DEVELOPMENT OF ACTIVITY SPACE AND SPATIAL KNOWLEDGE AMONG FIRST-YEAR COLLEGE STUDENTS

A Thesis

by

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This thesis explores the development of activity space and spatial knowledge among first-year college students through the use of sketch maps. Sketch maps were drawn of Chico by first-year students during the first, fifth, and fifteenth week of the Fall 2007 semester at California State University. The students' sketch maps were analyzed over time to determine the rate of their spatial knowledge acquisition, and to examine how various activities create opportunities to explore and develop students' subjective sense of place. The contents of the sketch maps were compared to the classic work in sketch map methodology and the map elements of paths, edges, districts, nodes, and landmarks. Similar to the results of other researchers, paths and landmarks are the most frequently used map elements. The further categorization of landmarks (visually
and functionally prominent, functionally important, and personally functional) were found to be neither applicable nor appropriate for this study group. It was determined that the manner in which elements were used did not change over time as earlier work found, but did coincide with one researcher's findings of stable map element usage. The map elements were also analyzed for the number of landmarks included, types of landmarks, number of labeled roads, and a comparison between roads included and traffic volumes. Further spatial analysis was performed by creating secondary digital versions of the students’ sketch maps in GIS, thereby, enabling the comparison of activity space for all participating students and illustrating the most commonly included activity spaces. In general, the growth trend of student activity space and spatial literacy can be summarized as limited to a pedestrian scale and focused on food and shopping. The students’ sense of place regarding Chico is positive, but limited in scale. University retention programs might respond to this by providing or promoting off-campus activities that still occur within Chico. It is possible that building a first-year student’s knowledge of what Chico has to offer may help them further develop a greater sense of place and potentially leading to a higher retention rate.
CHAPTER I

INTRODUCTION

Every year, people leave home to attend their first year of college. For many young adults, this is a rite of passage as they venture out of their parents' homes and experience life as first-year college students. Often, the start of a college career involves a new town, far from home, where a student will embark on not only a journey of new life experiences but one of spatial learning in a new environment. During the process of collecting spatial information about their new town, students will build mental maps of once unfamiliar territory, but their mental maps are not those of cartographers. Their maps are schematic, sketchy, incomplete, distorted, and otherwise simplified and idiosyncratic; each map is an individual product of experience (Kaplan 1973, 63).

The term “mental map” refers to the “map in the head” or the spatial information stored in one’s memory for recall during navigation, giving directions, or imagining a place previously visited. The mental map of a single location will vary from person to person as it is subjective. Personal experiences build mental maps and create a unique sense of place for individuals.

Sense of place is a feeling or perception held by someone regarding a location (Johnston et al. 2000). A person can illustrate his or her mental map and, to a certain extent, their sense of place through the process of drawing sketch maps. A sketch map is a personal rendering of spatial knowledge of a particular location or place on paper. For
In this study, the term mental map will be used to describe spatial knowledge that exists in the brain and sketch maps will be used to describe the information when it is drawn on paper.

A sketch map is a good tool to use when examining a mental map. It does not, however, represent the mental map in its entirety nor is it an exact replica of the mental map stored in a person’s brain. There are items that the sketch map creator may not include because they simply forgot, do not know how to place it in relation to other items on the map, choose to omit it or simply cannot draw. The drawing abilities of a person may strongly affect the product of a sketch map. In some instances, a person may actually have topographical amnesia. They can identify a landmark, but can not place it in relation to other landmarks and, therefore, are unable to draw a map (De Renzi, Faglioni, and Previdi 1977). Furthermore, a person’s mental map may be altered from its organic state as a result of the request to produce a sketch map. If a person is aware they will be required to draw a mental map at a later time, they may consciously, or unconsciously, store geographical data at a different rate or in a different manner. The process, therefore, of sketching the map may lead to changes in the mental map that would otherwise not occur.

Mental mapping of a new area can be a difficult task and the process is different for each individual. One is faced with connecting locations first to a “home” or starting location and eventually, through exploration and experience, filling in what lies between the new locations and home. While the process of structuring a mental map and then producing a representative sketch map is an individualized process, researchers have determined that there are generic features or elements that can be used to measure the
process and structure of mental mapping. Lynch’s *The Image of the City* (1960) first described sketch map elements as including paths, edges, districts, nodes, and landmarks. Subsequent research on mental maps has generally referenced the above “Lynchian” elements. Some researchers, however, dispute the categories and refine them to include only paths, landmarks, and districts (Seigel and White 1975; Norberg-Schulz 1971; Thorndyke and Goldin 1983; MacEachren 1991) or further define landmarks into sub-categories dependent on functionality (Devlin 1978).

Using a sketch map methodology, researchers can explore students' spatial growth, activity space and sense of place development. An understanding of these could possibly aid university orientation and retention programs to help students learn and adjust to their new homes successfully. Students’ activity space, which is the geographical space in which they carry out daily activities, will increase as they explore their new community. What is not known are the types of activities students participate in and how these activities affect their mental maps and sense of place.

**Problem Statement and Objective**

The process of building a mental map can be well illustrated by first year students attending a university in a community other than their hometown. By the first day of classes, students generally know the location of their dorm, the dining hall, the bookstore, and, hopefully, have succeeded in finding their classrooms. Necessity and daily activity have required the exploration of these locations; however, these locations consist only of the students’ immediate surroundings on campus.
This study examines the development of first year college students’ cognitive maps with regards to the types of elements that dominate the map, while chronicling the development of structure and detail that occurs over time. The object is to examine the development of spatial literacy of first year students by asking them to create sketch maps of their new surrounding throughout their first semester at California State University, Chico (CSUC). An assessment of first year students’ sketch maps can illuminate spatial patterns, sense of place, the types of activities students participate in, and the degree to which these activities influence their exploration and spatial literacy development.

Study Location

California State University, Chico, is located in the City of Chico. The City is at the base of the Sierra Nevada foothills, in the north Sacramento Valley (see Figure 1).

Chico has a population of 84,396 residents in an area of 30.78 square miles. The total population of the “Chico Urban Area” which includes the immediately surrounding areas is 105,080 (The California State University 2007). The closest city with a comparable population is Redding (population 90,033), which is located 71 miles to the north, and has only a community college and small private college. Accordingly, Chico is somewhat isolated, and serves as a regional center for neighboring towns and communities. The surrounding communities are supported by agricultural and ranching activities and are not highly urbanized. There is little or no public transportation available between communities and the wide range of activities available in Chico decreases the likelihood that students will spend much time in the surrounding areas during their first
semester. Chico’s relatively isolated location makes it a prime location for studying the development of spatial knowledge in a relatively confined environment.

The town has a well-developed street grid, with the CSUC campus located near the center (see Figure 2). North of campus, streets running from southeast to northwest are called avenues and numbered as First Avenue through Eleventh Avenue.
South of campus, streets running from southeast to northwest are called streets and numbered as First Street through 20th Street. This is often a source of confusion when providing directions to first time visitors of Chico. If someone asks how to get to “First,” it must be clarified if the person is looking for First Avenue (north of campus) or First Street (south of campus). Only one southeast to northwest road, Warner Street/Ivy Street, actually continues through campus. Big Chico Creek, which runs through the middle of campus, is the specific point at which the road name changes. North of Big Chico Creek,
the roadway is known as Warner Street, whereas south of Big Chico Creek, the roadway is known as Ivy Street (see Figure 2).

To add to the confusion in navigation, several streets in Chico possess more than one name. Highway 32, which runs through the western portion of Chico and then turns eastward and runs through the southern part of downtown, has many names (see Figure 2). It enters Chico from the northwest as Highway 32. As it enters the city limits, it becomes Nord Avenue. Nord Avenue serves as a major arterial road on the west side of Chico. Nord Avenue becomes Walnut Avenue once it crosses Big Chico Creek and First Avenue, which extends from downtown. Walnut Avenue continues south out of town, but if you turn left onto Ninth Street (a one-way street, with Eighth Street serving the alternate direction) you can continue east and drive into the Sierra Nevada foothills, where the road’s name returns to Highway 32.

On the east side of campus the main southeast to northwest road goes by several names, and in the downtown area splits into two separate one-way roads that join back together south of downtown (see Figure 2). This roadway is known as the Esplanade to the north of Big Chico Creek. After crossing the creek, the roadway splits into Main Street (one-way going northwest) and Broadway Street (one-way going southeast). Main Street and Broadway Street rejoin after crossing 9th Street and Little Chico Creek south of the central downtown area and is then called Park Avenue. While these roads are one continuous travel corridor, the road segments are separately named. This too can be a point of confusion for those new to navigating in Chico. In general, the street naming conventions are a major source of confusion for a new resident of Chico.
As previously mentioned, the CSUC campus is located at the center of Chico. Downtown Chico, a thriving business location and social hot spot, is located directly adjacent to the southeast of campus (see Figure 3). CSU Chico’s student population is around 17,000 and ranks 13th out of 23 in student population in the California State University System (The California State University 2009).

Figure 3. General map of Chico, California.
With the downtown area directly adjoining the campus, plenty of eating, shopping and other services are easily accessible to students who live on campus. As such, Chico and CSUC provide an excellent real life situation in which students are exploring new surroundings and gaining spatial literacy on a daily basis in a relatively controlled (i.e., isolated) environment.

Plan of Development

The following outlines the general plan of development in this thesis. This chapter described the project and introduced the problem statement and objective. It also details the location of the study (Chico, California). Chapter II combines a review of literature related to cognitive and mental mapping. It discusses previous uses of sketch maps in geography and other disciplines. Chapter III describes the research methods. It provides detail and data on the population sample and the data collection techniques utilized. Chapter IV contains data analysis and results. These include a summary of the demographic and activity questionnaire data. Sketch map elements were analyzed in several ways, including number of landmarks, types of landmarks, number of labeled roads, and a comparison between roads included and traffic volumes. Additionally, a density analysis is implemented utilizing Global Information Systems (GIS) to indicate the most commonly sketched areas. Lastly, Chapter V provides a summary discussion of conclusions and comments regarding the development of the sketch maps, the use of elements, and the student’s overall activity space.
Summary

This thesis explores the spatial development of first-year students at California State University, Chico, through the examination of sketch maps produced by the students. It illuminates how student activity space is created and increases the understanding of students’ sense of place. It is possible that sense of place can increase students’ feeling of belonging to their new community, reducing their feelings of separation from home and increasing the likelihood of positive college experiences and higher retention and graduation rates.
CHAPTER II

LITERATURE REVIEW

Introduction

In this chapter, an examination of the literature related to the use of mental maps is discussed. Mental maps are studied in a variety of disciplines including geography, psychology, linguistics, computer science, cognitive science, philosophy, information science, planning, and engineering (Freundschuh and Kitchin 1999). Within these areas, the subdisciplines of behavioral geography and environmental psychology are the most relevant to this study, and research from these areas will be discussed below.

Behavioral Geography and Environmental Psychology

The roots of behavioral geography and environmental psychology can be traced back to three articles written in the 1940s by the economist and sociologist Walter Firey (1945), the geographer J. K. Wright (1947), and the psychologist Edward C. Tolman (1948). These authors’ disciplines emphasize the multi-disciplinary nature of this research. According to Moore and Golledge (1976), these articles identified the concept that human behavior in large-scale environments is in direct relation to internal, subjective factors rather than objective factors and that the personal image of the environment mediates behavior.
The fields of behavioral geography and environmental psychology developed simultaneously but independently in the 1960s in response to trends in their respective fields (Gold and Goodey 1983). Behavioral geographers responded to the rise of positivism and the development of quantitative research models in the larger field of geography (Pocock 1976), while environmental psychology attempted to extend traditional psychology research of behavioral process to real-world settings (Kitchin 1996).

Lynch’s (1960) *The Image of the City* is a commonly cited work in behavioral geography (perhaps even a classic) in relation to how humans view the geography surrounding them. Lynch used sketch maps (as mentioned earlier, spatial information that has been drawn on paper by a subject) to collect the urban perceptions of residents in three American cities. The sketch maps provided a model of how individuals store geographical information in their mind, also known as a cognitive map or mental map. Lynch used the sketch maps to further analyze the “imageability” or place legibility of a city, which is, essentially, the ease with which people understand the layout of a place.

The term “Environmental Psychology” was first documented in a paper delivered by psychologist William H. Ittelson at a hospital planning meeting in 1964 (Bell and Sundstrom 1997). Ittelson and his associates were asked to create an environment that would positively affect the mental health of hospital patients. The realization that psychologists had neglected the influence of environment on human behavior led to the development of a new area of research that explored the theoretical concepts of human environment interactions (Spencer and Blades 1986). The new sub-discipline, environmental psychology, attempted to extend traditional psychological
research of behavioral processes to real-world settings (Kitchin 1996). While a schema (or guiding base of theories and linked hypotheses) for environmental behavior was developing in geography (Kirk 1963; Downs 1970; Pocock 1976; Lloyd 1976; Pacione 1978), psychologists were trying to establish environmental psychology as its own sub-discipline and the sharing of ideas and research with geography was limited (Neisser 1976).

Similarities and Differences Between Behavioral Geography and Environmental Psychology

Research on the areas of environmental cognition, environmental assessment, and environmental behavior can be found in both behavioral geography and environmental psychology. According to Kitchin (1996), the philosophical underpinnings of both disciplines were compatible and many ideas and techniques overlapped, but joint research was uncommon. Strong similarities between behavioral geography (and its sub-discipline, environmental perception) and environmental psychology exist due to their common history, focus of study, and techniques for collecting and analyzing data (Johnston et al 2000; Kitchin, Blades, and Golledge 1997). Both disciplines explore the environment as defined, ordered, and perceived through human interactions. The few authors that worked together across the disciplines include Downs and Stea (1974), Moore and Golledge (1976), and Golledge and Rayner (1982), but they more often than not wrote separately, rather than collaboratively.

The most notable difference between the two disciplines was the difference in scale. Environmental psychology focused on the processes of understanding the
surrounding environment at the individual level (Spencer and Blades 1986), while the majority of studies in behavioral geography focused more on actual space and the relationships between spaces from the neighborhood to city level as seen by groups of people (Kitchin 1996; Johnston et al. 2000). There were, however, studies in environmental perception within behavioral geography that focused on the individual (Del Casino 2009)

Another notable difference was that of the focus of each discipline. Environmental psychology asked the how, whereas behavioral geography asked the what, where and why and examined the reasons for the resulting patterns in the real world (Kitchin 1996). Spencer and Blades (1986) noted that geographers ignored the learning dimension of environmental knowing, while psychologists considered only the factors involved in the formation of the cognitive map internally.

Multiple Terms for a Similar Subject

The fields of environmental perception in behavioral geography and environmental psychology share the concepts of cognitive and mental mapping. Mental maps, or cognitive maps, are noted as one of the principal concepts discussed in behavioral geography (Johnston et al. 2000). Geography’s mental maps also coincide with psychology’s cognitive studies, which focus more on the storage of spatial data rather than extracting it in sketch map form. Unfortunately, a divide between the disciplines is often expanded due to the inconsistent use of terms and the definitions of those terms in regards to mental maps. Kitchin (1996) provides the following terms used in geography and psychology as an example of such: abstract maps, cognitive
configurations, cognitive images, cognitive representations, cognitive schemata, cognitive space, cognitive systems, conceptual representation, environmental images, mental images, mental maps, mental representations, orienting schemata, spatial schemata, topological representations, topological schemata, and world graphs. The differences and problems with the numerous multi-disciplinary terms has been discussed in length by Kitchin (1996), Gold and Goodey (1983) and Downs (1981). As an example, Beck and Wood (1976) define mental maps as “sketch products created by experimental subjects. They are personal views of the geographic structure of the world expressed in map form: and ‘map’ is taken in the concrete sense of the conventional map, so that the products resemble maps” (57).

Alternatively, Son (2005) uses the definition by Pocock and Hudson (1978) that describes a mental map as an individual’s knowledge of what is where in the environment.

Regardless of the actual term used, both disciplines use similar methods to explore similar ideas. As indicated by Kitchin (1996, 57),

Cognitive mapping researchers, by using controlled experiments, aim to understand an individual’s cognitive map knowledge. For example, geographers traditionally try to discover the constituent components of an individual’s cognitive map knowledge, the amount of information known and the factors that affect how an environment, or a representation of an environment (e.g., a map), is learnt and remembered. Psychologists traditionally study the processes used in thinking about geographical or spatial tasks, how knowledge is stored (structure) and the form of that storage (e.g., images or words).

Cognitive Maps

The concept of cognitive or mental maps began with the psychologist Tolman (1948) who conducted a study concluding rats, and therefore presumably humans, were
able to draw on previous environmental experience when navigating. In his study, Tolman introduced the term “cognitive map” (Tolman 1948), which is often and simply described as the map in the head.

Research about cognitive maps did not expand into geography until Kevin Lynch’s *The Image of the City* (1960) that examined the components and public perception of Boston, Jersey City, and Los Angeles through the use of what he called “sketch maps,” in which study participants would draw their mental maps on paper. In this study, Lynch created a linguistic framework for describing cities, or rather the development of sketch maps of cities.

Lynch’s linguistic framework identified paths, edges, districts, nodes, and landmarks as the elements that make up a person’s mental map. Paths consist of roads, trails, and sidewalks, along which a person may travel. Edges consist of other lines not included as a path of travel, such as those that define the edge of a district. Districts are areas of a city that contain a unifying theme. Nodes, or points, are identified where many paths cross, such as an intersection. Finally, landmarks are urban features that are used as reference points or as an aid in wayfinding (Lynch 1960.) Much of the subsequent cognitive map research employing sketch maps utilizes or builds upon Lynch’s basic map elements.

During the 1960s through the early 1980s, research on cognitive mapping was at its height. During this time, researchers within various disciplines explored the use of various methods and techniques of exploring the cognitive map (Huynh and Doherty 2006). In response to Lynch’s early work, researchers explored how cognitive maps were structured. For example, Appleyard (1970) developed a classification of map styles
elicited from the mental maps of a town in eastern Venezuela. Using the classification of
map styles outlined by Appleyard (1970), Pocock (1976) explored the relationship
between cognitive map complexity and gender, class, and familiarity with the region
mapped. In response to both Appleyard and Pocock, Spencer and Weetman (1981)
analyzed cognitive maps for map style and degree of organization.

Concurrently, Beck and Wood (1976) described the process of taking in
information, storing it and then mapping it; all an attempt to build an information
processing model or theoretical construct. Psychologists also explored the presumed
structure of the cognitive map as it exists in memory (Kuipers 1983). The inherent
distortions and misconceptions found in mental maps were also examined by Raitz and

Criticism of mental map studies arose in the 1980s. In response, Downs
(1981) discussed what is meant by the term “map” in cognitive or mental map and
Waterman and Gordon (1984) developed a quantitative procedure for analyzing and
comparing distortion in mental maps as a way to bolster analysis methods.

Research on cognitive mapping slowed during the 1980s, but experienced a
revival in the 1990s as methodologies using technological advances were explored
(Huynh and Doherty 2006). During this time, Lloyd and Heivly (1987) examined
distortions in urban cognitive maps, determining that systematic distortions in cognitive
maps are common as features are often rotated to cardinal directions to simplify
information. Lloyd (1989) went on to examine the encoding and decoding of cognitive
information. Kitchen and Fotheringham (1997) studied analysis methods of cognitive
maps, specifically the type of data aggregation in large study groups. Golledge (1999)

Over time, cognitive mapping research in behavioral geography drew criticism because the underlying theories (or schemata) were regarded as overly simplistic and lacked testable hypotheses (Kitchen 1996). Golledge and Timmermans (1990) indicated that interest in behavioral research was reduced as researchers moved on to social geography. However, research about cognitive mapping appeared regularly in journals, and one of the most active areas of research in environmental perception and behavioral geography continues to be spatial knowledge acquisition and cognitive maps (Gaile and Wilmont 2003). According to Huynh and Doherty (2006), the 1990s brought about a shift from experimenting with various cognitive mapping theories to creating innovative methodologies to collect cognitive mapping data sets and analyze the resulting information to determine how people view their environment. In concert with the increasing use of computers, new methods of examining the content and growth of cognitive maps were explored and included the use of computer software systems including GIS (Cinderby 1999).

**Sketch Maps**

Sketches of mental maps have been used in a multitude of ways to derive many types of spatial knowledge, information, and perceptions. The use of sketch maps in the exploration of cognitive maps was popular in early research but has been
overshadowed more recently by the use of technology for collecting information on
cognitive maps (Huynh and Doherty 2006).

Pioneering work using sketch maps (following that of Lynch’s) focused on
orientation, wayfinding, and the active mental process of learning about places (Downs
and Stea 1974, 1977). Sketch maps have also been used in environmental planning and
design to help create spaces with enhanced usability (as found in Guy, Curtis, and Crotts
1990).

Several studies have examined the types of sketch maps (Appleyard 1970;
Pocock 1976), in which it was determined that the type of sketch map drawn often
depended on the structure of the area being drawn. In other words, an urban area with a
well defined street grid would be defined as path dominated, and focus on streets, where
an area with a less defined network of streets would be defined as spatially dominated,
focusing on districts. Other research on the structure of sketch maps indicated that the
individual style of the map drawer influences whether a map is path or spatially
dominated (Spencer and Weetman 1981). Overall, paths, landmarks, and districts tend to
be the dominate sketch map features in most studies.

Other studies using sketch maps have looked at residential preferences (Gould
and White 1986), perception of regions (Raitz and Ulack 1981), ability to retain route
descriptions (Schneider and Taylor 1999), and urban geography (Beck and Wood 1976).
Gender differences in spatial knowledge have also been examined (Kitchin 1994; Young
1999); however, only minor gender differences have been found to exist. Sketch maps
have also been implemented in studies to examine the environmental perception and
spatial knowledge acquisition of tourists (Guy, Curtis, and Crotts 1990; Young 1999; Son
2005; Walmsley and Jenkins 1992) and the construction of mental maps by residents in a new town (Devlin 1978). Saarinen (1988) examined how world sketch maps reflect world images and further examined effects of drawing skills or map knowledge on world sketch maps (Saarinen and MacCabe 1995).

More recent research has incorporated the use of computerized mapping (Huynh and Doherty 2006). Some researchers digitized hand drawn maps (Cinderby 1999) while others had participants sketch their cognitive maps using computer software. One study had participants draw their mental maps on a tablet PC while also collecting video of participants’ process of mapping, thereby providing additional qualitative data about the mapping process. By collecting the map information digitally, researchers were also able to analyze the sequence in which map elements were drawn (Huynh and Doherty 2006).

Mental Mapping of Unfamiliar Space

Spencer and Weetman (1981), Appleyard (1970), Devlin (1978), and Herman, Kail, and Siegel (1979) all researched the mental map development of new residents in an urban area. Devlin (1978) collected sketch maps from military wives in a town where they were to live for six months. Devlin’s study examined the speed with which cognitive maps form, the types of elements that dominate the map, and the development of map detail that occurs in the study period. Results indicated that the items appearing on the maps most frequently were functionally prominent landmarks (in that the respondents went to the locations for a reason) and perceptually prominent landmarks (in that they visually dominated the landscape). It can be argued, however, that the military wives are
still a transitory group who may not develop mental maps similar to those who are to reside in a location for longer. A study comparing the mental maps of short-term versus long-term residents has yet to be performed.

Summary

Mental maps are studied in a variety of disciplines, but the sub-disciplines of behavioral geography and environmental psychology are the most relevant to this study and research. Behavioral geography and environmental psychology have strong similarities relating to the study of human-environment interaction due to their common history, focus of study, and techniques for collecting and analyzing data. Differences between the disciplines include the scale of analysis (individual versus group) and focal point (how versus what, where and why). A common method used in both disciplines is sketch mapping. Sketch mapping has been used in a variety of ways and, of the diverse literature examined, information on tourists’ and residents’ sketch maps are most relevant to this research. Accordingly, in response to Devlin’s research on mental map development in short-term residents, an examination of the mental maps of long-term residents was conducted on first-year university students who are expected to live in their new city for at least four years.
CHAPTER III

DATA COLLECTION

Introduction

This chapter contains a discourse on the data collection methods used in this research. These methods included questionnaires, sketch maps, a focus group, and a collective sketch-map exercise. In this chapter, the criteria and method for recruiting and selecting participants for the sample group are explained and the three data collection sessions are described. Also in this chapter is a discussion of each of the data collection methods employed and an explanation of the collective focus group session.

Sample Group

Participation Criteria

The participants for this study were first year college students attending CSU Chico. In an attempt to reduce variations in existing and future potential spatial knowledge, participants were carefully selected by limiting participants to students who lived in Whitney Hall (so they all had a central location from which spatial learning occurred), had minimal previous experience in Chico and did not have friends or relatives living in Chico. These restrictions were set in place so that the participants would all start with approximately the same baseline of spatial knowledge. Restricting the participants to those who lived in Whitney Hall ensured that they were all learning about Chico from a
geographically similar starting point. Whitney Hall was chosen from other residence halls on campus because of its large student population and its central location on campus. Only those students who had little or no experience within Chico beyond that of selecting the college for attendance, attending the optional Summer Orientation and starting their fall semesters were included because it was important to the study that participants had minimal exposure to Chico. The study’s participants needed to have a relatively blank slate in regards to spatial exposure to reduce the variations in existing spatial knowledge. Lastly, it was important that participants had no friends or relatives living in Chico who might assist them or influence their spatial learning by showing them around town, providing directions, or mentioning locations to visit. In summary, students who were invited to participate met the following required criteria:

- 18 years or older (for legal purposes).
- Whitney Hall resident.
- No visits to Chico prior to attending CSUC, excluding Summer Orientation or other activities related to selection CSUC for college (e.g., entrance testing or campus tours).
- No friends or relatives in the area who might influence spatial learning.

**Participant Collection Method**

In order to collect a sample group of participants, I approached students during dinner hours in the dining room of Whitney Hall from August 22 through August 24, 2007, the week prior to the start of the Fall 2007 semester. During that time, interested students were given a brief explanation regarding the research and told they would be provided with incentives (i.e., food) to participate. Willing participants who met
the research criteria signed informed consent forms (see Appendix A) and were given a flyer listing the days and times of the data collection sessions during which the study would occur. A total of 72 informed consent forms were collected from prospective participants.

The 72 students were emailed twice prior to the first data collection session to remind them to attend. In an effort to increase participation, the emails also explained that they were welcome to bring anyone who met the participation criterion. Nine students attended the first data collection session, and ultimately, seven students completed the entire data collection session series.

Data Collection Sessions

Data for this study were collected during three separate data collection sessions, in which students were asked to fill out questionnaires and draw sketch maps. The three data collection sessions were held during the first, fifth, and fifteenth weeks of the Fall 2007 semester; herein referred to as session one (week one), session two (week five), and session three (week fifteen). The intervals of sessions were chosen based on other studies that demonstrated significant spatial learning takes place during the first few days in an environment, and spatial learning continues, albeit at a slower pace, as time continues (Devlin, 1978; Guy, Curtis, and Crotts 1990). In addition, a focus study session was held during the last (sixteenth) week of the semester, during which students were asked a series of questions and asked to draw a sketch map collectively.

The first data collection session (session one), was held during the first week of the semester on Thursday, August 30, 2007, in a classroom on campus near Whitney
Hall. Of the 72 students who were invited to attend during recruitment at Whitney Hall, nine students attended, three of whom were notified of the session by friends and, therefore, needed to sign a release form. The second data collection session (session two), was held during the fifth week of the semester at which eight of the nine students returned to participate in the study. At the third data collection session (session three), held during the fifteenth week of the semester, seven students returned. During session three, attending students were invited to participate in a follow up focus group session the following week (week sixteen of the semester). Of the seven students in attendance at the third data collection section, five returned to participate in the focus group and one student, who could not attend, emailed his responses to the focus group questions.

During session one the students were given a demographic survey (see Appendix B), an activity survey (see Appendix C), and a blank piece of letter-sized paper. After the students completed both surveys, I read them the instructions for drawing their mental maps on the blank piece of paper (Appendix D).

The same process of answering a questionnaire and drawing a mental map was repeated during session two and session three. Students were not required to fill out the demographic survey again, as those questions would not change over the course of the study period.

In total, a complete set of data consisting of demographic information, activity information, and three sketch maps, was obtained for seven students. Information and maps from students who did not attend all data collection sessions were considered incomplete and removed from the sample.
The small sample size of seven precludes the ability to use inferential statistics and conduct quantitative analyses. The small sample size, however, made qualitatively analyzing the mental maps an achievable task by a single researcher. It allowed for detailed examination and insight that might otherwise be missed in a quantitative analysis.

Research Methods

As previously mentioned, the research methods used included questionnaires, sketch maps, a focus group, and a group sketch-map exercise. Each data collection method is discussed below.

Questionnaires

Two separate questionnaires were administered to collect information from the participants during the three data collection sessions: a demographic questionnaire and an activity questionnaire. The questionnaires were used to collect basic information about the participants and to collect spatial information in a non-spatially oriented manner (i.e., lists of locations instead of asking for the same locations to be drawn on a sketch map). The questionnaires collected additional spatial information that may not have been readily extracted from the sketch maps, or general information that provided background on the student. For example, a student may have frequented a location, but not drawn it on a sketch map due to simple omission, or an inability to place it on the map correctly.

The demographic questionnaire collected personal data (see Appendix B) and was administered during the session one only. The demographic questionnaire consisted
of information pertaining to items that would not change throughout the students’ first semester, for example, the name of their hometowns, favorite recreational activities, and the dates they moved to Chico (see Appendix E). The purpose of the demographic questionnaire was to collect basic information about the participants that could help in understanding and comparing the participants involved in the study and their sketch maps. For instance, if a student is from a very small town, it may explain why that student had a hard time navigating in a medium sized city, such as Chico.

The second questionnaire (see Appendix C), or activity questionnaire, consisted of questions that might change for the students throughout the semester and was administered at each of the three data collection sessions. The activity questionnaire was used to collect spatial information in a non-spatially oriented manner (i.e., lists of locations instead of asking for the same locations to be drawn on a sketch map). The activity questionnaire also asked about the students' general involvement in activities, types of transportation used, time spent outside of their dorm room, and other questions that related to their sense of place. Questions were asked about the students’ activities outside of the classroom and off-campus. The information helped to track any major changes that might affect mobility or exposure to areas off-campus. Additionally, the activity questionnaire allowed participants to provide spatial information in a written format. For example, they were asked to list their five most frequently visited places off-campus (see Appendix F). This information was intended to provide additional spatial data that, for whatever reason, might not be included in their sketch maps or could not be directly inferred from their sketch maps.
Sketch Maps

Sketch maps were used to monitor participant's change in spatial knowledge over their first fifteen weeks in Chico. After filling out the questionnaires as described previously, the participants were individually asked to complete the sketch map component during all three data collection sessions. The sketch map component consisted of a blank sheet of standard, letter-size paper and verbally provided instructions (see Appendix D). No time limit was given for the completion of the maps. Students generally took five to ten minutes to complete the task. The participants were asked not to draw the campus but instead focus on the City of Chico. They were, however, allowed to use the campus as a reference or starting point. Participants, therefore, spent more time thinking about, and drawing, areas that they had experienced off campus. The purpose of the sketch map exercises was to have the participants draw their spatial perception of Chico during that week of the semester. This allowed the monitoring and evaluation of the participants’ spatial knowledge as it developed over time. Analysis of these sketches provided information about first year students’ perceptions of Chico, and what off-campus activities they participated in, as well as how their sense of place developed.

Focus Group

During session three (week fifteen), participants were invited to attend a focus group session the following week (week sixteen). Five participants returned to participate in the focus group. The participants were verbally asked prepared questions (see Appendix G) that were based on initial review of their questionnaire and sketch maps results from the previous three data collection sessions. Students were allowed to interact and discuss their answers. The students’ responses and conversations were recorded and
notes were taken. One participant who was unable to attend the focus group emailed his answers to the focus group questions.

**Group Sketch Map**

The focus group participants were also asked to create a sketch map together. A 36- by 48-inch piece of white paper was provided and the five attending respondents took approximately fifteen minutes to draw their collective version of Chico. During this time, I observed the students’ drawing process, took notes, and recorded their conversations. Observing this process provided insight into whether or not a group of students could connect to each other’s spatial information to create a larger or more detailed sketch map. This process may simulate how a group of students might collectively navigate while off-campus. The collective sketch map, like the individual sketch maps, shows the students’ spatial knowledge. Because it is completed collectively, however, it provides a view of all their mental maps combined and a sense of how collective recall may prove more than the sum of the individuals' recall.

**Summary**

Students who participated in this study were carefully selected in an attempt to minimize existing spatial knowledge of Chico, thereby, initially providing relatively blank mental maps. Information from the participating students was collected during three separate data collection sessions and a final focus group session. During those sessions, students were asked to fill out questionnaires and create sketch maps. In the final focus group session, students collectively answered verbal questions and prepared a group sketch map. The goals of these methods were to monitor and evaluate the student’s
developing spatial knowledge and activity space. Data from these methods were compiled and analyzed. The results are discussed in the following chapter.
CHAPTER IV

ANALYSIS AND RESULTS

Introduction

In this chapter, the analysis procedures and resulting information regarding the questionnaires, sketch maps and focus group are discussed. First, the basic demographics of the population sample are reviewed. Second, the information from the activity questionnaires is summarized. Third, the sketch map analysis procedure is described and resulting information is discussed. Lastly, information gathered from the focus group session is considered in relation to the individual maps.

The students’ maps were examined for the elements found in Lynch’s (1960) work and further examined by Devlin (1978). It was determined that the manner in which elements were used did not change over time as Lynch found, but instead coincided with Devlin’s findings of stable map element usage. It was further revealed that Devlin’s (1978) further categorization of Lynch’s landmarks was neither applicable nor appropriate for this study group. It was also noted that the long-term residents obtained spatial knowledge at a similar rate as the short-term residents of Devlin’s study.
Questionnaires

Seven participants completed all three individual data collection sessions and six participated in the focus group session. In the following section, pertinent information from the demographic and activity questionnaires is summarized.

Demographic Questionnaire

The demographic questionnaire was given during session one. The demographic questionnaire consisted of information pertaining to items that would not change throughout a student’s first semester. The following is a summary of information gathered from the demographic questionnaire. A complete compilation of information gathered by the demographic questionnaire can be found in Appendix E.

Of the seven students who completed all three data collection sessions, two were male and five were female, all were 18 years of age. As required by the participant criteria, they all moved to Chico between August 21 and August 23, 2007, lived in Whitney Hall, and had not lived in Chico previously. Prior visits to Chico numbered on average 2.35 times, most of which were for the Summer Orientation program or other college related activities, e.g., entrance testing or campus tours prior to admission. One student had attended a basketball tournament in Chico prior to living there, but it was not disclosed if it was in association with the university or a high school activity.

All students were living independently from their parents for the first time as well as attending college for the first time. The average units of enrollment were 14.28, effectively full-time students.

Of the seven students, six were from Sacramento or a surrounding area. The seventh student was from San Diego. Most students described their hometown as medium
to large; however, questions about the exact population of their hometowns showed that
the students did not know the population of their hometowns. One student remarked that
there are 70 million people living in Sacramento, which is almost double the amount of
people residing in the entire state of California!

Students were asked how often they thought they would leave Chico during
their first semester. Answers to this question ranged from once to ten times with an
average of four times. Interestingly, all students indicated that trips outside of Chico
would solely be to their respective hometowns for holidays or to visit family and friends.

In addition to general demographic information, this questionnaire also asked
about their favorite activities. The information provided by the participants indicated that
they were an athletic group; only one student did not mention a sporting activity. Three
students mentioned outdoor activities, such as Ultimate Frisbee, hiking, and whitewater
rafting. One student responded to the favorite activities question with, “Anything
outside.” This proved counter to what their sketch maps revealed about them since none
of the participants included the location of any such activities.

Students were also asked if they were involved in the First Year Experience
(FYE) program and a University 101 class. The FYE program is aimed at helping first-
time students adjust to their new surroundings. University 101 is a class offered through
the FYE program designed to help first-year students succeed in their studies and as
members of the campus community. None of the students involved in this study were
currently enrolled in a University 101 class or the FYE program. The participants were
also asked if they were involved in Community Action Volunteers in Education (CAVE).
CAVE is a non-profit organization that offers over 20 programs in which students
participate in community service. During the fall 2007 semester, first-year students who participated in CAVE and lived on campus all lived on the ninth floor of Whitney Hall. One participant in this study was involved in CAVE.

Activity Questionnaire

The activity questionnaire (see Appendix C) consisted of questions that might change for the students throughout the semester. The activity questionnaire was administered during all three data collection sessions. A summary of the answers can be found in Appendix F. The questions asked of the participants were initially coded (Cope 2005) into four main categories: activities, transportation, mobility and sense of place, each of which is discussed in the following text.

Activities. The students were asked about their activities outside of the classroom. This included employment, volunteering, clubs or organizations and any other extra-curricular activities. Involvement in these types of activities helps integrate people into their new community and expose them to new locations in Chico. None of the students noted having a job or volunteering their time until session three when one student acquired job and two other students volunteering their time to on-campus organizations.

Students were also asked to list their favorite, least favorite and most visited places in Chico. For many of the students, the locations listed under favorite places and most visited places were the same. Responses to the least favorite places were actually limited and students often said that they did not know of places that they did not like. A few students mentioned that they disliked the railroad tracks. Some students, however, listed some of their most visited locations under their least favorite locations as well. The
locations that appeared under both of these categories were locations like banks, gyms, and the library. The reason for listing these locations in both categories implied that they felt obligated to visit these locations and use their respective functions but that they found the functions unpleasant.

**Transportation.** Students living in the dorms are encouraged by University Housing not to bring a vehicle and instead to bring a bike. All participants indicated that they did not initially bring a car with them to Chico. One student did indicate that she brought her car to campus after the Thanksgiving holiday, which was prior to session three. Four of the students had a bike with them on campus during the entire semester and two students acquired one between session one and session two. One student stated that he used a skateboard for transportation. The modes of travel are indicative of their activity space as it is geographically limited in distance by the lack of access to a car. While Chico is a bike and pedestrian friendly town, a car is still a useful mode of transportation when navigating the entirety of Chico. During the focus group session students were asked if they used the local public bus system, which is free with a student identification card. Three of them said they had, but that it was not convenient and the schedule was not easy to understand. Transportation access and its relation to activity space are addressed further in the discussion regarding mental maps.

**Mobility.** Several questions were asked of the students regarding their general mobility levels. Such questions included how many times they leave their dorm room in one day, how often they leave campus and how often they leave Chico. Based on the responses, and as shown in Table 1, participants left their dorm rooms an average of 6.4
Table 1. Number of student trips outside of dorm room per day

<table>
<thead>
<tr>
<th>Session</th>
<th>Student</th>
<th>Average by Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session One (Week One)</td>
<td>7.5 5.0</td>
<td>10.0 7.0 4.5 6.0 5.0 6.4</td>
</tr>
<tr>
<td>Session Five (Week Five)</td>
<td>5.5 6.0</td>
<td>5.5 8.0 5.5 10.0 5.5 6.4</td>
</tr>
<tr>
<td>Session Three (Week Fifteen)</td>
<td>5.5 5.0</td>
<td>7.0 3.3 8.0 5.0 6.3</td>
</tr>
<tr>
<td>Average by student</td>
<td>6.2 5.3</td>
<td>8.5 7.3 4.4 7.8 5.0 -</td>
</tr>
<tr>
<td>Overall Average</td>
<td></td>
<td>6.4</td>
</tr>
</tbody>
</table>

times per day. Each letter across the top of Table 1 indicates the ID assigned to them at the beginning of the study.

It is unclear in retrospect if the students included all trips outside their dormitory room or just trips outside of Whitney hall due to the ambiguity of the question. Nonetheless, the responses to this question show that students who participated in this survey were not spending an extraordinary amount of time in their dorm rooms or Whitney Hall, but did visit their rooms often throughout the day.

When asked how many times they left campus per day or week, responses were varied. Responses ranged from once a week to once a day. As shown in Table 2, the reasons for leaving campus varied, the most common reasons being food, shopping or going to the gym. The average number of times students reportedly left campus remained constant throughout the study.

When asked how many times they left the city of Chico for more than 24 hours, responses ranged from zero to 12. All responses are summarized in Table 3. Trips outside of Chico took place the most between session two and session three. During session three students indicated that they had left Chico anywhere from one to 12 times
Table 2. Reasons for leaving campus

<table>
<thead>
<tr>
<th>Reason</th>
<th>Session One (Week One)</th>
<th>Session Two (Week Five)</th>
<th>Session Three (Week Fifteen)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Shopping</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Gym</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>To See Friends</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Downtown</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Home</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Party</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Volunteer</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>To Leave Campus</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Work</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>14</td>
<td>13</td>
<td>40</td>
</tr>
<tr>
<td>Average</td>
<td>1.3</td>
<td>1.4</td>
<td>1.3</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Number of trips outside Chico

<table>
<thead>
<tr>
<th>Session</th>
<th>Student</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Session One (Week One)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Session Five (Week Five)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Session Three (Week Fifteen)</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Total by Student</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

*Note:* Some students indicated a range of numbers for trips outside of Chico (i.e., three to five), in such cases, the trips were averaged, resulting in number such as 5.5 and 3.5.

and an average of four times. The rise in trips outside of Chico is attributed to the longer length of time between session two and session three, which was 10 weeks compared to five weeks between session one and session two. In addition, the Thanksgiving holiday occurred during between session two and session three, during which, students are required to leave their dorm rooms. In total, students indicate that they had left Chico a
combined 41 times since the start of the semester. Overall, the main reason students left Chico was to visit their homes. Other answers included concerts, visiting friends at other colleges and getting a haircut.

**Sense of Place.** Students were asked to provide a general description of the City of Chico and to compare it with their hometowns. Overall, students described Chico as a small, friendly college town. They noted the large amount of trees located within Chico and the ease of pedestrian movement. Two students used the word “hippie” to describe Chico and only one student mentioned the word “party.”

When comparing Chico with their hometowns, all but one student described Chico as smaller. The student from Cameron Park, a census designated place of 14,549 people located in El Dorado County, California (U.S. Census Bureau 2000) described Chico as a larger city with more diversity, which is accurate. Alternatively, the student from San Diego described Chico as very small and less diverse, also accurate. Terms that were often used to compare Chico with the students' respective hometowns include friendlier, more diverse, compact, and centralized.

Sense of place varied for each student and was affected by the hometown sense of place. All students’ descriptions of their new home (Chico) were positive.

**Sketch Maps**

As previously described in Chapter III, students were asked to draw mental maps of Chico. The purpose of the sketch map exercises was to have the participants draw their perceptions of Chico during that week of the semester; allowing the
development of their spatial literacy over the first 15 weeks in Chico to be monitored and evaluated. The sketch maps are included in Appendix H.

Through a longitudinal study of the participants’ sketch maps I will attempt to ascertain first-year activity space within Chico, what off-campus activities they are participating in, as well as how their spatial literacy develops over time. In addition, areas included in the sketch maps were aggregated to determine the most commonly sketched areas and presumably, the most common activity spaces of the students.

In general, the growth trend of student activity space and spatial literacy can be summarized as limited to a pedestrian scale and focused on basic daily needs, such as eating, and activities, such as shopping, tanning, and going to the gym. While detail increased significantly between session one (week one) and session two (week five), the overall types of landmarks included on the maps throughout all three mapping sessions remained similar. This result is similar to that found in Devlin’s work (1978). The contents of the sketch maps were compared to what Lynch (1960) originally coined as map elements: paths, edges, districts, nodes, and landmarks. Similar to the results found by Huynh and Doherty (2006), paths and landmarks were the most frequently used map elements. In order to explore more detailed information, the map elements were analyzed (or coded) in several ways, including number of landmarks, types of landmarks, number of labeled roads, and a comparison between roads included and traffic volumes.

Further spatial analysis was performed by creating secondary digital versions of the students’ sketch maps in GIS. The basic configuration of each sketch map was digitized using ArcMap. To create a level of comparability, the digitization of streets was based on an actual street grid of Chico. If a portion of a street was included on the sketch
map, it was copied from the street grid into the digital representation of the sketch map. In a few cases, students included streets that they knew of, but could not properly fit on their sketch map. An arrow was often used to indicate that a road was located off the edge of the sketch map. In these cases, the portion of the street mentioned was digitized as well. This digitization process aims to represent each sketch map as appropriately as possible while normalizing the data (i.e., roads) by putting them in the correct physical location. This enables the comparison of roads and activity space included in the entire group of sketch maps. The digitized sketch maps compared streets included by the students to respective traffic volume numbers and illustrated the most commonly included activity spaces. Further discussion regarding each type of sketch map content analysis and secondary digitized map analysis is provided below.

Map Elements

Mental maps are generally described as containing a certain set of elements. Lynch (1960) first defined those elements as paths, edges, districts, nodes, and landmarks. Some researchers (MacEachren 1991; Norberg-Schultsz 1971) dispute Lynch’s categories and refine them to include only paths, landmarks, and districts, thus, dissolving nodes into the crossing of two paths or paths and landmarks, and dissolving edges into districts as their outer boundaries.

Devlin (1978) does not dispute Lynch’s five elements but instead focuses on paths (in the form of streets) and landmarks (in the form of stores, buildings, or geographical features), and briefly mentions edges (in the form of a river and railroad). It is these two map elements that are the focus of the article's sketch map analysis. Devlin further divided landmarks into three categories: functionally and perceptually prominent:
Landmarks which are visually distinctive but also serve a function, such as a courthouse or hospital; functional importance: landmarks that lack visual prominence but are of functional importance, such as an office or grocery store, and; personally functional: landmarks that are functionally important and lack visual prominence, but are personally significant on an individual basis, such as home.

Landmarks. The students were asked to include in their mental maps any place referred to here as landmarks that they had visited in Chico. For each data collection session, each landmark included on each sketch map was counted. For example, if, during session one the post office was included by three students on their three respective sketch maps, it was counted three times. Sketch maps from session one included a total of 61 landmarks. The number of landmarks included on sketch maps then increased to 95 during session two and decreased slightly to 82 during the session three. It is unclear why fewer landmarks were included on maps from the third session than from the second session. The types of landmarks appearing on the sketch maps were grouped or coded into 11 categories (see Figure 4).

As shown in Figure 4, the categories of landmarks that decreased in inclusion from the second session to the third session included government (e.g., police station, city hall), food (e.g. restaurants, grocery store) and general retail (e.g., clothing stores, convenience stores, larger chain stores) landmarks. The overall trend, however, of the students' ability to include landmarks on their maps shows that the main growth period for learning landmarks happens during the first five weeks of school with less learning occurring between week 11 and week 15. By the end of the first week of school, students
are already becoming familiar with their new surroundings and a substantial amount of spatial learning occurs between the first and fifth week of the semester.

The following is a description of each category and the total number of times each was included in all of the maps. Again, each landmark included on each sketch map was counted. For example, if an individual landmark was included by one student during week one, four during week five, and six during week fifteen, the landmark was counted a total of 11 times in its respective category.

Over all three data collection sessions, places included in the food category were restaurants or grocery stores, which occurred the most frequently at a total of 96 times (see Figure 4). General retail locations appeared the second most often at a total of
47 times. General retail included such places as convenience stores, drug stores, big box retailers, the local mall, thrift stores or specialty retail stores that are prevalent in downtown Chico. The government category included locations, such as the courthouse, city hall, and police station, and occurred a total of 10 times. Lodging included hotels and residences, such as on- and off-campus dorms, and the houses of friends. Lodging places occurred 21 times. Places included in the recreation/health/beauty category occurred 19 times and included the gym, health supplement store, tanning salon and tattoo parlor. Places included in the bank category included only banks or credit unions and occurred 10 times. Transportation locations occurred a total of nine times and included bus stops, gas stations, parking lots and bicycle stores. The entertainment category included places, such as the movie theater or live concert venues and occurred five times in total. Educationally related places included the CSU Chico campus, off-campus bookstores, and copy stores. Educationally related places occurred 18 times, of which the campus accounted for 13 occurrences.

The categories themselves evolved through time as needed. This is a common occurrence as noted by Cope (2005) who indicates that coding is an iterative process, where some codes, categories or groups emerge during analysis while others die out, or are not as prevalent or needed as initially thought. For example, a single sketch map during session two included two churches requiring the creation of a religious category. Similarly, during session two, a single map included Enloe Hospital prompting the creation of a medical category.

Places that were included in the food category (restaurants and grocery stores) were the most frequently mentioned during all three sessions. On maps from session one,
after the food category (26 occurrences), lodging (dorms, houses and hotels) was most frequently placed on the maps at 12 times, followed by general retail (eight occurrences) and educationally related (six occurrences) (see Figure 4). Lodging was prevalent during session one due to the presence of hotels on the sketch maps. Perhaps this is where their parents stayed while helping them move or where they stayed during Summer Orientation.

During session two, after food (38 occurrences), general retail was the second most common category, listed 22 times (see Figure 2). Educationally related places were the third most common category, listed seven times. This indicates that after five weeks on campus students have begun to settle in to their new town and have noted places to buy general necessities. The high occurrence of educationally related places can be attributed to the notation of CSU, Chico’s location on their maps, which accounted for more than half of occurrences under this category.

During session three, the most frequently mentioned category was food (32 occurrences), followed again by general retail (17 occurrences) (see Figure 4). During session three, however, the recreation/health/beauty landmarks (e.g., park, gym, salon, tattoo parlor) occurred the third most commonly with nine instances (see Figure 4).

An interesting trend occurs in the transportation category (e.g., parking lots, bus stations, gas stations and bike stores) as this category steadily increased between each of the three data collection session from one to three and then five occurrences, respectively. The only other category with a similar trend was the recreation/health/beauty category, which increased from four to six to nine occurrences throughout the data
collection sessions. All other categories stayed about the same throughout all three data collection sessions or decreased in the session three sketch maps.

Overall, the locations that make up the participant’s activity space show little variety, and involve mainly food, shopping, and the campus. Note that important and prominent locations within the Chico community are rarely included. For example, only one student noted the Bidwell Mansion, which is located just north of the downtown area, within a few feet of campus and is a conspicuous Victorian structure (see Figure 2). Under Devlin’s categorization of landmarks (1978), Bidwell Mansion would surely be prominently used as a visually prominent landmark. A few students included the newly renovated downtown plaza park, which is an open city block approximately four blocks from campus and less than a half mile from Whitney Hall. No other students noted parks or natural features of any type, even though the demographic questionnaires indicated that the participants were athletic and enjoyed outdoor activities.

Two creeks, Big Chico Creek and Little Chico Creek, run through campus and along the southern portion of the downtown area, respectively (refer to Figure 3). Children’s Park is located just behind the Physical Sciences Building, directly east of campus. Chico also boasts the third largest municipal park in California and one of the 25 largest city parks in the United States: Bidwell Park. The lower portion, which is located a mere half mile east of campus, was never included on any of the sketch maps (see Figure 2). While one student mentioned the Sacramento River in the questionnaire, it was not drawn on any of the maps. This was probably attributed to the five-mile distance between the river and campus making it cartographically challenging for mapping.
novices to include on the sketch maps. See Figure 2 and Figure 3 for a depiction of these places in relation to the location of campus and downtown Chico.

In accordance with Devlin's further distinction of landmarks, all landmarks were divided into one of two categories: physical-perceptional (visually prominent) and functional (Devlin 1978). Devlin further divided functional landmarks into three categories: visually and functionally prominent, functionally important, and personally functional (Devlin 1978). In dividing the landmarks included on the student maps, however, it became apparent that some landmarks could fall in more than one category. Because everyone uses or notices different landmarks in navigating a new environment, it is possible to conclude that almost any landmark that serves a function (be it an eating establishment, grocery, or bike store) could serve as both a visually and functional landmark (though some may be less visually prominent than others). Very few landmarks can simply be categorized or coded as only functional and very few landmarks can simply be categorized as only visually prominent.

For example, Devlin categorized restaurants under the personally functional landmark category, but it seems that certain restaurants could actually serve as visually and functionally prominent landmarks due to their unique location or building architecture. Restaurants dominated the students' maps as the most commonly included landmark making it difficult to differentiate when a restaurant served as a personally functional landmark, a visually prominent landmark or both.

Furthermore, Riley’s (a local bar) was mentioned by several students, but none of the students were old enough to enter the bar. When questioned about the possibility of entering the bar using a fake I.D. none of the students admitted to doing so.
As such, the bar, which under different circumstances may be personally functional as a favorite watering hole is actually a visually prominent landmark, as it serves no function to the underage students.

Other than restaurants, Devlin’s main example of a personally functional landmark was a personal residence or home (Devlin 1978). The students involved in this study all lived in the same dorm and, therefore, all marked this similarly on their maps.

In summary, landmarks increased the most between session one and session two. A slight increase in the number of categories occurred with time, as students included new landmarks on their maps and an overall reduction in landmarks occurred during session three. Devlin’s 1987 research also found that significant learning occurred between the two sets of sketch maps acquired. A third sketch map, however, was not completed in Devlin’s study and therefore it is unknown if the same attrition occurred as found in this study.

**Number of Labeled Roads.** Roads, which are categorized by Lynch as paths (Lynch 1960), were the prominent structural feature of the students’ sketch maps, much like the sketch maps of Devlin’s study (Devlin 1978). Labeled roads included on the sketch maps were analyzed. The number of labeled roads increased over all three data collection sessions for the majority of the participants (see Figure 5). The average number of labeled roads on the sketch maps from session one was eight, for session two the average was 15 and for session three the average was 17. Two students included fewer labeled roads in the session three map than the session two map and one of these two students did not include any labeled roads in the week one map. The greatest increase in labeled roads occurred between session one and session two, paralleling the greatest
growth in the number of landmarks as discussed above. This shows that the main growth period for learning roads, as much as landmarks, happens during the first five weeks of school with less learning occurring between week 11 and 15. Figure 5 shows the number of roads included in each sketch map by each student.

**Major Roads.** The roads included on the student sketch maps were also compared against Chico’s major roads. The purpose of this was to see which major roads the students were using and which major roads are not appearing on their maps. There are many major roads when it comes to surface roads in Chico. For the purposes of this analysis, the following were considered major roads:

- Major north/south roads:
  - Highway 99
  - Esplanade
• Main Street
• Broadway Street
• Mangrove Street
• Nord Avenue/Walnut Avenue/Highway 32
• Warner Street/Ivy Street

☐ Major east/west roads:
• Eaton Avenue
• East Avenue
• First Avenue
• West Sacramento Avenue
• Second Street
• Eighth Street
• Ninth Street
• Twentieth Street
• Park Avenue

Main roads were not constant elements on the mental maps. While some appeared throughout all three of a student’s sketch maps, others appeared and disappeared from one session to the next. This varied for each student. Each of the above listed major roads was found on the student maps anywhere from zero to 21 times (21 times indicated that the road was included on all students’ sketch maps throughout all three data sessions, which occurred only for Second Street). Similar to how the landmarks were counted, roads were counted once for each appearance on each map.
(throughout all the sketch map sessions). During session one, the sketch maps included an assortment of the above listed major roads a combined 23 times. During session two and session three, major roads were collectively included a total of 46 and 45 times, respectively. This again shows that the students are already becoming familiar with their surroundings during the first week of school and the largest increase in spatial knowledge, with regards to major roads, occurs between week one and week five of the semester.

Second Street appeared on every sketch map and was the most commonly included major road at 21 times (i.e., once on each sketch map for each student). This is likely due to Second Street’s prominent location between the south edge of campus and downtown (see Figure 2). Warner/Ivy Street appeared on the sketch maps the second most often at 19 times. Warner/Ivy Street is located directly adjacent to Whitney Hall and connects to Second Street to the south. As previously mentioned, Warner/Ivy Street is the only road that runs through campus and changes names at Big Chico Creek on campus. Approximately half of the students were able to correctly label the separate sections of Warner/Ivy Street, but the change was denoted on either side of campus, as no one noted Big Chico Creek on their maps. Main Street, a northwest-flowing, one-way street in downtown, occurred the third most commonly on maps (14 times). Broadway Street, which is Main Street’s southeast-flowing counter part, occurred the fourth most commonly (11 times). Table 4 shows the number of times each major road was included in all of the sketch maps. Figures 6 and 11 collectively show the roads included in the sketch maps.
Table 4. Occurrences of major roads

<table>
<thead>
<tr>
<th>Major Road</th>
<th>Map One</th>
<th>Map Two</th>
<th>Map Three</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second Street</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>Warner/Ivy Street</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>Main</td>
<td>2</td>
<td>7</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Broadway</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Nord Avenue/Highway 32</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>West Sacramento</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Esplanade</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Mangrove</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>First Avenue</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Eighth Street</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Ninth Street</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Highway 99</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Park Avenue</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Twentieth Street</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Eaton</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>East Avenue</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>East Park Avenue</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>46</td>
<td>45</td>
<td>114</td>
</tr>
</tbody>
</table>

The three major roads that were not included on any of the student’s sketch maps were Eaton Avenue, East Avenue and Park Avenue (see Figure 3). These roads are located at the far north and south ends of Chico and their absence demonstrates that students were not familiar enough with these outlying areas to include them in their sketch maps. The fact that Highway 99, the largest road in Chico, is only included on two of the sketch maps supports the fact that the students are limited to a pedestrian scale, since Highway 99 is limited to vehicle traffic only.

C.H.I.C.O. It is well known locally that a series of five northwest/southeast oriented roads located south of campus spell out the word “Chico” when their first letters are combined. These streets are Cherry, Hazel, Ivy, Chestnut, and Orange. According to the students who participated in this study, this information is shared with them during
Summer Orientation. Accordingly, it was not a surprise to see that many of the students were able to label these roads on their sketch maps even during Session One. Even during session one, three students were correctly able to include and label the five streets which spell out Chico. This number increased to five students during session two. Similar to the decline in the number of streets and landmarks included in session three maps, the number of students who included all five C.H.I.C.O. streets declined during the third session.

Traffic Volume. The main roads appearing on the sketch maps were also compared to traffic data obtained directly from the City of Chico, which maintains annual traffic counts. Main roads were ranked by total traffic volume, which was calculated by adding up all traffic link counts along the road. This information was compared to the number of times each road was included on a student sketch map (see Table 5).

As shown in Table 5, roads that students included most frequently in their sketch maps had no correlation with roads that have the highest traffic volumes. Roads that were included most often on student maps were determined more by proximity to the college and the student’s activity locations than traffic volume. Figure 6 depicts this information graphically. Orange represents streets with high traffic volumes and blue represents the streets mostly commonly drawn by students. Only Nord Avenue/Highway 32 appeared in the top five for both traffic volume and inclusion in sketch maps. It ranked fourth in traffic volume and fifth in for inclusion on the student sketch maps. Nord Avenue/Highway 32 has a significant amount of apartments and housing used by students, as well as a grocery store and restaurants frequented by the student population. The grocery store and restaurants are easily accessible by walking or bicycling from the
Table 5. Traffic volume versus sketch map occurrences

<table>
<thead>
<tr>
<th>Major Road</th>
<th>Rank by 8-Hour Traffic Volume</th>
<th>Sketch Maps Inclusion Rank*</th>
<th># of Occurrences</th>
<th>Distance to Whitney Hall (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway 99</td>
<td>1 9</td>
<td>2</td>
<td>1.37</td>
<td></td>
</tr>
<tr>
<td>East Ave</td>
<td>2 11</td>
<td>0</td>
<td>1.83</td>
<td></td>
</tr>
<tr>
<td>Esplanade</td>
<td>3 6</td>
<td>6</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>Nord/Walnut Ave</td>
<td>4 4</td>
<td>11</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Mangrove Ave</td>
<td>5 6</td>
<td>6</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>East Park Ave</td>
<td>6 11</td>
<td>0</td>
<td>2.19</td>
<td></td>
</tr>
<tr>
<td>Twentieth St</td>
<td>7 10</td>
<td>1</td>
<td>1.56</td>
<td></td>
</tr>
<tr>
<td>First Ave</td>
<td>8 7</td>
<td>5</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>Park Ave</td>
<td>9 9</td>
<td>2</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Warner/Ivy St</td>
<td>10 2</td>
<td>19</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Eaton Avenue</td>
<td>11 11</td>
<td>0</td>
<td>3.21</td>
<td></td>
</tr>
<tr>
<td>Second St</td>
<td>12 1</td>
<td>21</td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>Eighth St</td>
<td>13 7</td>
<td>5</td>
<td>0.69</td>
<td></td>
</tr>
<tr>
<td>Main St</td>
<td>14 3</td>
<td>14</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>Ninth St</td>
<td>15 8</td>
<td>4</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Vallombrosa Ave</td>
<td>16 10</td>
<td>1</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>West Sacramento Ave</td>
<td>17 5</td>
<td>7</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>Broadway St</td>
<td>18 4</td>
<td>11</td>
<td>0.36</td>
<td></td>
</tr>
</tbody>
</table>

* Multiple ranks ties with another rank (i.e., same number of occurrences)

This supports the supposition that the students’ sketch maps and, therefore, their activity space are pedestrian oriented.

**Areas of Common Activity Space**

As previously noted, the roads occurring on the students' sketch maps were digitized using ArcMap. This enables the comparison of all roads occurring in each of the sketch maps across the entire group of sketch maps. Each individual sketch map’s resulting digital map of streets was buffered by 200 feet to indicate known activity space. A buffer value of 200 feet was used because it represents one-half of a Chico downtown city block and it is assumed that if a student was able to draw a street on their map that they were at least somewhat familiar with locations on that street. This process was
completed for each of the student’s sketch maps. Each of the students' maps was then
combined to show common activity space for all participants. Areas of commonality
were also given a value based on the number of students who included that area in their
map during each week. The areas of commonality were then displayed based on the
occurrence value to rank the areas of commonality. As shown on the following figures,
darker colors represent the most occurrences of an area on the students' maps and the
greatest commonality, while lighter colors indicate fewer occurrences and the least commonality. In other words, the darkest blue indicates that an area appeared on all seven student sketch maps, while the lightest yellow indicates an area appeared on only one student sketch map.

**Session One (Week One).** As shown on Figure 7 and represented by the letter “A,” the corner of Second Street and Ivy Street appeared on all student sketch maps from

![Figure 7. Session one (week one) areas of commonality.](image)
session one and is shown in dark blue. The second most common area, represented by letter “B,” appears on all but one of the student sketch maps and is the portion of Second Street which creates the border between campus and downtown. The third most common areas appearing on the sketch maps are the corner of Legion Avenue and Warner Street where Whitney Hall is located (represented by letter “C”), a portion of Ivy Street between Second and Fifth Street (represented by letter “D”), and portions of downtown near Main Street and Second Street (represented by letter “E”). Familiarity decreases with distance from the downtown area, specifically from Second Street.

Two separate areas of common activity space are located in the downtown area split by an area that was included on only one student map. The eastern area (represented by number “2”) occurs due to the presence of Main and Broadway streets, while the western area (represented by number “1”) occurs due to the presence of the C.H.I.C.O. streets (Chestnut, Hazel, Ivy, Cherry, and Orange streets). Because the students are told about the street name acronym during Summer Orientation, they are more likely to include the street names in this area on their sketch maps.

While not shown on Figure 7, one student was able to indicate properly the direction in which Target and the Chico Mall are located by utilizing an arrow pointing off the map. No other student included a reference to this area during session one (week one).

The session one areas of commonality indicate that by Thursday of the first week of the semester, students have already ventured downtown along Second Street and Warner/Ivy Streets. Knowledge of other areas surrounding the campus, however, is limited, especially to the north.
Session Two (Week Five). As expected, the students' session two maps included a greater amount of detail than the session one maps (see Figure 8). The most common activity space included in all sketch maps (represented by letter “A”) has spread from the corner of Second Street and Ivy Street to the downtown area along Second, Third, Main and Ivy streets. The corner of Legion Avenue and Warner Street where

Figure 8. Session two (week five) areas of commonality.
Whitney Hall is located (represented by letter “B”), is included by the same amount of students as in session one; however, two additional students were able to make the connection between this corner and the corner of Second Street and Ivy Street.

The two separate areas of commonality comprised of the C.H.I.C.O streets (represented by number “1”), and Main and Broadway Streets (represented by number “2”), are now included in the sketch maps by a majority of the students and more than half were able to include Normal and Salem streets which create the division between these two areas, as previously discussed regarding the session one maps.

Eighth and Ninth streets form a sharp southeastern boundary to the students' activity space (represented by letter “C”) while other cardinal directions have less specific boundaries.

While not shown on Figure 8, two students (one more than in session one) were able to indicate properly the direction in which Highway 99, Target, the Chico Mall, Walmart and 20th Street are located by utilizing an arrow pointing off the map. No other students included a reference to this area during session two.

The overall area of extent has increased on the session two (week five) maps; however, the students' ability to sketch areas beyond the downtown area and north of campus still remain limited. By the fifth week of the semester, student activity space has increased but their ability to sketch their surroundings remains limited to areas directly adjacent to campus. This is further indication that their spatial learning is limited to a pedestrian or bicycle scale.

Session Three (Week Fifteen). During session three, the sketch maps indicate that student activity space has continued to focus on the downtown area of Chico (refer to
Figure 9). All students are able to include in their sketch maps the C.H.I.C.O. acronym streets (represented by letter “A”) and the majority of students are able to include Main, Broadway, Normal, and Salem streets (represented by letter “B”).

Figure 9. Session three (week fifteen) areas of commonality.

Eight and Ninth streets (represented by letter “D”) have remained as the southeastern boundary of the students’ sketch maps but exploration has increased in other
directions, especially to the north and northwest. Questioning during the focus group session, however, indicated that the majority of northern expansion of spatial knowledge can be attributed to only one student who had a job that required her to travel outside of the other students' activity space.

While not shown on Figure 9, only one student (one fewer than in session two) was able to indicate properly the direction in which Highway 99, Target, the Chico Mall, Walmart and 20th Street are located by utilizing an arrow pointing off the map. Throughout the three sets of sketch maps not a single student was able to draw the complete route between campus and the Chico Mall, even though questioning during the focus group interview indicated that most students had visited the Chico Mall or other retail locations near the Chico Mall.

The session three map illustrates that students are now able to represent the downtown street grid properly, but with some general errors. The ability to sketch the downtown area may, however, be aided by the C.H.I.C.O. acronym streets, the use of numbers for street names, and the simple grid street pattern. Due to these factors, Lynch may have characterized the “imageability” (defined as place legibility or more simply, the ease of which a location is spatial learned and understood) of the downtown area of Chico as simple and easily understood (Lynch 1960). Nonetheless, according to the sketch maps, students are most familiar and conduct the majority of their activities in the downtown area by the fifteenth week of their first semester. While they have ventured out to other areas outside of downtown (to the Chico Mall, Trader Joe’s grocery store, or Tinseltown movie theater), they are still unable to draw or connect the outlying areas to the well known downtown area correctly.
In summary, the areas of commonality included on all sketch maps focused on Second Street, Warner/Ivy Street, and Main and Broadway streets in downtown Chico. This indicates that the students’ most common activity space was downtown Chico and the South Campus area. It should be noted, however, that perhaps the students’ ability to draw the downtown areas was aided by the simple grid pattern, the use of numbers for street names, and the C.H.I.C.O. acronym streets. Nonetheless, the greatest amount of detail included on the students’ maps consistently occurred in the downtown area and South Campus area that is characterized by student rental homes, fraternity and sorority houses, and student hangouts.

Focus Group Session

The data collected at the focus group (conducted during the sixteenth week of the semester) consisted of verbal answers to a prepared list of questions (see Appendix G) and a collective sketch map where students were asked to collectively sketch a mental map on a 36- by 48-inch piece of paper. The resulting map can be found in Appendix I. Five of the seven students who attended all three data collection sessions attended the focus group session.

Focus Group Questions

Open-ended questions asked during the focus group session centered on detailed information that was not or could not be obtained through the questionnaires or sketch maps. The questions asked were compiled in response to preliminary analysis and coding of the students’ completed questionnaires and sketch maps, respectively.
When the students were asked how they thought being involved in the study affected them, they indicated that they thought more about where they were when walking around town. One student indicated that, while walking downtown, she would note what she had drawn incorrectly on the sketch maps. This shows that being involved in the study might have positively influenced the construction of the students’ mental maps because they were more aware of their location and surroundings. The students indicated, however, that they felt they knew Chico only slightly better than their peers who were not involved in the study. When going somewhere, the students tend to rely on an acquaintance or friend acting as a navigator, and, therefore, it might take several trips to the same location before they are able to navigate to that location by themselves.

I asked the students which activities helped them learn about Chico or experience the community. Several students indicated that just walking around campus and the downtown area helped them learn about Chico spatially. Another student indicated that a friend drove her to the local Trader Joe’s grocery store, which helped her expand her spatial knowledge of Chico. None of the students mentioned any organized activities that helped them get to know Chico. The students did mention that once they had a better spatial knowledge of Chico, they were more willing to venture off campus and explore.

When asked what would help the students learn more about Chico, they resoundingly indicated that having a car would be a definite benefit. In fact, one student remarked that she was in a car the majority of the times she learned about a new location in Chico but first-year students living in the dorms are encouraged not to bring a car. While the students may see this as a disadvantage, perhaps forcing them to learn about
Chico at the pedestrian scale first enables them to focus on resources and activities available to them on campus and in the downtown area, limiting the spatial extent of their mental maps, but increasing the amount of knowledge about direct surroundings.

CSU, Chico does offer a program called Adventure Outings that focuses on field-trip excursions to locations throughout Northern California. Only a few of the students were familiar with Adventure Outings but none of the students had participated in a trip, even though they had indicated outdoor activities as favorite activities on the initial activity questionnaire. Even if students had participated in an Adventure Outing, the trips would not increase spatial knowledge of Chico because they focus on locations outside of Chico.

Students were also asked if they had utilized the local bus system that is free with a student I.D. Three of the five students at the focus group indicated they had used the bus but they all agreed that it was not convenient and at times confusing.

Because the students' sketch maps did not include many locations beyond the downtown area, I asked them to indicate if they had been to a list of several locations by a show of hands. Table 6 includes the list of locations and the number of students who had been to each.

As shown in Table 6, by week sixteen of their first semester on campus, students have yet to explore Chico beyond locations that offer basic necessities (groceries at Trader Joe’s), shopping, and entertainment (the mall or movie theater). All five students at the focus group session did indicate that they knew where Bidwell Mansion and the Chico Museum were located, but none had actually gone to either location. Part of Chico’s charm is its proudly displayed history and perhaps first-year students should
Table 6. locations visited by students

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Students Who had Visited the Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Bidwell Park</td>
<td>1</td>
</tr>
<tr>
<td>Yahi Trail</td>
<td>0</td>
</tr>
<tr>
<td>Horseshoe Lake</td>
<td>0</td>
</tr>
<tr>
<td>Butte Creek Ecological Preserve</td>
<td>0</td>
</tr>
<tr>
<td>Vina Monastery</td>
<td>0</td>
</tr>
<tr>
<td>Bidwell Mansion</td>
<td>0</td>
</tr>
<tr>
<td>Chico Museum</td>
<td>0</td>
</tr>
<tr>
<td>Stansbury House</td>
<td>0</td>
</tr>
<tr>
<td>Sacramento River</td>
<td>0</td>
</tr>
<tr>
<td>Scotty’s Landing on the Sacramento River</td>
<td>0</td>
</tr>
<tr>
<td>Covered Bridge</td>
<td>0</td>
</tr>
<tr>
<td>Chapmantown</td>
<td>0</td>
</tr>
<tr>
<td>The Mall</td>
<td>5</td>
</tr>
<tr>
<td>Trader Joe’s</td>
<td>3</td>
</tr>
<tr>
<td>Tinsletown Movies</td>
<td>4</td>
</tr>
<tr>
<td>Pageant Theater</td>
<td>0</td>
</tr>
<tr>
<td>City of Paradise</td>
<td>0</td>
</tr>
<tr>
<td>Lake Oroville</td>
<td>0</td>
</tr>
</tbody>
</table>

be provided more opportunities or incentives to learn about Chico’s history. Knowledge of their new home’s history would help create a sense of place.

Focus Group Sketch Map

As previously mentioned, students attending the focus group session were asked to collectively draw a sketch map of Chico. They were instructed to put the campus in the middle of the 36- by 48-inch sheet of drawing paper provided and to draw locations and roads that they had visited off-campus. A scanned version of this map can be found in Appendix I.

Focus Group Sketch Map Landmarks. Similar to the individual sketch map analysis, the landmarks denoted on the group sketch map were coded or categorized and
totaled. Figure 10 shows the number and type of landmarks included in the group sketch map.

Figure 10. Landmarks included in group sketch map.

As noted in Figure 10, landmarks that were included in the food category (restaurants or grocery stores) were included in the group sketch map the most at 41 occurrences. Similar to the individual sketch maps, the food category ranked first. Also similar to the individual sketch maps, the general retail (convenience stores, drug stores, big box retailers, the local mall, thrift stores, specialty retail stores, etc.) category ranked second, with 19 occurrences. In the group sketch map, the recreation/health/beauty category ranks third, whereas it ranked fourth in the individual sketch maps. For the most
part, the students included similar types of landmarks in the group sketch map as they did in the individual sketch maps; however, they were able to include a larger number of landmarks collectively. It is assumed that this is due to the nature of the activity students were able to collaborate and remind one another of landmarks to include.

The group sketch map did cover a larger portion of Chico. The students, however, still neglected to include natural features in the map. For instance, Bidwell Park, Bidwell Mansion, Children’s Park, Big Chico Creek and Little Chico Creek were still missing from the group sketch map. This further demonstrates that the students are missing some of Chico’s larger and better-known landmarks.

**Number of Labeled Roads and Traffic Volume.** The number of labeled roads included on the group sketch map was 37. This was more than any of the individual sketch maps. The group sketch map included the top five streets ranked by traffic volume (Highway 99, East Ave, Esplanade, Nord/Walnut Avenue, and Mangrove Avenue) indicating that, as a group, the students had a good grasp on the location of major roads in Chico. As previously noted, however, questioning revealed that spatial knowledge of the northern part of Chico was attributable to only one student who had a job that required to her travel to that area. The only road still missing from the sketch map was Eaton Avenue, located in far northern Chico. This indicates that the students have either not been that far north in Chico or have not been there enough to include Eaton Avenue on their sketch maps.

**Activity Space**

Similar to the individual sketch maps, the focus group sketch map was digitized using ArcMap. This allows comparison to the session three individual sketch
maps. As shown in Figure 11, the students were collectively able to sketch out a much more detailed map and larger area than they were able to complete individually during session three.

Figure 11. Roads included in individual maps compared to the focus group sketch map.
Summary

As discussed throughout this chapter, first-year students’ sketch maps indicate that significant spatial learning occurs very early in the semester. By the end of the first week of the semester, students already have a grasp on the core street grid located in downtown Chico and a substantial amount of spatial learning occurs between the first and fifth week of the semester. Spatial learning continues throughout their first semester but the rate of geographical data absorption does not occur at a consistent rate. There is a decline in intensity over time. There is even a suggestion that spatial learning may even degrade slightly past a certain point. This finding coincides with Devlin’s observations of spatial knowledge acquisition over time. The analysis of the inclusion of landmarks and streets supports this conclusion, as the most substantial growth period occurred between the session one and session two sessions.

Analysis of landmarks revealed that students’ activities are necessity based (such as visiting a grocery store or a restaurant) or focused on urban recreational activities (shopping, working out, or tanning). In an attempt to apply Devlin’s 1978 categorization of different types of landmarks (visually prominent, functionally important, and personally functional), it was revealed that, in this study, landmarks could not easily be categorized as purely one category. Everyone uses different landmarks in navigating a new environment but it is possible that almost any landmark that serves a function (be it an eating establishment, grocery or bike store) could serve as both a visually and functionally prominent landmark (though some may be less visually prominent than others). Very few landmarks can simply be categorized as only functional and very few landmarks can simply be categorized as only visually prominent.
The analysis also revealed that the first-year students’ activity space is generally limited to a pedestrian scale. This is attributable to the fact that all but one student in this study did not have cars with them during their first semester. This is exemplified by the almost reverse correlation in the comparison of traffic volumes for major roads in Chico and roads most commonly included on the sketch maps. The pedestrian scale activity space conclusion is also supported by the conglomeration of streets included in the sketch maps. The most commonly included streets (and, therefore the students’ activity spaces) were focused around the campus and downtown area. Furthermore, questions asked during the focus group indicated that very few students had been to areas located near the edges of Chico or beyond, including Upper Bidwell Park. The most common landmarks visited by students located outside of what would generally be considered a pedestrian scale were the Chico Mall, Trader Joe’s, and the movie theater. Students indicated that they either took the bus or had a friend drive them to these locations.

The focus group sketch map included a larger portion of Chico and a greater number of major roads than the individual sketch maps drawn during session three just a week earlier. It is likely, however, that this is due to the collective nature of the exercise where students were able to correct each other, build off each other’s knowledge and remind each other about landmarks and roads and not one week more of living in Chico.
CHAPTER V

CONCLUSIONS

This thesis project has explored the spatial development of first-year students through the examination of sketch maps produced by the students as well as data collected from questionnaires and a focus group. Analysis of the sketch maps and other collected data has revealed several characteristics of the sample group's spatial knowledge growth, activity space, and sense of place.

Overall, the activity space of the students expanded the most between the first and fifth weeks of the semester. This is exemplified by the increase in both landmarks and roads included in the students’ maps. As indicated by the overall decrease in landmarks and roads included in the students’ week fifteen maps, the overall area included actually appeared to decrease between session two and session three. It is unclear why this occurred and how, or if, it actually affects their activity space. One hypothesis is that students have less free time as they prepare for finals at the end of the semester or dedicated less energy to the sketch maps due to the distraction of upcoming finals. Another hypothesis is that students involved in the study experienced research fatigue and became less interested in the study and expended less energy in drawing their maps.

The students’ spatial knowledge and, therefore, their activity space was limited to a rather pedestrian scale, focusing on Chico’s downtown and areas directly
surrounding the campus. This is directly attributable to the fact that first-year students living in on-campus dorms are encouraged not to bring a car, thereby, limiting their spatial exploration to locations reached by foot or bicycle. The comparison of the roads included in the students' maps with actual traffic levels on Chico’s major roads supports this conclusion. Only one of the top five major roads (in terms of traffic levels) was also in the top five roads included by students in the sketch maps, once again attributable to their pedestrian based mode of travel.

The student's off-campus activities focused on food and shopping as supported by the analysis of landmark categories in which food and general retail consistently ranked highest. Despite the students’ indication that they enjoyed outdoor activities and sports, no such activities were depicted on any of the students’ maps. This is perhaps an area for improvement in campus new student orientation programs, as a main part of Chico’s sense of place is Bidwell Park. During the focus group session, students specifically indicated that Bidwell Park was “too far” for someone without a car to visit. This is interesting since Lower Bidwell Park begins a mere half mile east of campus. It has been noted, however, that poor signage and heavy traffic may be to blame for the lack of pedestrian connectivity from campus to Lower Bidwell Park.

When the areas of commonality included on all sketch maps were analyzed using ArcGIS, commonly drawn areas focused on Second Street, Ivy Street, and Main and Broadway streets in the downtown Chico area. This indicates that the students’ most common activity space was downtown Chico. It should be reiterated, however, that perhaps the student’s ability to draw the downtown areas was aided by the simple grid pattern, the use of numbers for street names, and the C.H.I.C.O. acronym streets.
Nonetheless, the greatest amount of detail included on the students’ maps consistently occurred in the downtown area and South Campus area that is characterized by student rental homes, fraternity and sorority houses, and student hangouts.

The students’ sense of place regarding Chico seemed to be positive as indicated by answers to the questionnaires. The data collected indicates that the students regularly explored their direct surroundings while getting to know their new home. Their knowledge of what Chico has to offer outside of campus remained limited throughout the semester to a pedestrian scale and a limited range of activities, such as dining out and shopping.

These findings indicate that CSU Chico staff tasked with improving student retention, such as the Chico Student Success Center, might respond to this by providing or promoting off-campus activities that still occur within Chico. The University 101 classes might consider adding a “get to know your new home town” component that could include such things as the use of maps of Chico in the classroom, trips to Lower and/or Upper Bidwell Park, education regarding the use of the local public bus system, providing information on intramural sports, or a lesson on Chico’s history, perhaps including a visit to Bidwell Mansion. Simply using maps of Chico in the classroom may provide a structurally holistic view of Chico that allows student to attribute and reference larger amounts of space and features in their new surroundings. Building first-year students’ knowledge of what Chico has to offer may help them further develop a positive sense of place, thereby potentially leading to a higher retention rate.

Further study on the activity space of students new to an area could be improved upon through the use of a larger sample population and greater control of
spatial knowledge regarding Chico prior to commencement of the study. For example, a larger sample population could be obtained through Summer Orientation or University 101 classes. Alternatively, a sample population could be obtained from CSU, Chico’s International Student Services program that serves approximately 500 students. Students involved in this program generally arrive in Chico with little to no pre-existing spatial knowledge and would have initially blank mental maps. In addition, it would be interesting to explore the effect that cultural differences would have on students' acquisition of new spatial knowledge.

Further study might also investigate the affect that smart-phones have had on student navigation, activity space, and mental maps. The data used in this study was collected in the fall of 2007, before the use of smart-phones and their navigational applications became common. Being guided by a phone to a location requires less cognitive activity and may lead to a mental map of reduced quality or a mental map that takes longer to develop. It would be interesting to investigate if students are using navigation applications or maps on their smart-phones to find locations in Chico during their first semester and how this is affecting the level of spatial information they are able to store and recall for use.

In summary, using sketch maps to determine the activity space and sense of place of students new to a town provides an interesting look at how their spatial knowledge develops and what activities they participate in. The simple process of asking the students to draw their mental maps certainly made them think more about the newly forming maps in their heads. While the students’ activities were rather limited in scope and their activity space was limited to a pedestrian scale, the information derived
provides a unique insight into the spatial lives of first-year students and the development of spatial cognition of new residents in general.
REFERENCES


APPENDIX A
NEW TO CHICO?
WANT FREE FOOD??

Sign up to participate in a Master’s thesis research project. You will be asked to fill out a quick survey and sketch a map three times throughout the semester. It will take less than an hour and dinner will be provided. No prior experience necessary!!!

Please circle one:

Will you be 18 years of age by August 22, 2007?

Yes  No

Will you be living in Whitney Hall?

Yes  No

How many times have you been to Chico prior to today? _________

What are the main reasons for your prior visits to Chico? ____________________________________

INFORMED CONSENT

Project Title: Mental Maps of First-Year Student’s Activity Space

Janna Waligorski, Department of Geography and Planning
California State University, Chico

Please read this consent agreement carefully before you decide to participate in the study.

Why this research is being done: This research is being done to further understand the development of mental maps of first-year students in regards to activity space. The purpose of the study is to examine how first-year students, who have never lived in Chico prior to this semester, learn about and use the area surrounding campus.

What you will do in the study: You will be asked to fill out a questionnaire three times throughout the Fall 2007 Semester. In addition you will be asked to sketch a basic map that represents your knowledge of Chico. Each session will last approximately 1 hour, take place between the hours of 5:30 and 6:30 on Wednesdays, and be located in a classroom on campus, close to Whitney Hall. These sessions are scheduled for 8/29, 9/26 and 11/28.

Benefits of the study: Food will be provided for participants. There may be no direct benefits to you from the study, but it may further the university’s understanding of how students develop their knowledge of Chico.

Risks & Confidentiality: You will be provided with a number under which your records will be kept. Your name will remain confidential. Participants will experience no risk except if you admit to illegal activities. Please do not admit to illegal activities of any kind. You may stop taking the survey at any point.

Participant Statement: By supplying the information below you are consenting to be contacted for possible inclusion in a Master’s thesis study. Your signature below will indicate that you are willing to volunteer as a research participant; that any questions have been answered satisfactorily; and that you have read the information above. You agree to participate in the research project described above.

______________________            _____________________  _______________
Name: Print     Signature     Date

________________________________________________________________________
Phone Number of Participant   E-Mail of Participant

Questions? Contact Janna Waligorski at 519-9736 or jlwaligorski@gmail.com
APPENDIX B
DEMOGRAPHIC QUESTIONNAIRE

Introductory Survey  Number:______________________

1. What is your gender?  Male  Female

2. What is your age?

3. Do you live in Whitney Hall?  Yes  No

4. On what date did you move to Chico?

5. Have you lived in Chico prior to living in Whitney Hall?
   5a. If so how long?

6. How many times have you been to Chico prior to the start of the Fall 2007 semester?
   6a. What was the main reason(s) for your prior visits?

7. What is the name and state of your hometown (placed lived in before attending Chico State)?

8. Is your hometown considered rural, a small, medium or a large city?
   8a. What is the approximate population of your hometown?

9. Is this your first time living independently from your parents?  Yes  No

10. Is this your first year in college?  Yes  No

11. How many units are you enrolled in this semester?  (If you are attending classes at more than one college, include all units)

12. Do you have friends or family that live in Chico?  Yes  No
   12a. How often do you see or visit those friends or family?

13. What are your favorite recreational activities?
14. How often do you plan on leaving Chico during the Fall 2007 semester? Include all trips outside of Chico.

14a. What will be the purpose of those trips?

15. When traversing to and from Chico are you typically a driver or passenger?

16. When riding in a vehicle around Chico are you typically a driver or passenger?

17. Are you involved in the First Year Experience Program? Yes No

18. Are you enrolled in a University 101 class? Yes No

19. Do you live on the CAVE (9th) floor of Whitney? Yes No
ACTIVITY QUESTIONNAIRE

Survey Number:_______________________

Please take this survey first and then use the attached blank piece of paper to draw a map of Chico. On your map please indicate as many places as possible that are located off of campus but in Chico. Please make short notations of what the places are and why you have visited that location.

1. Do you have a vehicle here in Chico?       Yes       No

2. Are you employed on campus?       Yes       No
   2a. How many hours per week do you work?

3. Do you have a job off campus?       Yes       No
   3a. How many hours per week do you work?
   3b. How far is your job from your dorm room?
   3c. What mode of transportation do you use to get to work?

4. Do you volunteer on or off campus?       Yes       No
   4a. How many hours per week do you volunteer?
   4b. How far is the volunteer location from your dorm room?
   4c. What mode of transportation do you use to get the location?

5. Do you have a bike here with you in Chico?       Yes       No
   5a. On average, how many days per week do you ride your bike?
   5b. Where do you ride your bike to?

6. Do you have a declared major?       Yes       No
   6a. What is it?
7. Are you involved in any extra curricular activities?      Yes      No
   7a. What are they?
8. Do you belong or are you pledging to a Greek organization?      Yes      No
9. Approximately how many times a day do you leave your dorm room?
10. How often do you leave campus?
11. What is your main reason(s) for leaving campus?
12. As of today, how many times have you left Chico for more than a 24 hour period?
   12a. What is the purpose of the trip(s)?
13. As of today, what is your general description of the City of Chico?
14. How does Chico compare to your hometown in size, population, ethnicity, culture, and atmosphere?
15. Please list your top five favorite places to visit that are located in Chico but not on campus and why each of these is your favorite.
   1.________________________________________________________________________
   2.________________________________________________________________________
   3.________________________________________________________________________
   4.________________________________________________________________________
   5.________________________________________________________________________
16. Please list your five most visited locations in Chico that are off campus and why you go there.
   1.________________________________________________________________________
   2.________________________________________________________________________
   3.________________________________________________________________________
   4.________________________________________________________________________
   5.________________________________________________________________________
17. Please list your least favorite places that are in Chico but not on campus and why you dislike these locations.
APPENDIX D
Please use the sheet of blank paper to sketch a map of Chico. On your map please indicate as many places as possible that are located off of campus but in Chico that you have visited since moving here and starting your first semester. Please identify the places and why you have visited them. For example, if you have been to Upper Bidwell Park please draw it on your map and label it “Upper Bidwell Park” and put “swimming” for why you went there.

I am asking for a basic sketch map of places you have visited off campus. You may place the Chico State campus on your map as a reference or starting point. What is important is where you’ve been off campus, not how you draw it. Hopefully you will be able to put at least one item on your map besides campus, and five items would be great. If you can place more locations on your map please feel free to do so. Draw the way or routes to these locations and identify features along the way to the best of your ability. Ideally the route would have enough information so that a friend of yours could use the map to find the locations on it. If you’ve been to a series of places in one general area, you can just draw that area and list the places inside that area. Remember, I am not looking for artistic ability, just what places you locate and how you got there on your sketch map. It is what geographers would refer to as a visual representation of your concept of space and area in Chico!!!
PARTICIPANT RESPONSES TO DEMOGRAPHIC QUESTIONNAIRE

Summary of Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is your gender?</td>
<td>Two participants were male and five were female</td>
</tr>
<tr>
<td>2. What is your age?</td>
<td>All participants were 18</td>
</tr>
<tr>
<td>3. Do you live in Whitney Hall?</td>
<td>All live in Whitney</td>
</tr>
<tr>
<td>4. On what date did you move to Chico?</td>
<td>All moved to Chico between 8/21 and 8/23</td>
</tr>
<tr>
<td>5. Have you lived in Chico prior to living in Whitney Hall?</td>
<td>None have lived in Chico previously</td>
</tr>
<tr>
<td>5a. If so, how long?</td>
<td>-</td>
</tr>
<tr>
<td>6. How many times have you been to Chico prior to the start of the Fall 2007 semester?</td>
<td>Visited Chico on avg. 2.35 times before moving here</td>
</tr>
<tr>
<td>6a. What were the main reason(s)) for your prior visits?</td>
<td>Visited mostly for orientation or other college related activities</td>
</tr>
<tr>
<td>7. What is the name and state of your hometown (place lived in before attending Chico State)?</td>
<td>All from California. The furthest participant was from San Diego. Many were from Sacramento and the surrounding areas.</td>
</tr>
<tr>
<td>8. Is your hometown considered rural, small, medium or large city?</td>
<td>Most participants answered medium or large.</td>
</tr>
<tr>
<td>8a. What is the approximate population of your hometown?</td>
<td>Answers to this question only showed that the participants did not know the population of their hometowns. One participant remarked that there are 70 million people living in Sacramento.</td>
</tr>
<tr>
<td>9. Is this your first time living independently from your parents?</td>
<td>It was the first time living independently from parents for all participants.</td>
</tr>
<tr>
<td>10. Is this your first year in College?</td>
<td>Everyone in first year of college</td>
</tr>
<tr>
<td>11. How many units are you enrolled in this semester?</td>
<td>Average enrollment: 14.28 units</td>
</tr>
<tr>
<td>Question</td>
<td>Summary</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>12. Do you have friends or family that lives in Chico?</td>
<td>One person had a friend in Chico other than those living in Whitney, none had family in Chico.</td>
</tr>
<tr>
<td>12a. How often do you see or visit those friends or family?</td>
<td>The one person who had a friend in Chico remarked that they only saw this person approximately once a week.</td>
</tr>
<tr>
<td>13. What are your favorite recreational activities?</td>
<td>The participants were an overall sporty group, only one participant did not mention a sport activity. Three students mentioned outdoor activities such as Ultimate Frisbee, hiking and white water rafting. One respondent listed &quot;anything outside&quot;.</td>
</tr>
<tr>
<td>14. How often do you plan on leaving Chico during the Fall 2007 semester? Include all trips outside of Chico.</td>
<td>Participants said they would leave, on average, 4 times during the semester. Answers ranged from once to 10 times.</td>
</tr>
<tr>
<td>14a. What will be the purpose of those trips?</td>
<td>All destinations when leaving Chico were their home town. Reasons for the visits were holidays or to visit family/friends.</td>
</tr>
<tr>
<td>15. When traversing to and from Chico are you typically a driver or passenger?</td>
<td>All but one student listed being a passenger when leaving Chico in a car. The student listed as a driver did not have a car with him on campus so it is unsure why he answered as being a driver.</td>
</tr>
<tr>
<td>16. When riding in a vehicle around Chico are you typically a driver or passenger?</td>
<td>All but one student responded as being a passenger. Again, the student listed as a driver did not have a car with him on campus so it is unsure why he answered as being a driver.</td>
</tr>
<tr>
<td>17. Are you involved in the First Year Experience Program?</td>
<td>No students were involved in the first year program.</td>
</tr>
<tr>
<td>18. Are you enrolled in a University 101 class?</td>
<td>No students were involved in a University 101 Class.</td>
</tr>
<tr>
<td>19. Do you live on the CAVE (9th) floor of Whitney Hall?</td>
<td>One student was involved in CAVE and lived on 9th floor of Whitney which was designated as the CAVE floor.</td>
</tr>
</tbody>
</table>
### Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. What is your age?</td>
<td>18, 18, 18, 18, 18, 18, 18</td>
</tr>
<tr>
<td>3. Do you live in Whitney Hall?</td>
<td>y, y, y, y, y, y, y</td>
</tr>
<tr>
<td>5. Have you lived in Chico prior to living in Whitney Hall?</td>
<td>No, No, No, No, No, No, No</td>
</tr>
<tr>
<td>5a. If so, how long?</td>
<td></td>
</tr>
<tr>
<td>6. How many times have you been to Chico prior to the start of the Fall 2007 semester?</td>
<td>3 or 4, 2, 2, 2, 3, 2, 2</td>
</tr>
<tr>
<td>6a. What was the main reason(s) for your prior visits?</td>
<td>Orientation, visit the area, To evaluate the campus and for orientation, Orientation, look at campus, Orientation, basketball tournament, Orientation, visit school, A placement test and orientation, To visit the campus and for summer orientation</td>
</tr>
<tr>
<td>7. What is the name and state of your hometown (place lived in before attending Chico State)?</td>
<td>San Diego, Ca, Orangevale, Ca, Sacramento, Ca, Sacramento, Ca, Sacramento, Ca, Sacramento, Ca, Cameron Park, Ca</td>
</tr>
<tr>
<td>8. Is your hometown considered rural, small, medium or large city?</td>
<td>Large, Medium, Large, Medium/Large, Large, Large, Small, Semi-rural</td>
</tr>
<tr>
<td>Question</td>
<td>A</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>8a. What is the approximate population of your hometown?</td>
<td>1 Million +</td>
</tr>
<tr>
<td>9. Is this your first time living independently from your parents?</td>
<td>Yes</td>
</tr>
<tr>
<td>10. Is this your first year in College?</td>
<td>Yes</td>
</tr>
<tr>
<td>11. How many units are you enrolled in this semester? (If you are attending classes at more than one college, include all units)</td>
<td>15</td>
</tr>
<tr>
<td>12. Do you have friends or family that lives in Chico?</td>
<td>No</td>
</tr>
<tr>
<td>12a. How often do you see or visit those friends or family?</td>
<td>N/A</td>
</tr>
<tr>
<td>13. What are your favorite recreational activities?</td>
<td>Volleyball, outdoor activities, shopping, running</td>
</tr>
<tr>
<td>Question</td>
<td>Participant</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>14. How often do you plan on leaving Chico during the Fall 2007 semester? Include all trips outside of Chico.</td>
<td></td>
</tr>
<tr>
<td>14a. What will be the purpose of those trips?</td>
<td>Thanksgiving</td>
</tr>
<tr>
<td>15. When traversing to and from Chico are you typically a driver or passenger?</td>
<td>Driver</td>
</tr>
<tr>
<td>16. When riding in a vehicle around Chico are you typically a driver or a passenger?</td>
<td>Driver</td>
</tr>
<tr>
<td>17. Are you involved in the First Year Experience Program?</td>
<td>No</td>
</tr>
<tr>
<td>18. Are you enrolled in a University 101 class?</td>
<td>No</td>
</tr>
<tr>
<td>19. Do you live on the CAVE (9th) floor of Whitney Hall?</td>
<td>No</td>
</tr>
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**RESPONSES TO ACTIVITY QUESTIONNAIRE**

<table>
<thead>
<tr>
<th>Question</th>
<th>Participant A</th>
<th>Participant B</th>
<th>Participant C</th>
<th>Participant D</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>n</td>
<td>n</td>
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<td>3</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>4</td>
<td>n</td>
<td>CAVE, but haven't started yet</td>
<td>Yes CAVE</td>
<td>n</td>
</tr>
<tr>
<td>5</td>
<td>y</td>
<td>y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>7</td>
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<td>n</td>
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<td>8</td>
<td>y</td>
<td>y</td>
<td>n</td>
<td>n</td>
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<tr>
<td>9</td>
<td>10-May</td>
<td>5 to 6</td>
<td>10-Jan</td>
<td>5</td>
</tr>
</tbody>
</table>

**Week One**

1. CAVE, but haven't started yet
2a. 3 to 5
3a. bike
4a. 3 to 5
4b. 1 mile
5a. 1 or 2
5b. Downtown or to nail salon
6a. Business Administration
7a. (Plans to enroll in intramural volleyball/other sports. Plans to pledge in spring)
8. y
9. 10-May

**Week Five**

1. On
2. bike
3a. feet
4b. Same building
5a. 1 or 2
5b. Downtown Gym (Chico Fitness), Gym (In Motion), Rosedale Elementary (Volunteer)
6a. Business Administration
7a. (Plans to enroll in intramural volleyball/other sports. Plans to pledge in spring)
8. y
9. 10-Jan

**Week Fifteen**

1. On
2. bike
3a. feet
4b.Same building
5a. 1 or 2
5b. Downtown Gym (Chico Fitness), Gym (In Motion), Rosedale Elementary (Volunteer)
6a. Business Administration
7a. (Plans to enroll in intramural volleyball/other sports. Plans to pledge in spring)
8. y
9. 10-Jan
<table>
<thead>
<tr>
<th>Question</th>
<th>Participant A</th>
<th>Participant B</th>
<th>Participant C</th>
<th>Participant D</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>at least once a day</td>
<td>almost every day</td>
<td>1</td>
<td>2 or 3 times a week</td>
</tr>
<tr>
<td>11</td>
<td>food, shopping</td>
<td>gym, volunteer program, food</td>
<td>going downtown or to friends house</td>
<td>to gym or back home or store</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td>never</td>
<td>Once</td>
<td>0</td>
</tr>
<tr>
<td>12a</td>
<td>0</td>
<td>Thanksgiving break</td>
<td>to go home</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>Small. Not a lot of places to go. But I like downtown and the river</td>
<td>small, able to walk to most places</td>
<td>Old San Luis Obisbo-esque</td>
<td>to go back home</td>
</tr>
<tr>
<td>14</td>
<td>Completely different atmosphere. A more small-town vibe. My hometown is always on the move, very busy. A lot more people live in San Diego. San Diego's downtown is five times bigger and more crowded.</td>
<td>Small, less diverse than San Diego</td>
<td>Much smaller. Homes are more centralized. Culture is much more warm and outgoing.</td>
<td>definitely smaller, less diverse, but more social, a person can walk anywhere</td>
</tr>
</tbody>
</table>

**Notes:**
- **Week One:**
  - Participant A: at least once a day
  - Participant B: almost every day
  - Participant C: 1 time
  - Participant D: 2 or 3 times a week
- **Week Five:**
  - Participant A: at least once a day
  - Participant B: going downtown or to friends house
  - Participant C: going downtown or to friends house
  - Participant D: to gym or back home or store
- **Week Fifteen:**
  - Participant A: 1 time
  - Participant B: going home, going to visit friends at other colleges
  - Participant C: going home, going to visit friends at other colleges
  - Participant D: to gym or back home or store
<table>
<thead>
<tr>
<th>Question</th>
<th>Participant A</th>
<th>Participant B</th>
<th>Participant C</th>
<th>Participant D</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Raw Bar, River, Lu Lu's, Jamba Juice</td>
<td>Lu Lu's- cute clothes, Pluto's- good salads, Jamba Juice- Yummy smoothies, Chico Mall- They have a Verizon store, Celestinos- good pizza</td>
<td>Gym- get in shape, Celestinos- best pizza, Cabo Tan- to get a tan and do my eyebrows, Starbucks- good coffee, Lu Lu's- cute clothes</td>
<td>Ivy Street, Franky's, Chico Mall, Target</td>
</tr>
<tr>
<td></td>
<td>Ivy Street, Franky's, Chico Mall, Target</td>
<td>Franky's, Ivy St. Target, Golden I, Trucker</td>
<td>Chico Middle School- water polo, The Senator- concert, The Mall- shop, Target- shop, Ivy Franky's- eat, Ivy street- party</td>
<td>Chico Street. (parties), Tres Hombres, Chipotle, Frankie's Pizza, Taco Bell</td>
</tr>
<tr>
<td></td>
<td>Chico Middle School- water polo, The Senator- concert, The Mall- shop, Target- shop, Ivy Franky's- eat, Ivy street- party</td>
<td>Ivy Street. (parties), Tres Hombres, Chipotle, Frankie's Pizza, Taco Bell</td>
<td>Chipotle- delicious food, Trader Joes- Shopping for groceries, Panda- Yum!, Lu Lu's- shopping for clothes, Jon and Boms- desert, frozen yogurt</td>
<td>In Motion Fitness- to work out, Junior High- polo practice, Target- to shop, Chipotle- to eat, Trader Joes- grocery shop</td>
</tr>
<tr>
<td></td>
<td>Ivy Street. (parties), Tres Hombres, Chipotle, Frankie's Pizza, Taco Bell</td>
<td>Chico Street. (parties), Tres Hombres, Chipotle, Frankie's Pizza, Taco Bell</td>
<td>In Motion Fitness- to work out, Junior High- polo practice, Target- to shop, Chipotle- to eat, Trader Joes- grocery shop</td>
<td>Chico fitness, taco bell</td>
</tr>
<tr>
<td>16</td>
<td>same as 15</td>
<td>Chico Mall- to fix my cell phone, Lu Lu's- cute clothes, Pluto's- good salads, Jamba Juice- Yummy smoothies, Celestinos- good pizza</td>
<td>Gym- get in shape, Celestinos- best pizza, Cabo Tan- to get a tan and do my eyebrows, Starbucks- good coffee, Lu Lu's- cute clothes</td>
<td>Ivy St. (Parties) Franky's, Downtown (various reasons)</td>
</tr>
<tr>
<td></td>
<td>Ivy St. (Parties) Franky's, Downtown (various reasons)</td>
<td>Franky's- Pizza, Ivy Street- Party, Little Quickie mart on 5th and Ivy- beverages, Golden I- money stuff</td>
<td>Chico middle school- water polo, The bank, get money, Gym- work on my fitness, Ivy Street- party, Target- shop, Mall- Shop</td>
<td>Chico Street. (Parties), Mr. Pickles, Target, Taco Bell, Nicks (friend's house?)</td>
</tr>
<tr>
<td></td>
<td>Chico middle school- water polo, The bank, get money, Gym- work on my fitness, Ivy Street- party, Target- shop, Mall- Shop</td>
<td>Ivy Street. (parties), Mr. Pickles, Target, Taco Bell, Nicks (friend's house?)</td>
<td>Chipotle- food, Panda- food, Trader Joes- shopping for groceries, Target- shop for toiletries etc..., Movie Theater- fun, see new movies</td>
<td>In Motion Fitness- to work out, Junior High- polo practice, Target- to shop, Sun Center- to shop, Trader Joes- grocery shop</td>
</tr>
<tr>
<td></td>
<td>Chico middle school- water polo, The bank, get money, Gym- work on my fitness, Ivy Street- party, Target- shop, Mall- Shop</td>
<td>Ivy Street. (parties), Mr. Pickles, Target, Taco Bell, Nicks (friend's house?)</td>
<td>In Motion Fitness- to work out, Junior High- polo practice, Target- to shop, Sun Center- to shop, Trader Joes- grocery shop</td>
<td>Chico Fitness, GNC, Walgreen's</td>
</tr>
<tr>
<td></td>
<td>Chico middle school- water polo, The bank, get money, Gym- work on my fitness, Ivy Street- party, Target- shop, Mall- Shop</td>
<td>In Motion Fitness- to work out, Junior High- polo practice, Target- to shop, Sun Center- to shop, Trader Joes- grocery shop</td>
<td>Chico Fitness, GNC, Walgreen's</td>
<td>gym-to workout, home- to get stuff (food, water, etc.) and see girlfriend, Walgreen's- for food, bus station- to go/come back from home</td>
</tr>
<tr>
<td>17</td>
<td>The railroad tracks</td>
<td>I haven't found a place I dislike yet. Everything, everyone is really nice.</td>
<td>I have not experienced any places that I don't like</td>
<td>Oroville, Its yucky and boring</td>
</tr>
<tr>
<td></td>
<td>I have not experienced any places that I don't like</td>
<td>Downtown-kind of boring and hot</td>
<td>The bank- depressing</td>
<td>book store, means I have to read</td>
</tr>
<tr>
<td></td>
<td>Downtown-kind of boring and hot</td>
<td>The bank- depressing</td>
<td>Target (too far), Post office (for school), book store (for school), Some party (people got shot)</td>
<td>bank- no money, Pool- tired of swimming, Safeway- buy too much food, Costco- buy too much, Other food places- spend money</td>
</tr>
<tr>
<td></td>
<td>The bank- depressing</td>
<td>Target (too far), Post office (for school), book store (for school), Some party (people got shot)</td>
<td>book store, means I have to read</td>
<td>W. Sacramento and Nord, because they are ghetto and far to walk</td>
</tr>
<tr>
<td></td>
<td>Target (too far), Post office (for school), book store (for school), Some party (people got shot)</td>
<td>book store, means I have to read</td>
<td>Bank- no money, Pool- tired of swimming, Safeway- buy too much food, Costco- buy too much, Other food places- spend money</td>
<td>W. Sacramento and Nord, because they are ghetto and far to walk</td>
</tr>
<tr>
<td></td>
<td>book store, means I have to read</td>
<td>Bank- no money, Pool- tired of swimming, Safeway- buy too much food, Costco- buy too much, Other food places- spend money</td>
<td>W. Sacramento and Nord, because they are ghetto and far to walk</td>
<td>Chico Fitness, its fun to work out, but this place is gloomy and not motivating</td>
</tr>
<tr>
<td></td>
<td>Bank- no money, Pool- tired of swimming, Safeway- buy too much food, Costco- buy too much, Other food places- spend money</td>
<td>Chico Fitness, its fun to work out, but this place is gloomy and not motivating</td>
<td>Chico Fitness, its fun to work out, but this place is gloomy and not motivating</td>
<td>Chico Fitness- Workout, Best buy- buy electronics, Woodstock's- good food, atmosphere, In-n-Out-good food</td>
</tr>
<tr>
<td></td>
<td>W. Sacramento and Nord, because they are ghetto and far to walk</td>
<td>Chico Fitness, its fun to work out, but this place is gloomy and not motivating</td>
<td>Chico Fitness, its fun to work out, but this place is gloomy and not motivating</td>
<td>Chico Fitness- Workout, Best buy- buy electronics, Woodstock's- good food, atmosphere, In-n-Out-good food</td>
</tr>
<tr>
<td>Question</td>
<td>Participant E</td>
<td>Participant F</td>
<td>Participant G</td>
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<tr>
<td></td>
<td>Week One</td>
<td>Week Five</td>
<td>Week Fifteen</td>
<td>Week One</td>
</tr>
<tr>
<td>1</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
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<tr>
<td>2</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
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<td>2a</td>
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<td>3</td>
<td>n</td>
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<td>3b</td>
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<td>3c</td>
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<td>4</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
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<td>4a</td>
<td></td>
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<td>4b</td>
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<tr>
<td>4c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>y</td>
<td>y</td>
<td>y</td>
<td>Y (long board)</td>
</tr>
<tr>
<td>5a</td>
<td>2 to 3</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>5b</td>
<td>Stores for food</td>
<td>stores</td>
<td>classes</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>Y (long board)</td>
</tr>
<tr>
<td>6a</td>
<td></td>
<td></td>
<td></td>
<td>political science</td>
</tr>
<tr>
<td>7</td>
<td>y</td>
<td>y</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>7a</td>
<td>water polo in spring</td>
<td>Hall Council</td>
<td>water polo</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>n</td>
<td>N</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>9</td>
<td>4-5 times a day</td>
<td>5 to 6</td>
<td>3 to 4</td>
<td>7-May</td>
</tr>
<tr>
<td>10</td>
<td>Only on the weekends, unless food shopping</td>
<td>3-4 times a week</td>
<td>maybe once a day</td>
<td>5 times a week or more</td>
</tr>
<tr>
<td>11</td>
<td>food shopping</td>
<td>to get off campus</td>
<td>friends houses</td>
<td>food, downtown, parties</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td>none</td>
<td>3 to 4</td>
<td>0</td>
</tr>
<tr>
<td>12a</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

- Question 1: No activities in the first week, no activities in the fifth week, no activities in the fifteenth week.
- Question 2: No activities in the first week, no activities in the fifth week, no activities in the fifteenth week.
- Question 3: No activities in the first week, no activities in the fifth week, no activities in the fifteenth week.
- Question 4: No activities in the first week, no activities in the fifth week, no activities in the fifteenth week.
- Question 5: Participated in water polo in the spring and Hall Council in the first week.
- Question 6: Participated in water polo in the first week.
- Question 7: Participated in water polo in the first week.
- Question 8: Participated in the Hall Council in the first week.
- Question 9: Participated in water polo in the first week.
- Question 10: Participated in water polo in the first week.
- Question 11: Participated in water polo in the first week.
- Question 12: Participated in water polo in the first week.
<table>
<thead>
<tr>
<th>Question</th>
<th>Participant E</th>
<th>Participant F</th>
<th>Participant G</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Friendly, green</td>
<td>Small town, cute little shops, lots of trees</td>
<td>Small hippie town</td>
</tr>
<tr>
<td></td>
<td>I really like how close everything is, it's all within a 15-30 minute walk</td>
<td>I love it here, it is a very friendly, pedestrian oriented town</td>
<td>A fun, cultured hippie/party town</td>
</tr>
<tr>
<td></td>
<td>Week One</td>
<td>Week Five</td>
<td>Week Fifteen</td>
</tr>
<tr>
<td>14</td>
<td>Chico is smaller and definitely more of a college town, also much more friendly.</td>
<td>Smaller, smaller, smaller, less cultured, and more friendly</td>
<td>Smaller for everything but more friendly</td>
</tr>
<tr>
<td></td>
<td>It's a very much smaller packed in city. The people are a lot friendlier and it’s a very diverse culture with a great atmosphere</td>
<td>Very small and compact, very diverse and much more cultured and artsy</td>
<td>Chico is a lot bigger. However culture and atmosphere wise it is about the same.</td>
</tr>
<tr>
<td></td>
<td>Week One</td>
<td>Week Five</td>
<td>Week Fifteen</td>
</tr>
<tr>
<td>15</td>
<td>Franky’s, Taco Bell, Jon &amp; Bon’s, Parties</td>
<td>Tres Hombres- good bean dip, For Elise- cute clothes, Raley’s-food, Target-anything, Lu Lu’s- cute clothes</td>
<td>Lily’s house, shoe closet, LuLu’s Silvana’s house, The Bear</td>
</tr>
<tr>
<td></td>
<td>Ivy St (parties), Bidwell Park (fun), Chipotle, Friends house, home</td>
<td>Franky’s- late night downtown pizza, Taco de Acapulco- great quesadillas, Apartments at 3rd and Nord always a fun party, Friend Steven’s- place to kickback and hang out, WinCo- Cheap food!</td>
<td>Downtown (parties) Five and Eye- really good food, Friend’s house- hang out</td>
</tr>
<tr>
<td></td>
<td>Downtown (food, parties), Bidwell park (fun)</td>
<td>Taco de Acapulco- great quesadillas, Downtown-stores and parties, Friend Steven’s- to hang out, Franky’s- late night pizza</td>
<td>American Cancer Society Thrift Store, Salvation Army, Bookstore, Root beer restaurant, Lu Lu’s.</td>
</tr>
<tr>
<td></td>
<td>Downtown (parties)</td>
<td>Downtown (parties)</td>
<td>Discovery Shoppe Thrift Store- best deals around, Cancer Society Thrift Store- great prices, Salvation Army Thrift Store- big selection of vintage stuff, Payless shoes- cute and affordable shoes, Used Bookstore- fun to find new books to read, I just look around mostly.</td>
</tr>
<tr>
<td>16</td>
<td>Franky’s, Taco Bell, Jon &amp; Bon’s, Parties</td>
<td>See above</td>
<td>Same as above, Safeway, bookstore, salvation army, root beer restaurant</td>
</tr>
<tr>
<td></td>
<td>Downtown (food, parties), Bidwell park (fun)</td>
<td>Downtown (parties) Five and Eye- really good food, Friend’s house- hang out</td>
<td>Safeway- food/groceries, Discovery Shoppe thrift store- fun looking for bargains, US Bank- Money, Cancer Society Thrift Store- bargains, Used bookstore- look for books to read</td>
</tr>
<tr>
<td>17</td>
<td>I don’t know.</td>
<td>The Dungeon is creepy, and the workers are mean. That’s all so far.</td>
<td>I have not been anywhere I haven't liked yet.</td>
</tr>
<tr>
<td></td>
<td>The Bank, I get depressed.</td>
<td>No where!</td>
<td>None.</td>
</tr>
<tr>
<td></td>
<td>Week One</td>
<td>Week Five</td>
<td>Week Fifteen</td>
</tr>
</tbody>
</table>
FOCUS GROUP QUESTIONS

These questions are written using town, city and community as synonyms.

Focus Group

1. How did participating in this study affect you?
   Students Response: The participants indicated that there where times when they would be walking off campus and they would think about their location, the maps they have drawn during the study and what they did wrong on the maps.
   Conclusions: Students were certainly more cognizant of their spatial knowledge as a result of participation in the study.

2. Did participating in this study help you spatially learn about Chico? Did you learn Chico better/quicker than your peers not involved in the study? Explain? In what way?
   Students Response: Students felt that the study affected their spatial learning marginally. They indicated that when they are off campus they are often in large groups and rely on one person to navigate and don’t pay attention to where they are going.
   Conclusions: The students felt that they did not learn Chico spatially any quicker than their peer, even though they indicated in question 1 that they would think about their maps and mentally correct mistakes while walking around town. It is interesting that, much like navigating in a car, when the students walk in large group only one person does the actual navigating and the rest just follow.

3. Do you feel like a part of the greater Chico Community?
   Students Response: One student indicated that she still felt like a visitor and that it still felt odd to go places and think ‘I didn’t know this was here’. Other students indicated that they now felt that Chico was their new home and would refer to is such when visiting their home town.
   Conclusions: Through meeting and observing the students four times at this point, I get the sense the student who felt like a visitor in Chico was the least extroverted of the students. Perhaps a lower level of social interaction caused this student to still feel like a visitor during her 15th week living in Chico. Interestingly, this student was the only student to have a job off campus.

4. What activities have helped you learn about Chico or helped you experience the community?
   Student Responses: Personal exploration such as walking around downtown. Excursions to locations further from campus such as the movie theater, Trader Joe’s and Target also helped them learn about Chico’s spatiality.
   Conclusions: No mention of map use. Acquisition of knowledge from navigational experience only. I’m sure the students were provided a campus map upon their arrival in Chico, but where they ever given a map of Chico?

4a. How did you find out about these locations?
   Student Responses: Friends who had cars knew where they were and drove them there.
   Conclusions: Even though students were driven to locations further from campus, and as concluded before, being a passenger in a car doesn’t provide a great deal of additional spatial knowledge, students felt that these excursions did help them learn more about Chico’s spatiality.

5. What would be a good way to get you into the community?
   No response recorded.
6. Does knowing more about the town make it more accessible? (by accessible – more willing to venture out)?

*Student Response:* Yes, students felt they now had general idea of where to go and the best way to get there when off campus.

*Conclusions:* I don’t think Chico is ever perceived as not accessible. With downtown right next to campus it is easy to transition from being on campus to being downtown making exploration easy.

7. What could help you learn more about the town/community?

*Student Response:* The students overwhelming response to question was having a car. They indicated that in most instances when they learned about a new place they were taken to it in a car. Some students also indicated that they would learn the bus more if it were less confusing to take. All of the students had indicated they had never taken a bus before moving to Chico and perhaps having some around that could show them how to efficiently use the bus system would encourage them to use it more.

8. Regarding the questions: “On average, how many times a day do you leave your dorm room?” Did you answer reflect how many times you left your dorm or dorm room proper? (10 seemed like a lot of times to leave your building)

*Student response:* It meant leaving the actually dorm building

9. Only one of you ahs a car here on campus and that person didn’t bring it to Chico until the middle of the semester. What are the reasons you do not have a car with you in Chico?

*Student Response:* The students indicated that they were told that they would not need one and that they could get around fine without one. All students indicated they would like to have one and one indicated that they would definitely be bringing one next semester. They indicated that they felt that they would know Chico better if they had a car.

*Conclusions:* Student’s feel a little spatially trapped without the freedom of a car. Perhaps better introduction into the use of the bus system would lessen this. Students are in fact encouraged not to bring a car to campus with them while living in the dorms. I think this is good initially, forcing them to walk downtown and learn their surroundings by foot. But in order for students to get an overall feel for Chico, a car certainly assists in their exploration.

10. Since no one has cars, what mode of transportation do you use to get to the mall, Target, Trader Joe’s, movies, etc.?

*Student Response:* One student indicated that they biked to Target once and indicated that it was too far to ever do again. Another indicated that they biked to In Motion Fitness. Others took taxis or got rides from peers.

*Conclusions:* When venturing out beyond walking distance, students used various forms of transportation though not all of them were successful. This is where the need/want of a car comes into play.

11. Has anyone participated in or knows what Adventure Outings are?

*Student Response:* No one participated, but they know what they are and are somewhat interested.

*Conclusions:* I see adventure outings as a great resource to students in regards to learning about not only Chico, but northern California. Perhaps freshmen living in dorms could be provided with a voucher for a free trip with Adventure Outing or it could be assign as a field trip in the University 101 classes.

12. Can you go into Riley’s if you are underage?

*Student Response:* The students indicated that they didn’t think so and none of them had been inside.

*Conclusion:* This question was asked because many of the student maps included Riley’s Bar on their maps. It is interesting that it is used as a landmark even though they aren’t allowed to be a patron of the establishment.
13. **How many of you have ridden the bus? Are you aware that it is free with your student ID?**

   *Student Repose:* 3 out of 5 had ridden, all knew it was free.

   *Conclusions:* While a majority of the small sample group had ridden they bus, as indicated by earlier questions, these experiences weren’t always positive. Furthermore, some students indicated that riding the bus in their home town has connotations, and that ‘crazy people ride bus’. This is again a reason to provide students with better direction and mentoring in using the bus system in Chico.

14. **How do you know about the CHICO (Cherry, Hazel, Ivey, Chestnut, Orange) progression of streets?**

   *Student Response:* They were told during orientation.

15. **How did you learn about Streets vs. Aves?**

   *Student Response:* They were told during orientation or leaned by exploring. All students indicated that they know that avenues were north of campus and streets are south of campus.

16. **How many of you have been to?**

   - Upper Park – 1 on a Sunday with parents
   - Yahi Trail – 0
   - Horshoe Lake – 0
   - Lower Park – 0
   - Either nature preserves – 0
   - Vina monastery – 0
   - Bidwell Mansion – All know where it is, haven’t toured it
   - Chico Museum – All know where it is, none have gone
   - Stansbury House – 0
   - California Park – 0
   - Sacramento River – 0
   - Scotty’s Landing – 0
   - Covered bridge – 0
   - Chapmantown – 0 None even knew it existed
   - The Mall – all
   - Trader Joe’s – 3 out of 5
   - Tinseltown movie theater 4 out of 5
   - Pageant theater – 0
   - Paradise – 0 one student knew of it because her Dad’s friend lives up there
   - Oroville Lake or Dam? – 0
   - Joss house in Oroville – 0

   *Seen a play? What theater? – 1 on campus, 1 had been to concert at Senator Theater*

17. **Another other destinations not named here:**

   - Walmart – 1

**Notes about group map:**
- Told to put campus in middle
- Didn’t know NSEW directions
- Worked really well on campus, but off campus information was more vague and often two students would work together to figure out the correct location of something
- North portion of town all drawn by student who had job in that area
- Seems that the students were influenced a lot by what was discussed earlier – example, it was disused that Nord is also called Walnut Street and this was noted on the map.
SKETCH MAPS

Student A: Session One (Week One)
Student A: Session Two (Week Five)

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### Student A: Session Three (Week Fifteen)

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Student B: Session One (Week One)
Student B: Session Two (Week Five)
Student B: Session Three (Week Fifteen)
Student C: Session One (Week One)
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<td>Starbucks</td>
<td>Jon Bins</td>
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Student D: Session One (Week One)
Student D: Session Two (Week Five)
I forget locations pretty easily, sorry.

[Hand-drawn map with various locations and streets labeled, including 'CSUC', 'Loy St', and 'Chestnut St'.]
Student E: Session One (Week One)
Student E: Session Two (Week Five)
Student E: Session Three (Week Fifteen)
Student F: Session One (Week One)
Student F: Session Two (Week Five)
Student F: Session Three (Week Fifteen)
Student G: Session One (Week One)
Student G: Session Two (Week Five)
Student G: Session Three (Week Fifteen)