e] Does the place make sense? ☐ yes ☒ no

f] Is the place too spread out? ☒ yes ☐ no

g] Are there a confusing number of levels?
☐ yes ☒ no

h] Other comments?

_____

_____

14. Social Concerns [this lets you assess whether or not there are groups and organizations in place which add to your feelings of comfort and safety]

a] Are there cultural and social activities occurring in the neighbourhood?

❑ yes ❑ no

N/A

b] Describe how this makes you feel more or less

_____

_____

c] Are there organizations and groups in the neighbourhood which are concerned about the neighbourhood and its people?

❑ yes ❑ no

d] Describe how this makes you feel more or less comfortable:

_____

_____

_____

_____

e] Do you have friends or neighbours in the area you could count on in an emergency?

❑ yes ❑ no

f] Is the population of the area changing?

❑ yes ❑ no

g] Describe how more or less safe this makes you feel:

_____
_____
_____

h] Are there people with special needs in the area whose needs are not being met?

❑ yes ❑ no

N/A

i] Describe who they are:

_____
_____
_____

j] Are there institutions in the area which make you feel more or less comfortable?

❑ yes ❑ no

k] Describe how they make you feel more or less comfortable:

_____
_____
_____
_____
_____
_____
_____

APPENDIX B Safety audit checklist of Cowgill plaza

From the Crime Prevention Safety Audit questions that you just completed, identify what can be done to make you feel safer about this location

What improvements would you like to see?

More outdoor seating areas.
Shaded areas.

Do you have any specific recommendations?

More soften landscape elements.
Reduce the pyramids scale.

What skills or resources could you contribute to making these improvements?

Office of Research Compliance
Institutional Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24061
540/231-4991 Fax 540/231-0959
e-mail moored@vt.edu
www.irb.vt.edu

FWA00000572(expires 1/20/2010)
IRB # is IRB00000667

DATE: September 11, 2009

MEMORANDUM

TO: Patrick A. Miller
Sruthi Atmakur

Approval date: 9/11/2009
Continuing Review Due Date:8/27/2010
Expiration Date: 9/10/2010

FROM: David M. Moore

SUBJECT: **IRB Expedited Approval:** "Study of Public Spaces" , IRB # 09-745

This memo is regarding the above-mentioned protocol. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. As Chair of the Virginia Tech Institutional Review Board, I have granted approval to the study for a period of 12 months, effective September 11, 2009.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

Important:
If you are conducting **federally funded non-exempt research**, please send the applicable OSP/grant proposal to the IRB office, once available. OSP funds may not be released until the IRB has compared and found consistent the proposal and related IRB applicaton.

cc: File

VERBAL CONSENT SCRIPT

This research study is to understand how people use spaces and their preference of using public spaces. This study has three sections. The first section is an interview, where I will audio record our conversation. The second section is a questionnaire which has closed ended questions. The last section of the survey, seeks general demographic information like your age, sex, et al.

Your participation in this research survey is voluntary and your identity will remain anonymous. The survey will take no more than 15 minutes of your time.

This research has been reviewed and approved by the Institutional Review Board at Virginia Tech. If you have any questions, concerns, or complaints about this research project, please feel free to send an email to me at satmakur@vt.edu or Dr. Patrick Miller at pmiller@vt.edu. If you would like to speak someone other than the researchers, please contact the Institutional Review Board at Virginia Tech. The data will be strictly confidential and will not record your name. Also, your participation is completely voluntary. You are free to not answer any questions you may find objectionable, and may withdraw from my study at any time, just by letting me know you would not like to continue any further.

Are there any questions about my study that I can answer for you at this time?

Would you like to participate in my study?

APPENDIX E Interview protocol and Questionnaire

Welcome and Introduction:

Introduce thesis topic as “study of public spaces”. Provide overview of the conversation. Describe the questions as general questions about how one feels about spaces, and how the questions are related to preferences of people.

Structure of the interview:

The interview questionnaire has three sections. The first section is a conversation which will be recorded using a digital recorder. The second section focuses on social questions and is a survey with closed questions. The third section asks general information about the participants. The identity of the participants is anonymous and participation is voluntary.

Interview Questions:

SECTION 1:

1. Can you list three words that best describe the plaza?
    1.1. Why do you feel so?

2. What do you like most about the plaza?
    2.1. Why do you feel so?

3. What do you like least about the plaza?
    3.1. Why do you feel so?

4. Which of the following do you most associate with, with regard to safety in the plaza?
    a. Very safe
    b. Moderately safe
    c. Somewhat safe
    d. Slightly safe
    e. Not at all safe

    4.1. Why do you feel very safe/moderately safe/ somewhat safe/ slightly safe/ not at all safe?

        4.1.1. If the reply is not about a physical feature ask: what physical feature of this plaza makes you feel that way? And why?

5. If you could change any physical feature of the plaza, what would that be and why?
6. Looking at the plaza, can you locate a spot where you would feel the most comfortable?
    6.1. Explain why you feel that way.
    6.2. If the reason for preference is not related to safety, rephrase the question to: “Would you feel safe in the spot you indicated? And why?”

7. Looking at the plaza, can you locate a spot where you would feel the least comfortable?
    6.1. Explain why you feel that way.
    6.2. If the reason for preference is not related to safety, rephrase the question to: “Would you feel unsafe in the spot you indicated? And why?”

SECTION 2:

Please circle all that apply:

How would you use the space?	**How often?**	**And what times of the day?**
Sitting	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)
Leisure/Relaxing	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)
Eating	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)
Reading	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)

Listening to music	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)
As a place to meet another person/group of people	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)
Having group meetings	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)
Having private conversations	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)
Passing through	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)

Use as a space to attend private phone calls	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)
Other? _____ _____	Everyday Two or three times a week Once a week Once a month Barely use the place Never	Early morning (6 a.m. to 9 a.m.) Late morning (9 a.m. to 11 a.m.) Noon (12 p.m. to 2 p.m.) Late afternoon (2 p.m. to 5 p.m.) Evening (5 p.m. to 8 p.m.) Night (8 p.m. to 11 p.m.)

SECTION 3: (General demographic information)

Age:

Sex: M / F

Living: ___ On campus ___ Off campus

Purpose: ___ Undergraduate ___Graduate ___ Faculty ___ Visitor ___ Employee