BICYCLE AND PEDESTRIAN HARMONY: PERSPECTIVES ON BICYCLISTS BEHAVIOR ON CAMPUS

by

JOHN J. SCOTT

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Approved by:

Major Professor
Dr. Hyung Jin Kim

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A report submitted in partial fulfillment of the requirements for the degree:
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Department of Landscape Architecture/ Regional and Community Planning
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Kansas State University
Manhattan, Kansas

Committee:
Dr. Hyung Jin Kim, Department of Landscape Architecture/ Regional and Community Planning
Dr. John Keller, Department of Landscape Architecture/ Regional and Community Planning
Dr. Larry Lawhon, Department of Landscape Architecture/ Regional and Community Planning

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John J. Scott

Regional and Community Planing, Kansas State University

Abstract

In the past 20 years, the promotion of bicycle-friendly environments in the United States has become a major topic for city planners, engineers, landscape architects, and concerned citizens. The City of Manhattan, Kansas, and Kansas State University (KSU) are following the trend by creating more bicycle infrastructure. As an example, the Campus Planning and Facilities Management Department at KSU recently installed new signs on the pavement that support existing bicycle rules around campus. The rules require cyclists to dismount and walk their bicycles on the main campus sidewalk and yield to pedestrians when crossing Bosco Plaza. While signs are important, these markers should be part of a bigger plan that includes infrastructure, education and enforcement working together to create a safe, active transportation system. This project explores bicycling culture at KSU campus and uses three key concepts of infrastructure, education, and enforcement to discover what improvements are needed and what improvements can be made.

The video-based observation method consists of recording the activity of cyclists entering the campus core and analyzing the behavior of cyclists and pedestrians. The survey was conducted via social media in order to understand safety perceptions and behaviors of bicyclists and pedestrian as daily commuters to campus.

The results from both methods show a lack of involvement with infrastructure, education, and enforcement for cycling at Kansas State which creates areas that are not safe for pedestrians. Bicycling (15.4%) and walking (46.7%) represent 62.1% of commuters to campus; therefore, a safer approach to campus infrastructure needs to be addressed for these users. Results indicate that the dismount signs are ignored 82.9% of the time, and collisions between cyclists and pedestrians do happen on campus. An absence of enforcement is shown in the data, which is compounded by a non-existing bicycling education program, making for a less than optimal active transportation system on campus.

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All Black and White Bicycle photographs by John J. Scott (2013 & 2014)

Acknowledgments

During my first week at Kansas State University, I was nearly hit by a speeding bicycle cutting through Bosco Plaza and that was the catalyst for a few projects including this one. A thank you goes out to the careless cyclist that nearly hit me. I would also like to thank my committee for their continued support and encouragement: Dr. Hyung Jin Kim, my committee chair, Dr. John Keller and Dr. Larry Lawhon. Thank you to all the faculty within the College of Architecture, and Department of Landscape Architecture/ Regional and Community Planning. Thank you to Dr. Cheryl Ragar for your support, insight, patience, and valued friendship.

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Snow Bikers, photo by John J. Scott (2014)

Chapter I. Introduction

Successful bicycle networks and bicycle cultures have become a sign of a healthy city and healthy citizens. Bicycle transit systems rank high among requested amenities from citizens across the United States. The increased usage and promotion of a bicycling culture is evident in our streets, parks, and neighborhoods. Signs and pavement markings for bicycles appear on most city streets throughout the country. Bicycle trails serve as another system many citizens enjoy on a regular basis, and they are a selling point for cities trying to attract growth.

1. Background

In the United States, bicycling rates have increased dramatically since 1990 (Pucher, Buehler, & Seinen, 2011). This trend shifts the way professional planners, engineers, and designers look at transit systems and infrastructure. Bicycle paths, bicycle lanes, and other bicycle-based transportation services have seen major growth across the United States. The number of bicycle commuters in the United States grew by 64% from 1990 to 2009 (Pucher, Buehler, & Edward, 2011). The increase in urban bicycling equates to more bicycle amenities, such as bicycle lanes, bicycle share programs, bicycle boxes, bicycle boulevards, and other types of bicycle infrastructure (Pucher, Dill, & Handy, 2010). Given this increase in amenities, an interdependent relationship exists between bicycling facilities and a higher number of people bicycling.

Students and faculty at KSU reflect the trends for increased bicycle transportation. Surveys from 2008 (Bopp, Kaczynski, & Wittman, 2011) show 36.2% of students and 29.1% of faculty participate in a form of active transportation, walking or bicycling, to and from campus. Studies show that college students are the most likely demographic to use bicycles for

daily travel (Dill & Carr, 2003; Heinen, Van Wee, & Maat, 2010). This knowledge amplifies the importance of a successful bicycle transportation network on campus. College campuses and local communities can market comprehensive bicycle networks as a tool to attract students and new residents.

2. Problem

The Campus Planning and Facilities Management Department at KSU recently installed new signs that support existing bicycle rules around campus. The rules require bicyclists to dismount and walk through the main campus sidewalk and yield to pedestrians when crossing Bosco Plaza. Bicyclists ignore the dismount sign 82.9% of the time and continue to ride on sidewalks. There is a concern that the new signs are not enough to prevent a physical collision between pedestrians and bicyclists on KSU Campus. Students seem to lack a general understanding of the bicycle rules on campus or disregard the rules and continue to ride in prohibited areas.

3. Research Question and Hypothesis

Are the bicycling signs on campus effective for the safety of both pedestrians and bicyclists? How does enforcement and education of bicycle regulations influence the issue of safety on campus? Do differences exist in the perception of safety among pedestrians and bicyclists that share the same infrastructure? These questions will be explored in this project.

A. Safety

The possibilities of accidents between bicyclists and pedestrians on KSU campus are tremendous. Collisions are not reported to campus police, and, as a result, no data is maintained by KSU on this subject. However, 44% of daily commuters to campus know someone who has experienced a collision with a bicyclist. Regardless of reporting problems, a safety issue exists on campus between bicyclists and pedestrians. When bicyclists use areas that are prohibited from use, a potential for a collision between pedestrians and bicyclists becomes a possibility. This project serves as a tool to analyze the problem on campus from the perspective of bicyclists and pedestrians.

B. Infrastructure, Education, and Enforcement

A successful bicycle-oriented transportation network is one that embraces safe bicycle infrastructure, education, and enforcement. A recent publication from the European Bicycle Conference on Bicycle Transport and Networking indicates "layout and scale, integrated approaches," and "promotion and communication" (Bührmann, 2008) as components of a well-used bicycle network. Another study provides data that shows an increase in bicycle infrastructure, usage, and promotion as keys to define an advanced bicycle network (Pucher, Buehler, & Seinen, 2011). Portland, Oregon, which is a leader in innovative and progressive bicycle networks, promotes a policy that includes coordination, public involvement, and transportation education (City of Portland, 2011). Vancouver, B.C., has specifically outlined the responsibilities for infrastructure, enforcement, public outreach, and education as they relate to various city departments (Litman, Blair, Demopoulos, Eddy, Fritzel, Laidlaw, Maddox, & Forster, 2009). A combination of safe bicycle infrastructure, education, and enforcement components make up a triumphant bicycle transportation network.

When infrastructure, education, and enforcement are synergized, they create a safe bicycle system that works better for everyone. Bicycle infrastructure encompasses a wide variety of elements from bicycle paths to bicycle signs. The education component includes activism, advocacy, organizations, events, local data collection for designers, public information, technology, and planned updates for an active transportation system. Enforcement of rules and regulations needs to happen in conjunction with education to have positive results.

4. Relevance in Design and Planning

With current trends to design and implement more active transportation networks throughout the country, this information can be used to design better bicycle/pedestrian transportation networks. Gaps remain in research concerning the attitudes of bicyclists and pedestrians using the same sidewalks and understanding the perspectives of each group. Having a better understanding of the thoughts and attitudes of both groups can help guide designers with building infrastructure that is more intuitive to the users. This information can also be used to improve and correct flaws in current active transportation infrastructure.

Flat Tire Bagged Handle Bars, photo by John J. Scott (2014)

Chapter II. Literature Review and Precedent Studies

1. Overview

An increase in the popularity in bicycling has also produced an increase in valuable research on the topic of cycling. The topics include bicycle infrastructure, bicycle network design, bicycle community economics, and healthy cities. The literature used will focus on a general background of cycling behavior, infrastructure, safety, education, precedents, and enforcement. Additionally, the literature is focused on relating the problems back to KSU Campus.

2. Literature Review

An understanding of the basic bicycling community is necessary to help comprehend the problem. There are several types of bicyclist levels, and they have very different bicycle infrastructure needs. Riders choose different routes, and the perception of safety plays a role for bicyclists. There are different rules and regulations for bicyclists riding on sidewalks, and there is no consensus among the bicycling experts. All of these issues and subjects reveal the basic background to the bicycling issues.

A. Types of Bicyclists

Most publications indicate that there are three very distinct types of bicyclists, and each type has different infrastructure needs. Not only are the infrastructure requirements different, but the behavior of the three types can be completely different. This may be explained by varying levels of experience and knowledge of the rules of bicycling. There are three types of bicyclists: Group A (advanced bicyclists), Group B (basic bicyclists), and children in Group C (Allen, Rouphail, Hummer, & Milazzo, 1998).

Group A bicyclists are experienced and skilled bicyclists. This group takes longer trips, and usually takes the most direct route possible, regardless of available bicycle routes or bicycle infrastructure. This group does not require a comprehensive bicycle network to ride. They may be seen on long trips along highways in many rural regions, indicating an advanced level of confidence in the safety and skills.

Group B are casual bicyclists who have basic to average skills for bicycling. Bicyclists from this group primarily use bicycles for recreation. Some from this group bicycle for commutes or other reasons, and they may ride on busy streets. This is the largest group, and thus the target audience for bicycle infrastructure. This group does require a more comprehensive bicycle network to use, and the ideal situation is separate bicycle paths from automobiles. Most of the KSU bicyclist commuters fall into this category and are the focus of this study.

Group C is defined as children under the age of 16. This group generally stays in residential areas close to their homes. Traditional neighborhoods with low speed limits and low traffic volumes are the preferred area for Group C. This group also uses separate bicycle lanes and paths.

B. Infrastructure and Design

An interdependent relationship exists between economics and new bicycle infrastructure. According to the U.S. Department of Transportation, funding for active transportation networks (pedestrian and bicycle paths) has increased from $6 million in 1990 to $1.2 billion in 2009 (U.S. Department of Transportation, 2010). According to this report, there has been concurrent improvement to the nation's active transportation infrastructure as the funding has increased for active transportation. Also, this increased interest and funding, has contributed to improved design clarity and an enhanced understanding of the safety needs of cyclists.

(1) Route Choice

Riders at KSU have many options to enter and exit the campus. In general, there is very little variance in elevation in Manhattan, which makes for simpler bicycling. Studies indicate that several factors go into which route cyclists choose to take. Time, bicycle facilities, motor vehicle traffic, road surface quality, and overall perception of safety each play a role in which route cyclists choose for their daily commute.

Research suggests that low travel times and bicycle infrastructure are two of the top reasons for bicyclists to choose a given route (Stinson & Bhat, 2003). The infrastructure includes the types of roads, such as collector, arterial, and local, as well as the kind of bicycle infrastructure, such as shared lanes versus separate lanes. Manhattan has a variety of road types, but the majority of roads leading into campus are residential, which is a preferable route to Group B and Group C bicycle riders due to low traffic volumes and speeds.

(2) Signs

Although there is much more to the design of safe bicycle infrastructure than signs, this study focuses on the effectiveness of infrastructure, education, and enforcement in making a perceived successful bicycle network. Clarity of signs for bicycle infrastructure is the topic of much research.

Three different kinds of signs are typically used in active transportation networks: vertical, pavement marking, and bicycle traffic signals. Vertical signs are traditional signs such as a speed limit sign, and are bolted to a post set into the ground. These are located along the sides of paths and roads. Pavement markings are symbols painted on pavement that give instruction to users from the ground plane. Finally, bicycle traffic signals are similar to traffic lights but are just for cyclists. All three types of bicycle signs should be used together to create a clear system that helps a user safely negotiate a bicycle system and the city's street network as a whole.

(a) Vertical Signs

Two categories of vertical signs have been researched: animate and inanimate. Animate vertical signs show a bicyclist in motion, while the inanimate symbol shows a static motionless bicycle. In one study, animate vertical signs were found to be more effective when compared to inanimate

Figure 1 Inanimate Vertical Sign, Indicating Bicyclists are Present, ("Notify Pedestrians & Driver of Bikers with Bicycle Symbol Signs, SKU," 2013)

In their best practices guidelines, the City of Vancouver, B.C., recommends that vertical signs be lower so they are specifically directed toward bicyclists (Litman et al., 2009). KSU does not have

very many vertical signs, and the ones in place are inanimate. The ideal situation features animate signs placed at a bicyclist's eye level showing figures in motion.

Figure 2 Animate Vertical Sign,Indicating Bicyclists and Pedestrians are Present, ("Pedestrian And Bike Crossing Sign (With Symbol) , SKU," 2013)

bike symbols (Oh, Rogoff, & Smith-Jackson, 2013).

(b) Pavement Markings

Pavement markings, in conjunction with vertical signs, are recommended by many cities. Austin, Texas, conducted an observational study with the University of Texas using colored bicycle lanes, sharrows (pavement markings on roadways that indicate bicycles will share the same roadways with motor vehicles), and a vertical sign that informed motorists that "Bicycles May Use Full Lane." The objective of the study is to better comprehend the safest options for bicycle signs (Brady, Loskorn, Mills, Duthie, & Machemehl, 2011). The research team found the colored pavement markings to be most effective at perceived safety, and they learned an education campaign would be necessary to make the system safer for bicyclists of all ability levels. Other studies have confirmed that colored pavement markings were effective in improving clarity and safety for bicyclists (Parks, Ryus, Tanaka, Monsere, McNeil, Dill, & Schultheiss, 2012; Sadek, Dickason, & Kaplan, 2007; Lin & Luo, 2004). Currently, there are no colored pavement markings on Kansas State Campus or in the city of Manhattan, Kansas.

Cambridge, Massachusetts, conducted a road test to see if sharrows increase safety for bicyclists. Two test sites were selected to record

Figure 3 Pavement Markings on Kansas State Campus, photo by John J. Scott (2013)

the behavior of bicyclists and motorists before and after sharrows were added. The results show that sharrows on streets can help improve the safety for bicyclists and make motorists aware of the possibility of bicyclists on the streets with them (Hunter, Srinivasan, Thomas, Martell, & Seiderman, 2011).

(3) Traffic Signals

Traffic signals for bicyclists are a relatively new concept for bicycle transit systems, and concerns have emerged that must be addressed for bicycle traffic signals to be more effective. For example, Washington, D.C., placed a signal at an intersection and used an observation study and survey to determine the effectiveness of the signal. They found timing issues with the signals, as the users did not want to wait on the signals before proceeding (Parks et al., 2012). Another issue discovered was that the signals needed a better means of detecting when a bicyclist was approaching the signal. A push-button device, similar to pedestrian crosswalks, was recommended for intersections with bike signals. There are a few opportunities on campus that could work with bicycle intersection to have a push-button bicycle traffic signal.

It is clear from the literature that bold and colorful pavement markings are more effective at conveying information to bicyclists. Additionally, animate vertical signs are more pleasing and informative to users. Bicycle signals need some more advances before they are as effective as other signs, and there are opportunities in Manhattan for testing bicycle signals. Cities are trying new techniques and technologies to make the bicycle infrastructure a safer experience for bicyclists, but much research and development remains to be done.

(4) Sidewalk Usage

Riding on sidewalks is actively prohibited in some areas of the country. The infrastructure at KSU often leads bicyclists to use sidewalks in certain areas of campus. This quickly becomes a safety issue when pedestrians are also using the sidewalks. KSU Campus allows bicyclists on certain sidewalks and prohibits them in other areas, which is shown on the KSU Bicycle Routes and Bicycle Parking map, Appendix B. The City of Manhattan also allows cyclists on some sidewalks while prohibiting them on others, Appendix D.

Researchers at Queensland University of Technology in Brisbane, Australia, conducted a survey to explore the behaviors of adult riders in Queensland. Results showed that certain

characteristics of the physical infrastructure affected their behavior. For example, when riders felt that the roads were not safe, they used sidewalks if they were available (Haworth & Schramm, 2011). The same principle applies to riders who do not feel safe at KSU and in Manhattan, Kansas.

(5) Safety

All of the components that go into a bicycle network are intended to make the bicyclists feel safe and protected while using the network. Users are not likely to use a system that they perceive to be unsafe. The majority of bicyclists fall into a category that rides casually, and they are more likely to use a bicycle network if they feel safe using the system (Akar & Clifton, 2008). The overall design and clarity of bicycle infrastructure is a key to making the users feel safe and help to encourage usage. While there is a strong bicycle ridership at KSU, with improved infrastructure could be a catalyst for more bicycling.

C. Education

Education is a key component to ensuring that a bicycle network is used effectively and is safe. Communities with successful bicycle systems tend to educate the public through several techniques. Many cities and states have websites that include some element of bicycle education and safety. Minneapolis has a website that allows users to download maps, connect with smart phone applications, and discover other information about the bicycle network in the city ("Minneapolis City of Lakes," 2013). "Bike ED" in Fayetteville, Arkansas, is an education program that created a video on You Tube to display how Bikes of the Ozarks educates children on bicycle rules and regulations (Kids on Wheels, 2011).

The results of these programs are bicyclists who are educated in how to maneuver traffic and bicycle networks in a predictable, and safe manner. The goal of formal education of bicycle riders is safety. When bicyclists act in a predictable behavior around automobiles, they are much safer. Unfortunately, formal training programs for bicyclists are not as common for adults as they are for children.

Many bicycle organizations work with city officials on the implementation of a bicycle system. Bicycle coalitions exist all over the world with a common goal of bicycle promotion, and many participate in citizen education and promotional campaigns. In California, the San Luis Obispo

County Bicycle Coalition prominently displays its mission on its web page: "To improve the quality of life in SLO County through bicycle advocacy, education and inspiration" (SLO County Bicycle Coalition, 2013).

Promotional and social bicycle events are another way to increase visibility and to educate the public. These events help inform the community about bicycling, and they help promote a "bicycle culture." The group Kansas Cyclist advertises a calendar of bicycling events throughout the state such as "Riley County Police Department's Community Bike Ride," a ride with that county's police department that promotes safety (Kansascyclist.com, 2013). "Ciclovia" is another active transportation event that closes streets to cars for a given day, and then opens the streets for bicycles, vendors, and pedestrians, which creates a festival environment dedicated to bicycle advocacy ("Ciclovia," 2013). On September 7, 2013, Kansas City, Missouri, held its first "Ciclovia" in conjunction with Main Street Day and Bike Walk KC. Manhattan, Kansas, offers several social rides every Saturday for different rider levels that are geared toward socializing, working out, or local exploration (502 Media Group, 2013). Promotional social events that advocate for bicycling help to create a bicycle culture among citizens that can lead to a successful active transportation network.

Education must not be just for the public, but also for designers, officials, and others involved in creating bicycle networks. Collecting local data through observation studies, surveys, and other means is an excellent way for planning professionals to create effective designs that are data-driven. Portland, Austin, Washington, D.C., and other cities have collected data to improve the conditions of their systems and make an effort to continually evaluate their active transportation networks (Parks et al., 2012; Van Houten & Seiderman, 2005; Sadek, Dickason, & Kaplan, 2007). From the data collected, these cities can make evidence-based decisions to improve, adjust, or create new bicycle infrastructure. The design of active transportation networks is a cyclical process that requires education with local data to help make continual advancements to a bicycle system.

These cities are still experimenting with the design of signs, systems, rules, and regulations to improve their systems. Portland designed an intersection bicycle box, which is a marked

pavement box in front of automobile traffic at signals that allows bicycles to move in front of cars at stoplights for better visibility. The bicycle boxes at intersections are designed to help cyclists avoid possible contact with vehicles making right-hand turns (Dill, Monsere, & McNeil, 2010). Austin experimented with colored pavement to get the attention of motorists (Brady et al., 2011). Being open to experimentation with bicycle infrastructure is an effective way for a city or firm to become a leader and innovator in bicycle infrastructure.

One way to experiment with bicycle infrastructure is through temporary design. Several programs use this method for advocacy of bicycle networks and "complete streets." A complete street includes clear, accessible paths for automobiles, pedestrians, and bicycles (Smith, Reed, & Baker, 2010). Build a Better Block is a tool that gives advocates a chance to show the public what a "complete street" looks like ("The Better Block," 2013). Organizers use temporary materials to change a street, such as tape to mark a crosswalk or bicycle lane and potted trees to line a street or sidewalk. New York City used this technique on Times Square to see if it would function better as a pedestrian plaza. City officials were not certain this would work, and advocates for a pedestrian plaza decided to make their point by using temporary materials to create the pedestrian plaza. The experiment proved successful at convincing city officials to make Times Square into a permanent pedestrian plaza (Hinds, 2013). Experimenting with design through temporary displays can be an affordable option to help the public, designers, and officials understand a new design concept and to see if a design works before investing large sums of money.

Promotional social events, advocacy events, public education campaigns, local data collection, and design experimentation are all education components that help a bicycle network to be more successful. Educating school children may get them excited about bicycling from an early age. Social events are a great way to educate the public and garner support for bicycle systems. A continued focus on local data will keep officials informed and can lead to improvements for an active transportation network.

D. Enforcement

Enforcement plays a role in the active transportation system. Strategies for enforcement can range from aggressive ticketing to occasional "warning blitzes" to educational campaigns. A combination of the above elements seems to have

the best results. The City of Urbana, Illinois, saw an increase in the number of traffic violations by bicyclists, and the police department was willing to help keep the system bicyclist friendly and safe. The police issued citations but offered bicyclists education classes as a condition to reduce the fines (Bird, 2013). The department only issued tickets for serious offenses, such as running stop signs, going the wrong way down a one-way street, or other violations that could cause serious safety issues. Under this model, the goal of enforcement should be to work in conjunction with education to create a safer and a more aware bicycle culture.

Critics argue that ticketing is discouraging to ridership and works against a successful system. New York City is having difficulty with its new bicycle system and enforcing traffic laws for a population new to bicycling (Neistat, 2011). The increased number of tickets that officers are issuing to bicyclists in New York City seems to indicate that there is an education and signage issue that may be the root cause, and this may need to be addressed in a more direct and robust education campaign (Donohue, 2013). Heavy-handed enforcement can have negative consequences on a transportation network, and therefore, an educational approach to enforcement may give positive results.

Enforcement and education should not be limited to bicyclists, but should also include motorists. The automobile has been the dominant form of transportation in American cities for many decades, and the shift toward sharing the roads with other forms of transportation requires education and adjustments on the part of the driving public. The U.S. Department of Transportation has created several resources to encourage the driving and bicycling public to coexist in a safer fashion. The main message for both transit groups is education at a local/ community level (Hunter, Thomas, & Stutts, 2010).

Several techniques may be used for enforcement, but policies that connect to the education component have proven to be more successful at enforcement. The key for enforcement is balance. Too much of it creates negative impression for bicyclists, and not enough enforcement creates a void in bicyclist's perception of safety and importance. Cities have access to many resources that encourage education and effective approaches to bicycle enforcement. The role that enforcement plays in a successful bicycle network is closely connected to education and safety, and all are vital to creating a positive cycling environment.

3. Precedent Studies

Three universities similar to KSU were analyzed to compare what their programs offered for bicycle amenities. The universities studied were similar in enrollment, city population, and geographic region. Education programs, bike maps, and any other bicycle amenities were analyzed. The analysis was limited to the programs shown online, as visiting each campus was not a viable option.

A. Other University Campuses

Oklahoma State University, in Stillwater, Oklahoma, has fewer residents than Manhattan, and fewer students thanks KSU, but Stillwater's location is similar to Manhattan, Kansas, making it an ideal place to analyze bicycle amenities. OSU makes bicycle registration mandatory and requires students to take an online bicycle safety training tutorial (Oklahoma State University, 2013). Students are not eligible to ride their bicycles on campus without first taking the quiz. This is the only bicycle program on campus, and no maps are available that show bicycle routes. Stillwater was awarded a bronze-level Bike Friendly Community by the League of American Bicyclists, as was Manhattan, Kansas.

Ames, Iowa, is home to Iowa State University, which is similar in size and student population to Manhattan, Kansas, and KSU. Unfortunately, not much information was gained from Iowa State University's website concerning bicycles other than a very general basic policy containing two paragraphs (Iowa State University, 2013).

The University of Kansas in Lawrence, Kansas, is another school that shared enough similarities with KSU to compare their bicycle amenities. KU documents its bicycle information through the Center for Sustainability. KU also has several maps to help riders enter campus and navigate greater Lawrence ("Bike KU," 2013). The website includes a Lawrence Rideability Map that rates the streets around Lawrence for their safety and suggests the suitability according to a rider's experience level. KU was not selected as a Bicycle Friendly University in 2012 by the League of American Bicyclists, but the League prepared a full report on what improvements KU should make to become a Bicycle Friendly University in the future.

The League of American Bicyclists suggested that KU develop a Bicycle Advisory Committee, create a Bike Program Manager, create a formal bicycle program, build more bicycle infrastructure, and improve bicycle education. The nine-page report included "low hanging fruit and fast results," as well as long-term goals for each of its five categories. These are known as the Five E's: Engineering, Education, Encouragement, Enforcement, and Evaluation/ Planning (League of American Bicyclists, 2012). Large improvements were suggested for KU in all five categories.

Of the three universities studied, KU had the most information for cyclists and seemed to be the most aggressive in promoting bicycling, yet the university has not been successful enough to be granted a Bicycle Friendly University status by the League of American Bicyclists. The League of American Bicyclists may not use academic-based methods for granting awards, but they are the only organization that is working with universities and acknowledging those that are committed to promoting a strong bicycle culture.

A recent report came out that measured the bikeability of postsecondary institutions in the country. The findings showed that the universities they measured did not have adequate bicycle paths. The report went on to further support the findings of the League of American Bicyclists, that few schools and cities have become bike friendly (Horacek, White, Greene, Reznar, Quick, Morrell, Colby, Kattelmann, Herrick, Shelnutt, Mathews, Phillips, & Byrd-bredbenner, 2012).

B. The League of American Bicyclists

The League of American Bicyclists has created a process for universities to become Bicycle Friendly Universities. To enroll in the program, universities must incorporate the "Five E's: Engineering, Education, Encouragement, Enforcement, and Evaluation & Planning" to be considered a Bike Friendly University (The League, Bicycle Friendly America FAQ, 2000). The overall goal is to create better bike environments and educate cyclists.

To become a Bicycle Friendly University, several steps must be taken, and there is an application process to follow. Assessments help applicants understand the process that follows the Five E's. Several criteria involve education

and enforcement, such as what degree of adult education program does the school or community promote, as well as what training local law enforcement officers received that is specific to bicycles. The Bicycle Friendly University program promotes the benefit of receiving the award as a "positive environment in which to live, study and work." The Bicycle Friendly University is a good starting point for schools interested in promoting a successful bicycle network.

Stanford University, in Stanford, California, is a Platinum award-winning Bicycle Friendly University. The Bicycling at Stanford program is administered by the Parking & Transportation Services Department, just like at KSU. The Stanford website shows the university's commitment to bicycle education for new students, current students, and anyone else interested in learning the rules. Stanford also allows people to complete the bicycle education program called a Bicycle Diversion Program instead of paying a fine when they receive a ticket on campus (Stanford University Parking & Transportation Services, 2013).

Stanford also created a comic book character named Sprocket Man to promote safety and following bicycle rules (Palmer, 2002). This character is meant to educate and lead by example for students and the community in a fun way. Creative methods such as this one have helped to foster awareness and education among student cyclists.

Stanford has 15,000 bicycles on campus, and the campus police use enforcement as a means to educate cyclists on the University's and City's rules (Stanford & Hubbard, 2010). The police also give out bicycle helmet coupons to students on bicycles. Enforcement at Stanford is concerned with educating student on bicycle safety and reinforcing safe practices.

Colorado State University (CSU) in Fort Collins, Colorado, is a silver member of the Bicycle Friendly Universities. CSU's mission statement stresses safety through "awareness, planning, and education" (Bicycle.colostate.edu, 2009). The mission statement shows a dedication to the use of bicycles at CSU. The Bicycle Education and Enforcement Program (BEEP) is an organization that combines education and enforcement to make a safe cycling system at CSU. BEEP participates in many events throughout the year to promote safe bicycle practices. The program is flexible and adjusts to different needs, trends, complaints, and other issues that may arise. The enforcement

program also includes a ticket-diversion program that allows online bicycle education instead of paying a full fine.

CSU has a "dismount zone" in the core of campus that is similar KSU. CSU uses enforcement education to alleviate the issue of conflicts with pedestrians and bicyclists.

University of Nebraska in Lincoln (UNL) has recently been awarded a silver award from Bicycle Friendly Universities. Bike UNL was the result of a 2010 effort to encourage and advocate for bicycling at UNL. The purpose of Bike UNL is to inform, educate, promote, create and advocate for cycling on campus (University of Nebraska-Lincoln, 2013).

The advisory committee is made up of students, police, parking, and faculty that represent various points of view for cycling on campus. This effort to include a diverse group helps Bike UNL be successful by allowing several different points of view on cycling. Bike UNL also participates in a variety of education initiatives for bicycling including a course for credit in bicycling.

After looking at several schools that

SCHOOL	BICYCLE FRIENDLY STATUS	INFRASTRUCTURE	EDUCATION	ENFORCEMENT
COLORADO STATE UNIVERSITY	SILVER	DISMOUNT ZONE/ CONNECTS WITH THE CITY/	BEEP/TICKET DIVERSION PROGRAM/BIKE ADVISORY/	TICKET DIVERSION PROGRAM, BEEP, BIKE REGISTRATION
IOWA STATE UNIVERSITY	N/A	N/A	NONE	BIKE REGISTRATION
KANSAS STATE UNIVERSITY	N/A	DISMOUNT ZONE/ SEPARATE BIKE LANE/ SHARROWS	PAMPHLET WITH RULES MAPS AND ROUTES	BIKE REGISTRATION
OKLAHOMA STATE UNIVERSITY	N/A	BIKE LANES/ SHARROW/ SIDEWALKS/ BIKE RENTAL	ONLINE, MAPS/ TUTORIAL VIDEO/ EXAM FOR BIKE PERMIT	BIKE REGISTRATION
STANFORD UNIVERSITY	PLATINUM	BIKE LANES/ BIKE ROUND ABOUT/ SEPERATED BIKE LANES/ EXTENSIVE BIKE NETWORK	SPROCKETS/ PART OF REGISTRATION/ ONLINE/ ADVISORY GROUP	TICKET DIVERSION/ COUPON GIVE AWAY/ TICKET BLITZ IN PROBLEM AREAS/ BIKE PATROL/ BIKE REGISTRATION/ ABANDON BIKE RESALE EVENT
UNIVERSITY OF KANSAS	DENIED	BIKES ON BUSES/ BIKE LANES/ SHARROWS	ONLINE INSTRUCTION/ RIDEABILITY MAP/ ROUTES TO CAMPUS/ PART OF SUSTAINABILITY DEPARTMENT	BIKE REGISTRATION
UNIVERSTIY OF NEBRASKA AT LINCOLN	SILVER	TRIALS/ LANES	BIKE ADVISORY GROUP	BIKE REGISTRATION/ BIKE AUCTION

Table 1 Bicycle Environments of Peer Universities

are similar to KSU and examining other Bicycle Friendly Universities, there seems to be a vast difference in commitment from each city and university. The schools that have been awarded Bike Friendly status have programs that address education, enforcement, and infrastructure. The successful programs are more organized and offer more interaction with students than the schools that did not receive the award. The positive bicycle programs are well planned out, organized, promoted, and committed to a safe bicycle culture. They easily connect education, enforcement, and infrastructure in a cohesive manner.

4. Summary

The literature reveals that there are several types of cyclists, and the way cyclists use infrastructure is dependent on the infrastructure available. To make sure all cyclists are as safe as possible, bicycle infrastructure needs to be comprehensive, to be clear, and to promote safety. The largest group of bicyclists does not have much experience, is not comfortable on busier roadways, and will not ride everywhere. Safe infrastructure is the main key for this level of rider.

The best opportunity to educate the cycling public is at the university level and with children in elementary school. Several programs out there are using innovative programs to educate children. Many universities require students to participate in an education program if they violate any cycling rules on campus and may require them to be educated before they register their bicycle with a campus-parking department. Enforcement works best when directly tied with an education program

Bicycle infrastructure is improving through experiments with colors, pavement markings, and design. Research clearly indicates that bolder and more colorful signs are the most effective technique for pavement markings. Animated signs are also proving to be more effective than other types of signs.

Some universities and cities have very successful bicycle infrastructure that can be used for positive precedents. Stanford has an excellent bicycle program with many innovations. Portland, Oregon, receives adulations for its progressive bicycle policies and infrastructure. These places are not afraid to try different experiments for infrastructure and policies. Universities similar to KSU have similar issues with very little education,

little enforcement, and weak infrastructure. Advances are happening for regional schools and cities but just not as fast or progressive as other regions.

Continued observation, surveys, and data collection concerning bicyclists will give the best insights for improving on cycling infrastructure. Infrastructure design, education, and enforcement work together in a cyclical process with continuous evaluation and interaction. As cities and universities develop and improve bicycle networks, ensuring that several of these components work together will help to develop a successful network.

A recent study shows that cyclists, pedestrians, and transit users spend more money at local stores, than automobile users (Clifton, Currans, Muhs, Ritter, Morrissey, & Roughton, 2012). This information should be green lights for cities considering the importance and value of active transportation networks. A direct economic value can be gained by cities that have good bicycle and pedestrian networks.

An abundance of research is available on the topic of cycling and data showing the popularity of cycling. Several studies have been done on various aspects of bicycle infrastructure from bicycle signs to the best materials to use for pavement markings. There is also a good foundation on the subject of bicycle/pedestrian shared sidewalks. A reasonable amount of research that looks at separated cycling/ pedestrian shared paths exists. An area that is lacking in research is why cyclists are riding in prohibited sidewalks, and what other forces are causing this problem. How pedestrians and cyclists perceptions of this problem are different or similar is another area that has not been explored enough. Finally, data about the number of collisions that cyclists and pedestrians have is very difficult to find because of failure to report or not enough significant injury to make a report about.

Snowman's Old Ride, photo by John J Scott (2014)

Chapter III. Methodology

1. Research Design

The new bicycle pavement markings on campus were a stand-alone project, and no further complementary programs were included with the new pavement markings. Bicyclists and pedestrians come into conflict on sidewalks throughout campus, which indicates the need for a more comprehensive approach to bicycling. It can be argued that the new pavement markings remain ineffective due to a lack of education and enforcement. Using an video-based observation study and survey, this project will address the following concepts: safe and effective infrastructure, the role of enforcement and education, and perceptions of bicyclists/pedestrians on safety.

The methodology evolved as this project progressed. Adjustments were needed to create a complete picture of the problem and to answer specific questions for this project. Figure 4 illustrates the final methodology used for the project. The two methods complemented each other, and the results form a solid foundation on which to base conclusions.

2. Phase One: Video-Based Observation Study

The initial design of the methodology consisted of a video-based observation study, followed by an education intervention, and then a final post-test observation study to see if the behavior of the cyclists had changed. After completing these steps, a new method was required to make the project more effective. The video-based observation was kept, but the information regarding the intervention and post-

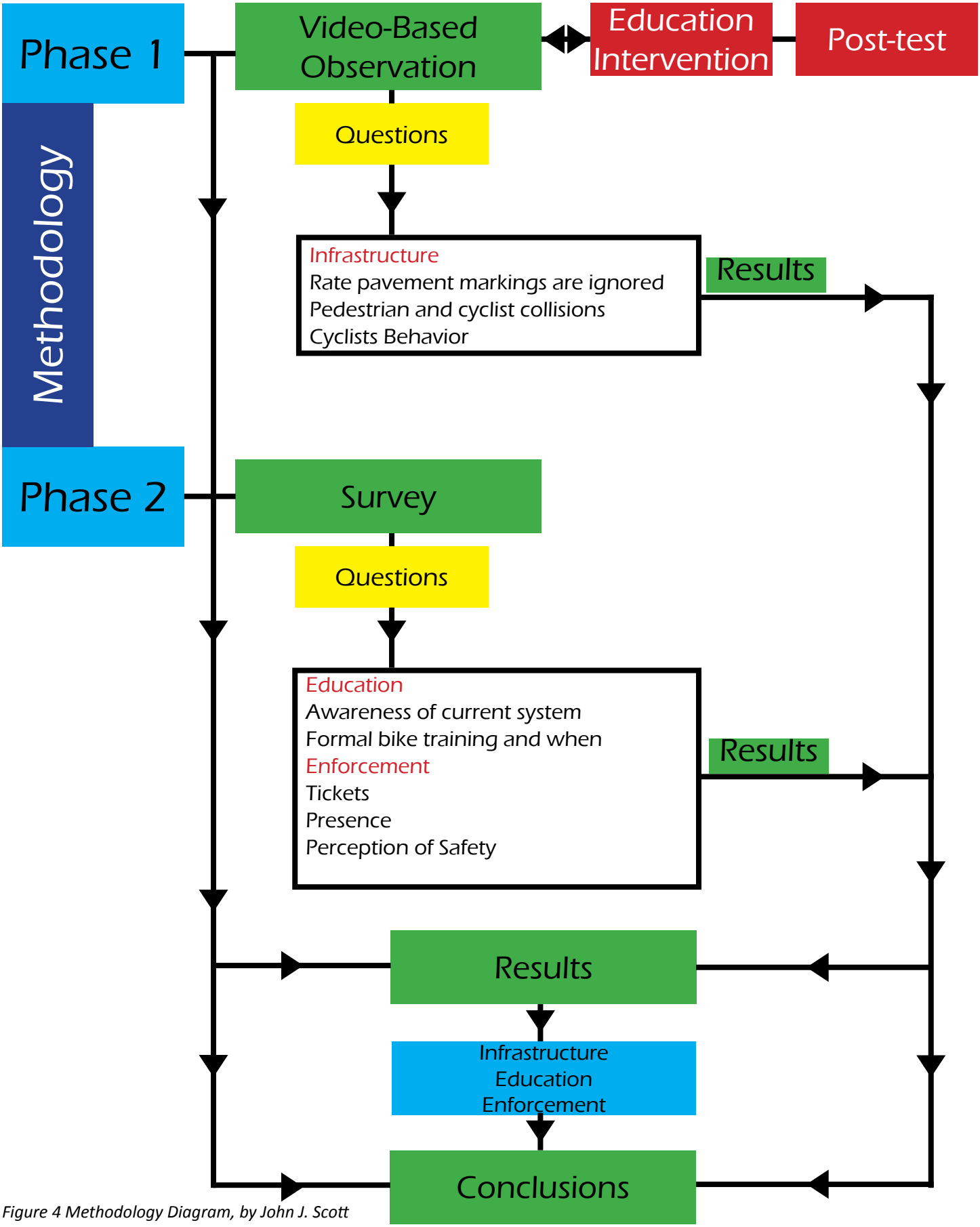

Figure 4 Methodology Diagram, by John J. Scott

test observation was eliminated from the project. The survey was added to help validate the project and make it more comprehensive.

A. Observation Locations

The pre-test and post-test video observation sites were selected by analyzing points at which students entered the main core of campus. The core of campus is between 17th street and Mid-Campus Drive (Figure 5). This area contains the main entry points to the busiest buildings on campus: Hale Library, Willard Hall, Waters Hall, Leasure Hall, Seaton Court, Holtz Hall and English/Counseling Service Building and the Student Union. The sidewalk that runs through the main corridor of these buildings serves as the "spine" of campus, and bicycling on this sidewalk is prohibited. Informal observation has shown that this area is used by bicyclists regardless of the pavement markings restricting such use. A preliminary study of the video-based observation data confirms this assumption. Several "dismount" and "yield" pavement markings exist in the study area. The main sidewalk in the study area runs north and south through the core of campus. Figure 6 shows the "dismount" markings on the pavement, and the area highlighted in orange is the focus

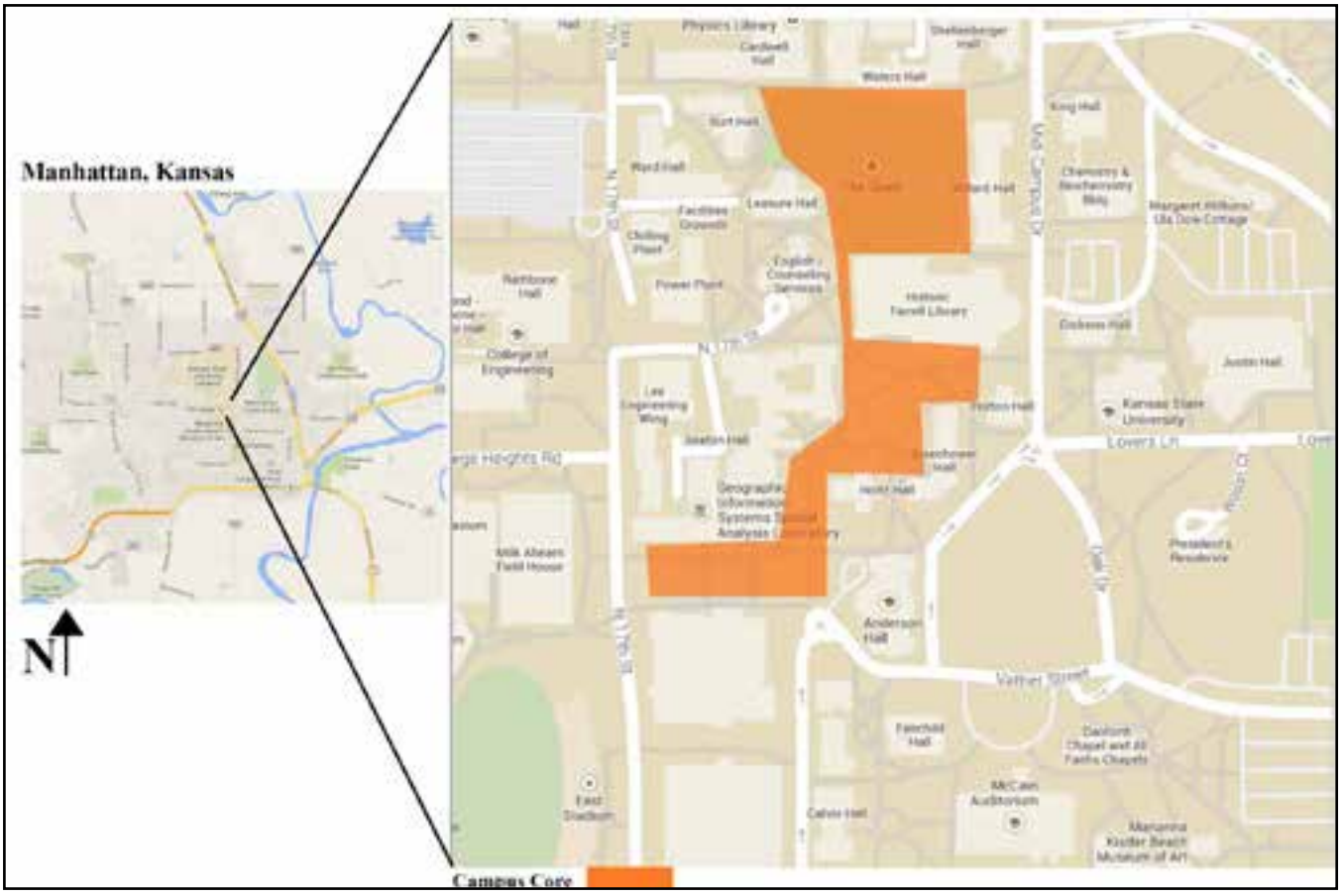

Figure 5 Context Map and Core Campus, Google Map amended by John J. Scott (2013)

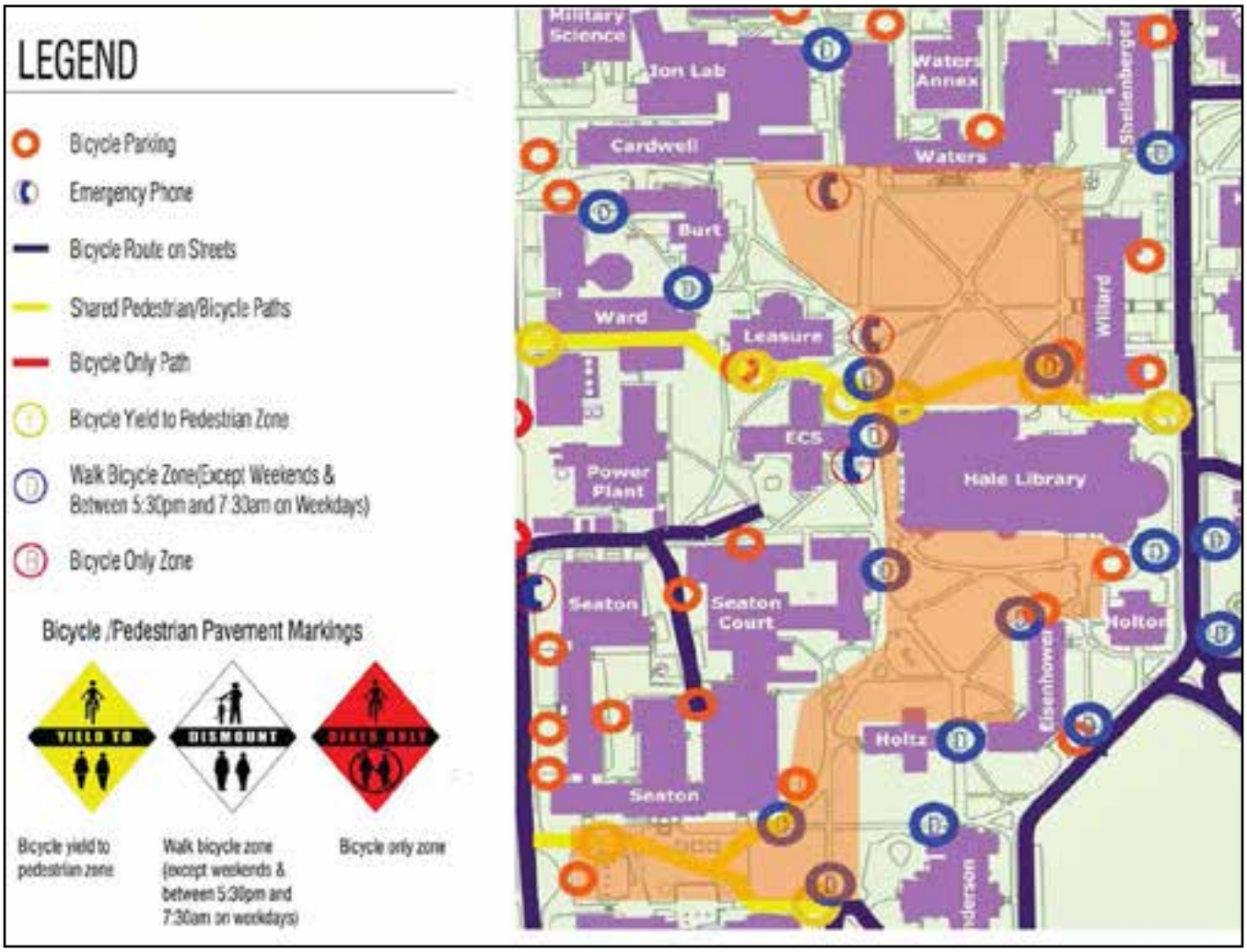

Figure 6 Dismount and Yield Locations, Kansas State University Map amended by John J. Scott (2013)

area. The only bicycle shared path in the focus area, traverses the main campus core east to west and is highlighted in yellow.

Four pieces of information served as the factors in deciding the observation sites. The first was locating the largest residential areas surrounding campus that pedestrians and bicyclists are most likely to use. The second was to determine what entry points into the focus area commuters were using. The main sidewalk intersection for these entry points was the third step in picking observation points. Finally, entry points that did not overlap each other were considered.

First, locations with high volumes of student residences are mapped in order to understand which routes students most frequently to use enter the core of campus. Figure 7 shows locations for both on-campus and off-campus housing. The areas in yellow are near residential

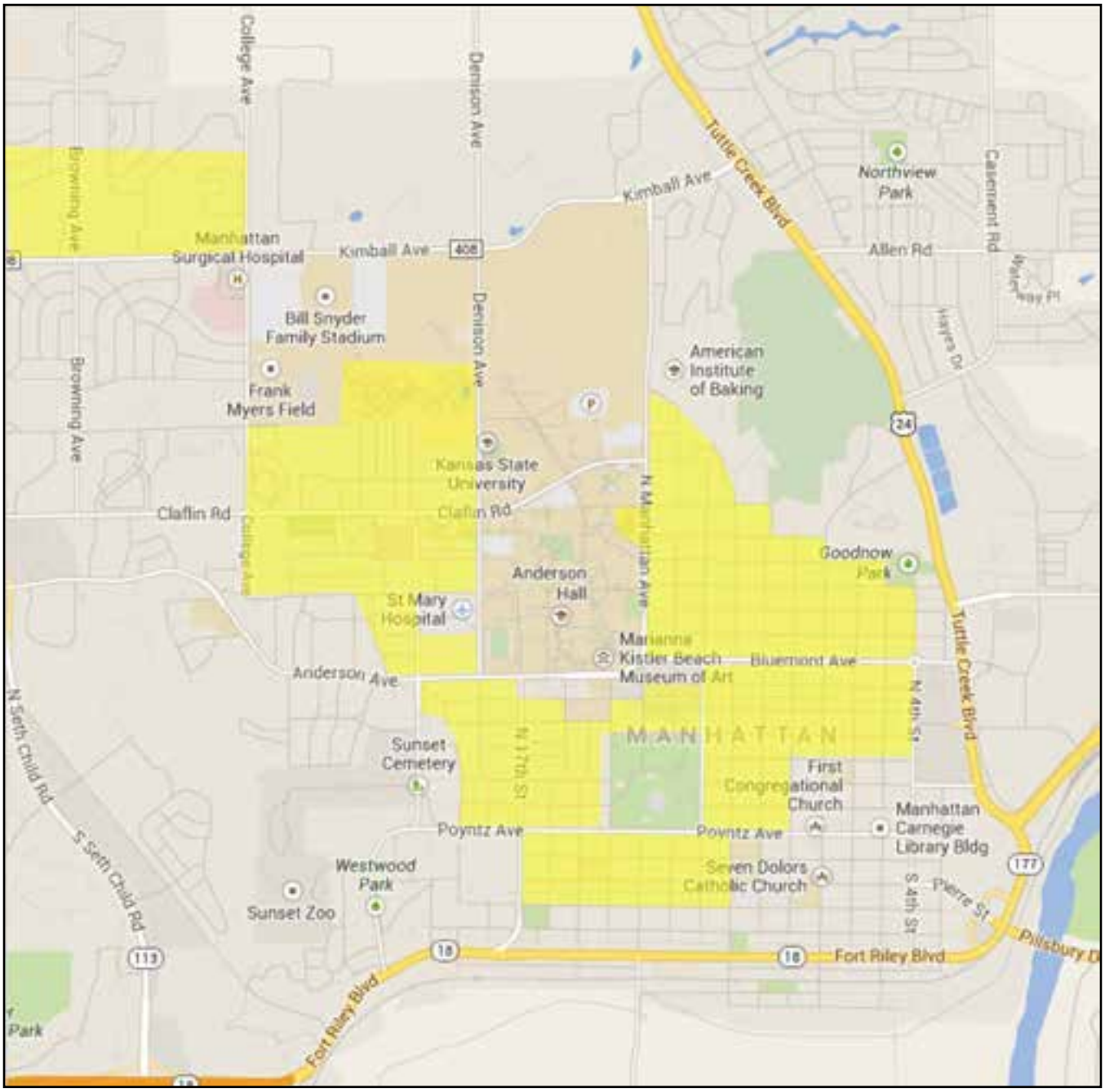

Figure 7 Residential in Yellow, Google Map amended by John J. Scott (2013)

neighborhoods adjacent to campus and signifies where much off-campus housing is located (Figure 7). A small portion of on-campus housing is located on the eastern edge of campus on Manhattan Avenue.

Figure 8 shows the routes students use to enter campus core from their residences. East of campus has the largest concentration of student housing. The map shows the locations of the entry points to the campus core.

Figure 8 Entry Paths into the Core of Campus, Google Map amended by John J. Scott (2013)

Five key entry points are revealed from the maps and are marked in Figure 9. These locations points are the ideal locations used to record the video-based observations. The original nine points identified were narrowed to five by reducing the overlapping entry points.

In addition to the key entry points to campus, three elements were used as criteria to determine camera placement. The first was security of the equipment from tampering and theft. The

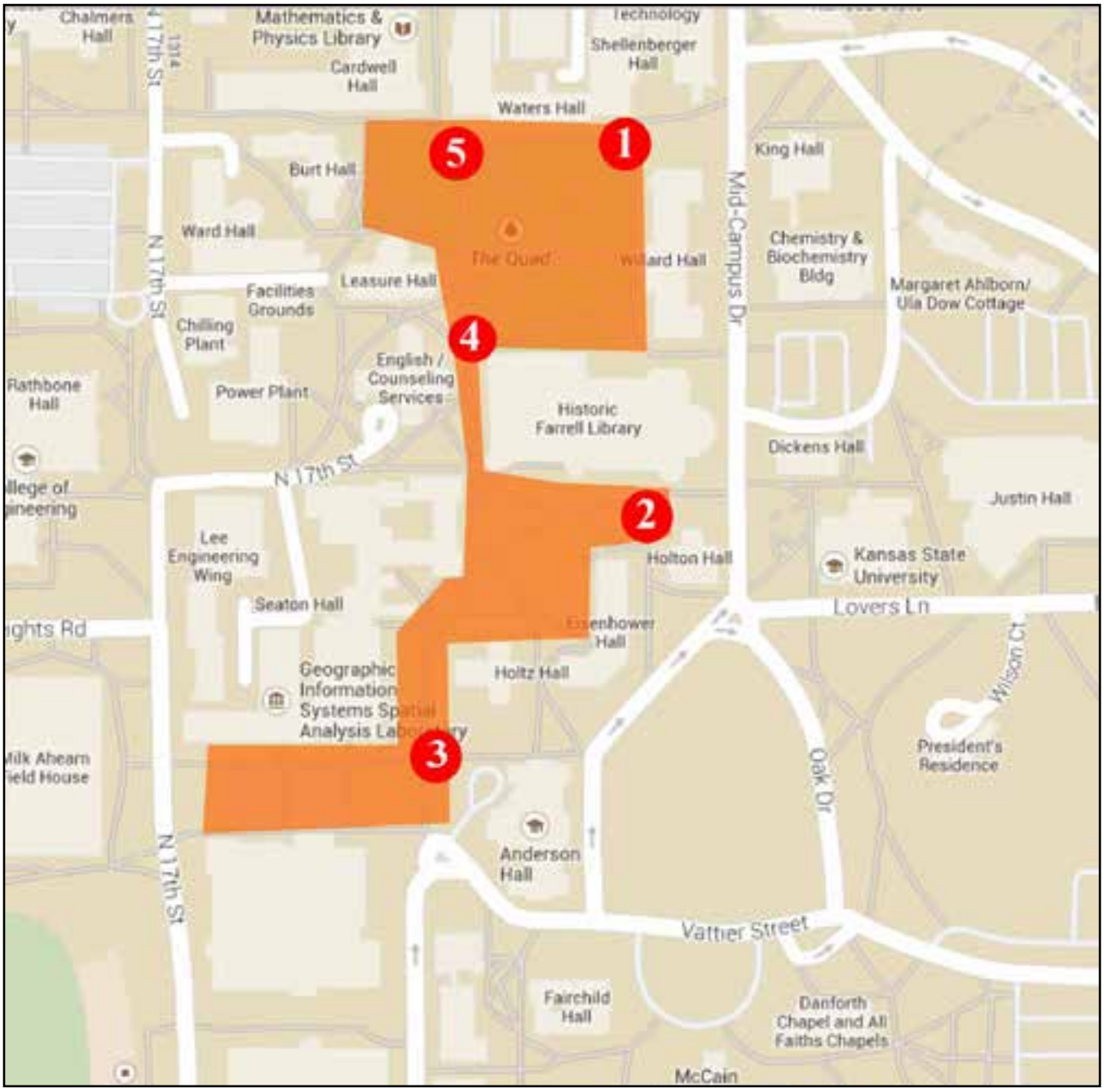

Figure 9 Numbered Entry Points into the Core of Campus, Google Map amended by John J. Scott (2013)

second was protection from the weather elements. Proper line-of-sight was the third element used to decide camera location.

Four observation locations were chosen after several locations were examined to see which windows would allow for optimal filming of the four entry points. Site one in Figure 9 was dropped due to overlapping with site four and five. These locations were secure, indoors, had great vantage points, and had very few

visual obstructions. Permission to film at these locations was gained from the proper authorities beforehand.

(1) Observation Location 1

The first location used was a faculty office in Holton Hall that overlooks entry point number two, the entry point that runs to the south of Hale Library. Figure 10 illustrates the observation location of Camera 1. The camera used at this location was a Cannon VIXIA HF R40 camcorder with a 64 GB memory card, and it sat on a tripod.

(2) Observation Location 2

The 2nd observation location was on the first floor of Seaton Hall, room 107. Camera 2, a Cannon VIXIA HFM40 with a 16 GB memory card, captured entry point number three, which is important because students enter campus from the south, west, and east directions at this location, and it is adjacent to administration buildings and the Student Union. This location is a main pedestrian hub on campus. Figure 11 shows the observation location of Camera 2 and the entry point three. The camera was placed on the windowsill, and to give extra height, bricks were placed on the sill directly beneath the camera.

(3) Observation Location 3

Camera 3 was located in an east-facing empty office in the English/Counseling Services Building and on the second floor. The viewpoint focused on a busy intersection that collects cyclists

Figure 10 Observation Location 1, Google Map amended by John J. Scott (2013)

Figure 11 Observation Location 2, Google Map amended by John J. Scott (2013)

Figure 12 Observation Location 3, Google Map amended by John J. Scott (2013)

Figure 13 Observation Location 4, Google Map amended by John J. Scott (2013)

entering from the east and west. Figure 12 shows the location of Camera 3 and the camera used was a Cannon VIXIA HF R40 camcorder with a 64 GB memory card. The camera was placed on the windowsill.

(4) Observation Location 4

Camera 4 was placed in Waters Hall and faced directly south. The cyclists that enter campus from the north were filmed using the same Cannon VIXIA HFM40 with a 16 GB memory card that was used in the Seaton Hall/Site 2 location. The camera was placed in a first floor window that overlooked the main north-south sidewalk. Cameras 3 and 4 captured overlapping entry points. Figure 13 shows the observation location of Camera 4.

B. Observation Times

KSU schedules classes primarily in two ways: three days-a-week or two days-a-week. The three days-a-week, classes are on Monday/ Wednesday/Friday and the two days-a-week, classes are on Tuesdays/Thursdays. Class schedules were taken into consideration for the dates used to record the cyclists' activity.

The video data was collected at each location from 8 A.M. to 2 P.M. Classes are in session throughout the day, therefore, the large window of 6 hours each day was needed to capture the variation between morning and afternoon classes. The times used captured commuting students in the morning, and extended

long enough to view travel behavior at the peak periods of 11:30 A.M. to 1:30 P.M.

The videos were recorded using two cameras at two locations each day. The recordings captured a Monday, Wednesday, or Friday to represent the three day-a-week classes and Tuesday or Thursday to capture the two day-a-week classes. Filming occurred between October 15th and October 21st, as Table 2 shows.

Camera 1	Holton Hall	10/15/2013
Camera 1	Holton Hall	10/16/2013
Camera 2	Seaton Hall	10/15/2013
Camera 2	Seaton Hall	10/16/2013
Camera 3	English Counseling Services	10/17/2013
Camera 3	English Counseling Services	10/21/2013
Camera 4	Waters Hall	10/17/2013
Camera 4	Waters Hall	10/21/2013

Table 2 Dates for Video-Based Observation Recordings

C. Education Intervention and Post-test

The original methods used for this project included an video-based observation, an education intervention, and a post-test observation. The education intervention and post-test were both completed, but the information was not used due to problems with both portions. Negative reactions from bicyclists during the intervention and cold, rainy weather during the post-test were the main issues. The confidence level for the intervention was low, which influenced the post-test. The goal was to educate the bicyclists and get them to consider their behavior on sidewalks, look for routes that did not require them to violate campus rules, and to see if any changes in bicycling behavior did occur after an education intervention happened.

(1) Education Intervention

The education intervention was designed to be a component that would inform cyclists of the bicycle routes, rules, and regulations on campus. Three key locations were chosen from the previous analysis done on the campus core. Vertical dismount signs were created and posted at these locations. For a few hours a day, I interacted with bicyclists, encouraged them to dismount, and informed them of the routes available. The interaction included handing out two pamphlets: bicycling rules for campus with a map of the bicycling routes and safety tips for bicycling.

The intervention took place over three days, October 23rd, 24th, and 25th of 2013. The times for the interaction were during the busiest times on campus from 11:30 A.M. to 2:30 P.M. The vertical signs were placed along the sides of the sidewalk at eye-level, informing bicyclists they were entering a "Dismount Zone." The bicyclist that bicycled in prohibited areas was the target

audience for the intervention.

The reaction varied between bicyclists and pedestrians: bicyclists were not pleased to be asked to dismount on the sidewalks from which riding was prohibited. While a few pedestrians were encouraging and curious about the routes and maps, the bicyclists that did stop and engage in conversation after an initial negative reaction quickly became curious about the routes and rules, and the interaction usually ended as a positive experience. The most common reaction from bicyclists could be characterized as irritated and apathetic. A few bicyclists rode past the interaction area regardless of efforts to engage them in conversation or encouragement to dismount. A few bicyclists dismounted, took the pamphlets, remounted and rode away a few feet away from my location. Several bicyclists debated the need for a dismount sign on campus. One pedestrian became hostile toward me for offering a bicyclist a pamphlet. Males were more likely to engage in conversation than female cyclists.

(2) Post-Test

After the education intervention was completed, a post-test was designed to see if the behavior of the bicyclists changed. The post-test was comprised of an video recordings in the same locations as the pre-test observation and took place on Monday October 28th and Tuesday October 29th of 2013. The same times used in the pre-test observation were used in the post-test observation. The weather for the two dates was very cold and rainy. There was not enough confidence in the education intervention to pursue recording later with better weather. The more time between the education intervention and the post-test also created doubt if the education intervention had a role in any behavior change.

(3) Problem

The idea of interacting with bicyclists in prohibited areas and educating them is a great concept that could be very beneficial for campus. The ideal situations should be manned by officials and authoritarians such as the campus police department in conjunction with a student group. One student, without an authoritarian position, is easily ignored and viewed as a nuisance instead of an educational opportunity. This process could have been more effective if an official university program or office was involved.

D. Phase One Outcome

Although the education intervention and post-test were not successful, the video-based observation study was valuable and contained enough data to continue with the project. Adjustments were made, and a survey was planned to coordinate the pre-test data. Flexibility proved to be an asset during the first part of this project.

3. Phase Two: Survey

The survey was designed to supplement the pre-test study and answer research questions that could not be answered through observation. The survey took place from February 6th to February 21st, 2014. The survey, Appendix A, was conducted with Survey Monkey, an online survey service.

A. Survey Design

The questions were designed to address infrastructure, safety, education, and enforcement of cycling rules on campus. Using different techniques, the respondents were broken down into three distinct groups: pedestrians, bicyclists, and bimodal. The bimodal group consists of commuters that occasionally bicycle to campus but predominantly walk. Each group answered questions tailored toward their commuting habits, and they revealed how they felt about certain safety issues on campus.

(1) Target Population

The target respondents were regular commuters to campus regardless of their association with KSU. The demographics of campus are 86% students, 14 % faculty/staff (*Faculty Demographics*, 2013, K-State Quick Facts). The respondents of the survey showed a similar demographic, with 80% student and 18.2% faculty/staff, and another 4% that did not answer. There were 450 responses to the survey, which at a 99% confidence level is +/- 6%, and at a 95% confidence level is +/- 4.6%.

(2) Survey Methods

The survey was distributed by social electronic media. Email, Twitter, and Facebook were the primary sources for distributing the survey. Emails were sent to faculty members, friends, and student organizations with a request to fill out the survey and pass it along. The emails were then passed along to students that filled out the surveys. Several classes were asked to fill out the survey throughout campus. A cross section of various programs was asked to fill out the survey and pass this along to their students. Student

organizations and other departments were asked to participate as well.

(a) Social Media

The survey was posted on Facebook accounts whose members were predominantly students or associated with KSU, which is the sample frame. The groups associated with KSU were listed and attached to a main Facebook page. Only groups with ties to daily commuters to campus were used for the survey. These groups were then asked to participate in the survey. Student organizations across the board were asked to help with the survey and to repost to their home pages to help with the process.

Twitter was another form of social media that was used to get more respondents. A similar process that was used for the Facebook sample frame was used on the Twitter sample frame. A simple search of groups associated with KSU proved helpful. These groups reposted (retweeted) the survey on several occasions. The KSU Library home page had a tweet that requested students "do a graduate student a favor," and fill out the survey. Several student organizations requested that their group members complete the survey.

(b) Campus Webmail

Another sample frame used was KSU email. Friends, professors, departments, and any other contacts available were asked to fill out the survey and pass it along to their classes, friends, or co-workers. As a graduate teaching assistant, a request to my class of 110 students to fill out the survey was made through email.

B. Variables

The variables in the questions were aimed at addressing the research questions and using the concepts of safety perception, infrastructure, education, and enforcement. The first set of questions were demographic questions used to split the respondents into the three groups of bicyclists, pedestrians, and bimodal. The respondents could also be broken into other demographics such as students or faculty/staff.

(1) Safety Perception

Questions 8, 9, 10, and 11 were used to discover how pedestrians viewed the safety of sharing sidewalks with bicyclists (Appendix A). These questions also asked if they had a collision as a pedestrian with a bicyclist, or witnessed a pedestrian-bicyclist collision. Two questions were

asked to the group identified as primarily bicyclists that dealt with pedestrian-bicyclists collision and if they were concerned for pedestrian safety on campus sidewalks.

(2) Infrastructure

The bicyclists were asked questions about the bicycle "Dismount" signs and about the routes on campus. The questions were designed to check awareness of the signs and designated bicycle routes on campus.

(3) Education

Questions concerning knowledge of the cyclists overlapped into other areas about infrastructure. One question asked if they were familiar with the routes, rules, and maps that the Parking and Transit Department produced. Questions also asked if the cyclists had formal bicycling training and when that training took place.

(4) Enforcement

The final questions on the survey asked cyclists if they were concerned about getting a ticket on campus, and if they had witnessed a cyclists get a ticket on campus. This variable is used to understand the role that enforcement is playing with cycling on campus.

4. Summary

The data collected from the survey can be cross-referenced and combined to show patterns. The patterns offer insight on the volume of users coming to campus and certain viewpoints from different groups, such as pedestrians or cyclists. Patterns of behavior were also found during the video-based observation study, and these two methods are combined to gain a better understanding of the cycling issues on campus.

The World is My Parking Lot, photo by John J. Scott (2014)

Chapter IV. Analysis and Results

1. Video-Based Observation Study

Bicycling is an excellent mode of transportation for residents of Manhattan, Kansas. The topography is relatively flat, and the core area can be traversed in less than 20 minutes from the far southeast corner to the far northwest corner. The results from the survey show that students and residents agree. Fifteen percent of residents that commute to campus daily use a bicycle for their commute. Easy access, exercise, cost efficiency, and no carbon emissions are some of the benefits for commuters in Manhattan to use bicycling as their main form of transportation.

During the 48 hours of recorded video, 29 bicyclists per hour were witnessed bicycling on campus. The behavior of 1,393 bicyclists was analyzed for the following: bicycling rules, pedestrian interaction, and any other pattern of behavior. Of the 1,393 bicyclists recorded, 1,143 were using routes that required them to dismount, and 82.9% ignored the dismount signs.

Table 3 shows the number of bicyclists observed on campus with their location and dates recorded. As you can see, the areas near observation location 1, 2, and 3 were more heavily traveled by bicyclists than those areas near observation location 4. All of the recordings used in this project were made on sunny days with warm temperatures above 50 degrees. An additional rainy day was recorded, and the number of bicyclists, surprisingly, stayed at a very similar number to the sunny days results. Despite the rain, 141 bicyclists were recorded on the rainy day at observation location 1 with 75.9% not following the dismount instructions.

Observation Location and Date	Did not Dismount	Dismount	Total
Observation Location 1 10-15-2013	99	23	122
Observation Location 1 10-16-2013	142	53	195
Observation Location 2 10-15-2013	186	32	218
Observation Location 2 10-16-2013	195	23	218
Observation Location 3 10-17-2013	118	12	130
Observation Location 3 10-21-2013	98	23	121
Observation Location 4 10-17-2013	67	13	80
Observation Location 4 10-21-2013	42	17	59
Totals	947	196	1143
	82.9%	17.1%	

Table 3 Video-Based Observation Results

During the video-based observation, the main core sidewalk was very busy at times, and bicyclists could still be seen riding and performing dangerous maneuvers to avoid pedestrians. Although there is still a safety issue on shared campus sidewalks, no collisions were recorded during the video- based observation study. Several narrow escapes were recorded where pedestrians had to stop quickly to avoid a bicyclist. Bicyclists would also exit the sidewalk to go around a large group of pedestrians and then re-enter ahead of the pedestrians.

A. Observation Location 1

Holton Hall was the location for camera 1 and provided the first recordings analyzed. The camera was aimed at a major entry point used by residents living on the east side of campus. The camera also caught a major bicycle parking area used by people visiting Hale Library, which caused a dilemma. The bicycle rack was located just a few feet away from the entry point (Figure 14) and just to the west of the dismount pavement marking. The bicyclists who rode a few feet past the dismount sign to park their bicycles were not counted as failing to dismount but as parking bicyclists. The only bicyclists that were counted as failing to dismount were supposed to have dismounted earlier in their trip.

Figure 14 Observation Location 1, photo by John J. Scott (2014)

The Holton Hall location experienced a heavy volume of pedestrians and bicyclists around 12:00 P.M. daily. The other surge in traffic volume occurred between 9:00 and10:00 A.M. daily. Table 4 shows that the number of bicyclists traveling through the area during the recorded hours of 8:00 A.M. to 2:00 P.M. averaged 158 daily and 26 bicyclists per hour. These results are similar in range to the overall numbers for the project. For both days, 76% of the cyclist did not dismount as required by the pavement markings. This number is a little lower than the total for all the sites but not drastically different.

Holton Hall		
10/15/2013	Did Not Dismount	Dismounted
8:06 to 9:06	8	0
9:06 to 10:06	20	5
10:06 to 11:06	14	5
11:06 to 12:06	17	4
12:06 to 13:06	24	7
13:06 to 14:06	16	2
Total	99	23
Percentages	60.37%	14.02%
10/16/2013		
8:00 to 9:00	25	4
9:00 to 10:00	27	7
10:00 to 11:00	13	15
11:00 to 12:00	27	9
12:00 to 13:00	23	5
13:00 to 14:00	27	13
Total	142	53
Percentages	58.92%	21.99%
Total	241	76
Percentages	76.0%	24.0%

Table 4 Observation Location 1 Results

Figure 15 Observation Location 2, photo by John J. Scott (2014)

B. Observation Location 2

The location at Seaton Hall was the busiest location used during the video-based observation (Figure 15). As seen in Table 5, 218 bicyclists were observed each day at the location. This location is one of the main intersections for campus and serves as a link between the Student Union and campus core. An average of 36 bicyclists passed through the area each hour. The camera angle chosen captured an area that required all bicyclists to dismount. In this area, 87% of bicyclists failed to dismount as instructed by the pavement markings.

Seaton Hall		
10/15/2013	Did Not Dismount	Dismounted
8:00 to 8:48	38	5
8:48 to 9:33	27	5
9:33 to 10:13	4	3
10:13 to 11:02	24	3
11:02 to 11:50	28	5
11:50 to 12:31	17	1
12:31 to 13:09	37	8
13:09 to 13:35	11	2
Total	186	32
Percentages	85%	15%
10/16/2013		
8:00 to 8:48	24	1
8:48 to 9:36	35	1
9:36 to 10:24	19	0
10:24 to 11:12	29	5
11:12 to 12:00	28	8
12:00 to 12:48	21	4
12:48 to 13:36	23	2
13:36 to 14:10	16	2
Total	195	23
Percentages	89%	11%
Totals	381	55
Percentages	87%	13%

Table 5 Observation Location 2 Results

C. Observation Location 3

The location observed from the English Counseling Service Building focused on an intersection near Hale Library. Bicyclists using an east to west or vice versa path (Figure 16) did not have to dismount from their bicycles. All other routes were required to dismount. Table 6 shows that 86.1% of the bicyclists required to dismount did not. At peak travel times, bicyclists were observed driving around pedestrians off the sidewalks instead of dismounting. The intersection was also very tricky for bicyclists using the east to west path and often required evasive bicycling maneuvers to avoid pedestrians during peak times.

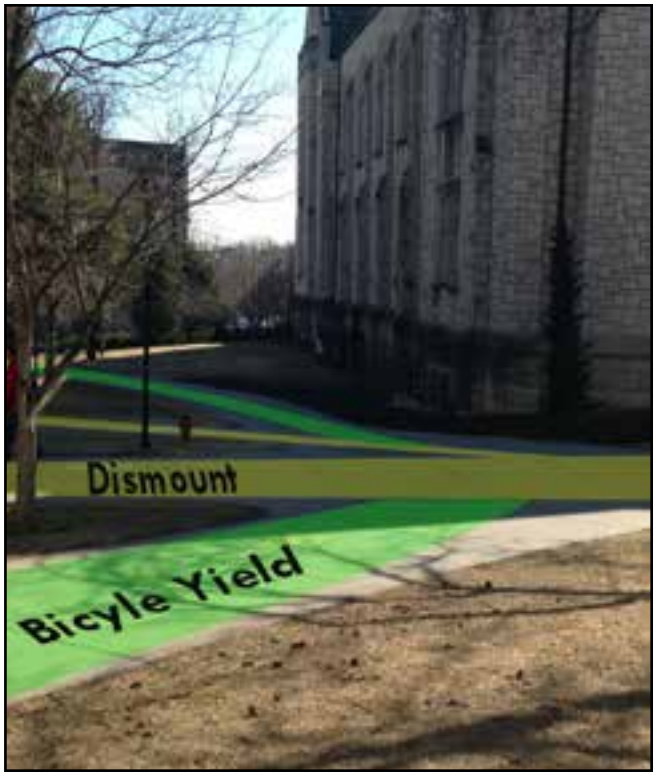

Figure 16 Observation Location 3, photo by John J. Scott (2014)

English Counceling Services Building		
10/17/2013	Did Not Dismount	Dismounted
8:05 to 9:05	14	1
9:05 to 10:05	21	4
10:05 to 11:05	19	2
11:05 to 12:05	22	0
12:05 to 13:05	25	2
13:05 to 14:08	17	3
Totals	118	12
Percentages	90.8%	9.2%
10/21/2013		
8:00 to 9:00	15	0
9:00 to 10:00	17	7
10:00 to 11:00	13	1
11:00 to 12:00	14	4
12:00 to 13:00	17	6
13:00 to 14:08	22	5
Totals	98	23
Percentages	81.0%	19.0%
Totals	216	35
Percentages	86.1%	13.9%

Table 6 Observation Location 3 Results

D. Observation Location 4

Observation location 4 at Waters Hall was the least busy location used in the video-based observation study. An average of 11.6 bicyclists passed through the observation area per hour. The two days shown in Table 7, had 139 bicyclists during the observation study, since most of the other sites had this or more as one day totals, the area is not as well traveled by bicyclists as anticipated. Figure 17 shows the view from the camera angle.

Figure 17 Observation Location 4, photo by John J. Scott (2014)

Waters Hall		
10/17/2013	Did Not Dismount	Dismounted
8:00 to 8:48	5	0
8:48 to 9:36	13	1
9:36 to 10:24	2	2
10:24 to 11:12	9	5
11:12 to 12:00	15	1
12:00 to 12:48	11	3
12:48 to 13:36	8	0
13:36 to 14:00	4	1
Total	67	13
Percentages	83.8%	16.3%
10/21/2013		
8:00 to 8:48	7	1
8:48 to 9:36	5	3
9:36 to 10:24	4	0
10:24 to 11:12	0	3
11:12 to 12:00	7	1
12:00 to 12:48	7	3
12:48 to 13:36	10	6
13:36 to 14:00	2	0
Total	42	17
Percentages	71.2%	28.8%
Totals	109	30
Percentages	78%	22%

Table 7 Observation Location 4 Results

2. Survey Study

The data gathered from the survey confirms the popularity of bicycling as a main form of commuting. The respondents indicated that 15.4% use bicycling as their main mode of transportation and 46.7% walk to campus. An additional 21.5% indicated that they will bicycle to campus on occasion but do not have a set pattern. Active transportation accounts for 62.1% of people commuting to campus. These numbers indicate that a more comprehensive approach is needed for bicycling and pedestrian infrastructure on campus. Both forms of transportation are less expensive than infrastructure for automobiles and are better for students' health and the environment.

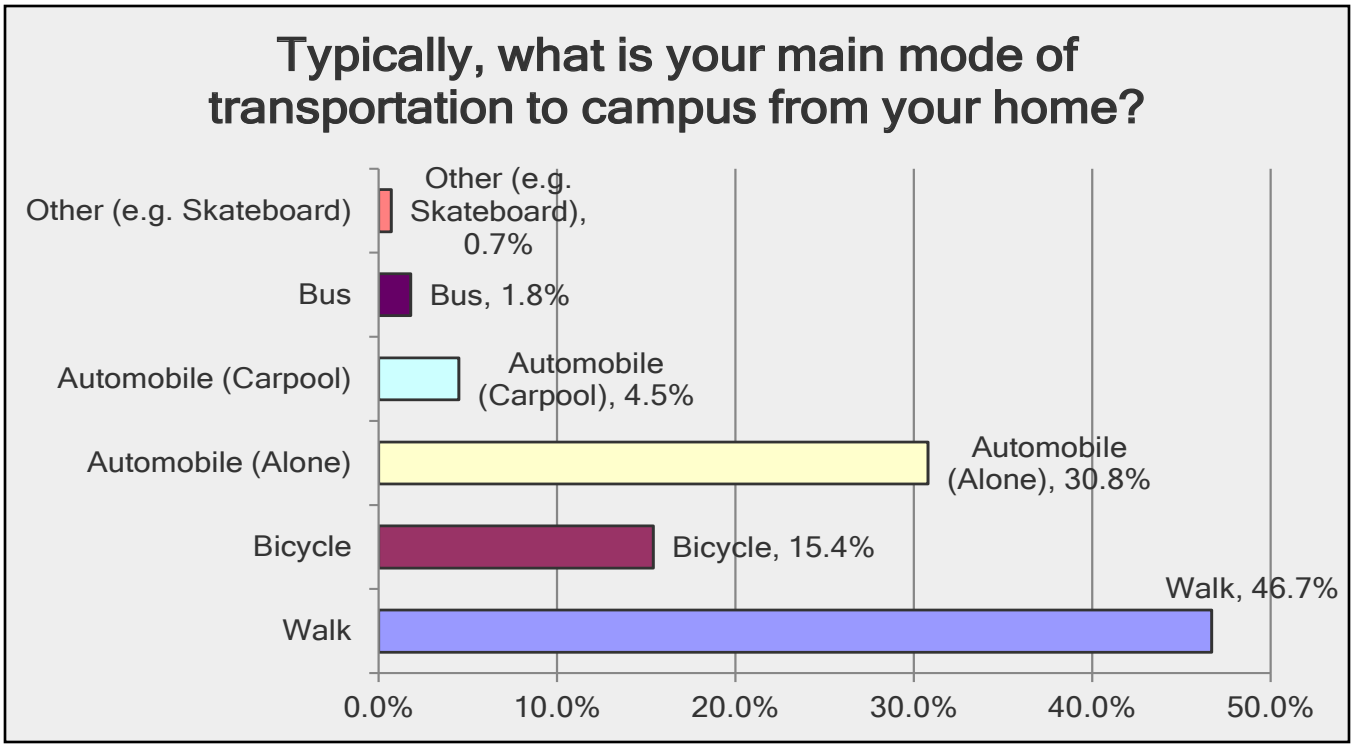

Figure 18 Main Mode of Transportation Results, from Survey

A startling percent, 44.3% of pedestrians, indicate they have witnessed a collision between a pedestrian and a bicyclist on campus, yet only 11.68% have actually been involved in a collision with a cyclists (Figure 19). Bicyclists indicate that only 7.2% have been involved in a collision with pedestrians on campus (Figure 20). While a gap appears in these numbers, the indication shows that accidents between bicyclists and pedestrians do occur on campus.

The survey was conducted from Thursday, February 6th, to Friday, February 21st, 2014. The responses from the survey can be broken up into several categories to better understand the data. Basic demographic information was gathered at the beginning of the survey, which reveals very general information about the respondents. Data collected concerning safety perception, infrastructure, education, and enforcement was gathered from the three groups: pedestrians, bicyclists, and bimodal users.

A. Survey Demographics

The basic demographics from the survey were in line with the campus make-up. Most of the respondents were under the age of 24 (67.3%), and another 16.2% were between 25 and 34 years old. Females were the majority of respondents at 59.5%. The students account

Safety Perception

Pedestrians Bicyclists

Collision Involvement

Figure 19 Pedestrian Collision Involvement, from Survey

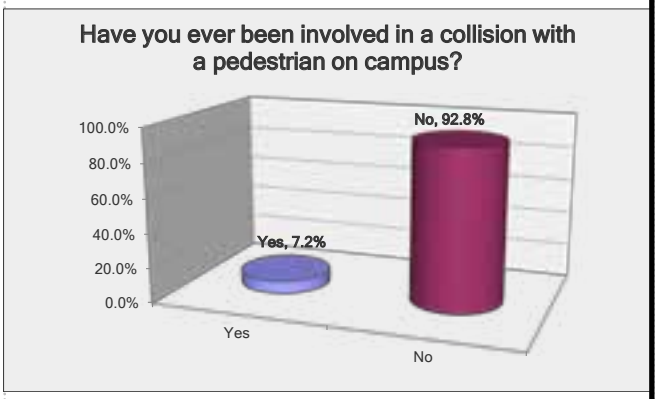

Figure 20 Bicyclists Collision Involvement, from Survey

Safety Comfort and Concern

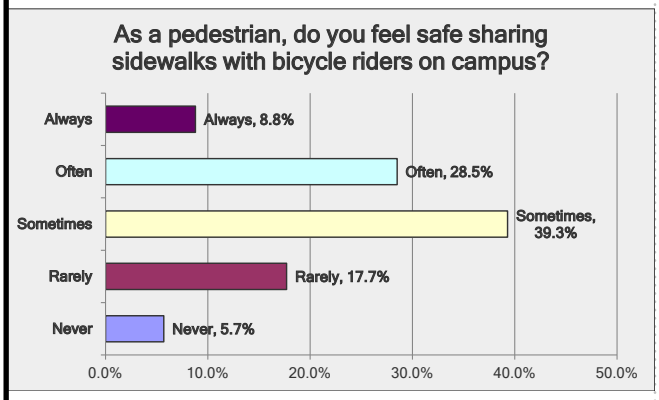

Figure 21 Pedestrians Perception of Safety on Shared Sidewalks, from Survey

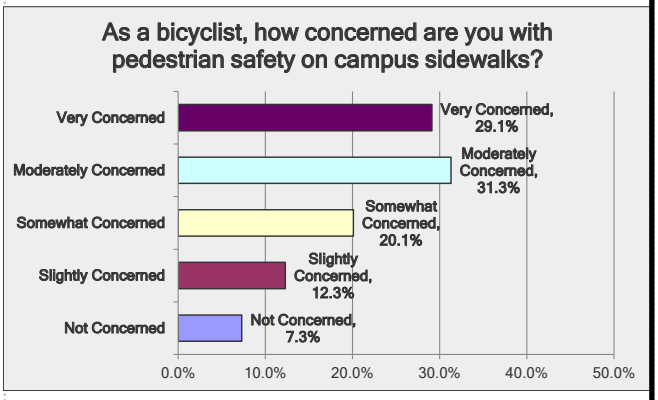

Figure 22 Bicyclists Concern for Pedestrians Safety on Shared Sidewalks, from Survey

Close Calls and Dismount Perception

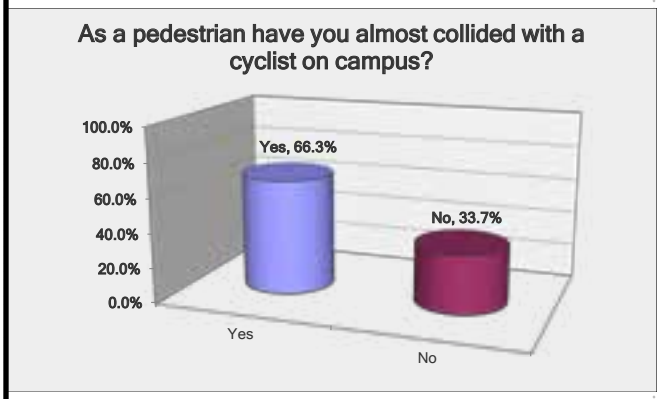

Figure 23 Pedestrians Close Calls with Bicyclists, from Survey

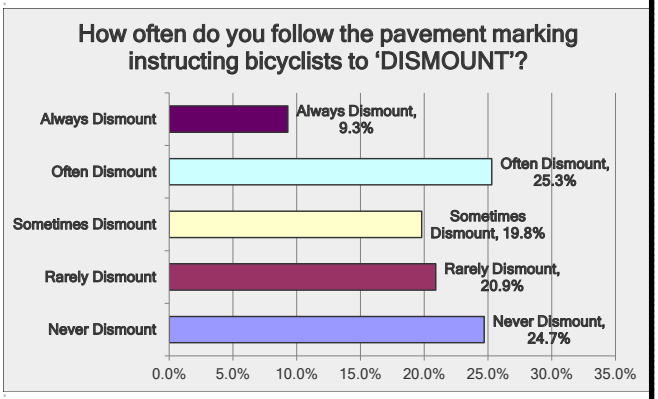

Figure 24 Bicyclists Dismount Perception, from Survey

for 85.4% of commuters to campus, and KSU employees represent 14.5%. The survey demographics were similar with students at 81% and KSU employees at 19%.

B. Pedestrians

Pedestrians represent almost half of the daily commuters to campus (46.7%), and of that group, 80% walk five days a week to campus. The data from the survey indicates that 95.6% live less than 20 minutes from campus. At the same time, 66.2% indicated that they have nearly collided with bicyclists on campus.

C. Bicyclists and Bimodal Users

The majority of bicyclists (47%) and bimodal commuters indicated that they have no set pattern on how many days a week they bicycle to campus. Bicyclists that commute 3 or 5 days per week are at 38.5%. From their home, 91.0% of bicyclists take less than 15 minutes to commute to campus. The standard for a casual speed for cycling is 9 miles per hour (City of Copenhagen, 2012).

D. Safety Perception

Most bicyclists (60.4%) indicated that they are concerned for the safety of pedestrians on shared sidewalks throughout campus, while 7.2% responded that they are not concerned for pedestrians' safety on shared sidewalks (Table 9). When asked if pedestrians felt safe sharing campus sidewalks with bicyclists, 23.4% indicated they rarely or never felt safe sharing the sidewalk (Table 10) while the majority felt safe sometimes (39.3%). Another 37.2% felt safe often or always sharing sidewalks with bicyclists.

3. Key Findings

A. Infrastructure

The video-base observation study was used to discover the effectiveness of the pavement markings and at what rate the bicyclists were ignoring the pavement markings. The fact that 82.9% are completely ignoring the pavement

Figure 25 Current Condition of Pavement Marking, photo by John J. Scott (2014)

markings does show that the pavement markings are not effective. The pavement markings are fading now (Figure 25) and will most likely be washed away by the end of the spring semester.

While over 91% of the bicyclists are aware of the new dismount signs, the survey indicates that 42.4% are not aware of the designated bike routes and bicycle lanes on campus. Another 54.8% of bicyclists and bimodal users are not familiar with the Bicycle Routes Map that is produced by the Parking and Transit Department (Figure 26).

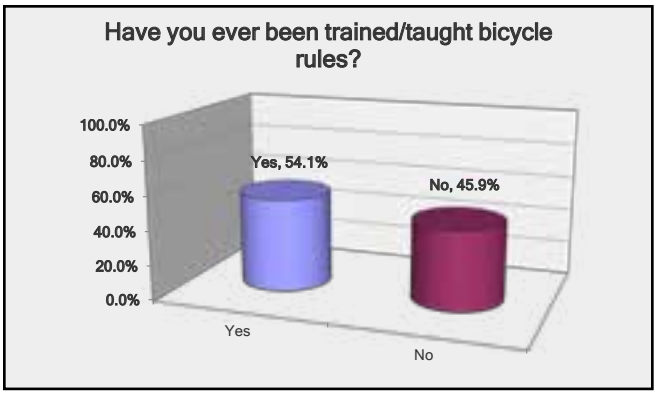

Figure 26 Formal Bicycle Training, from Survey

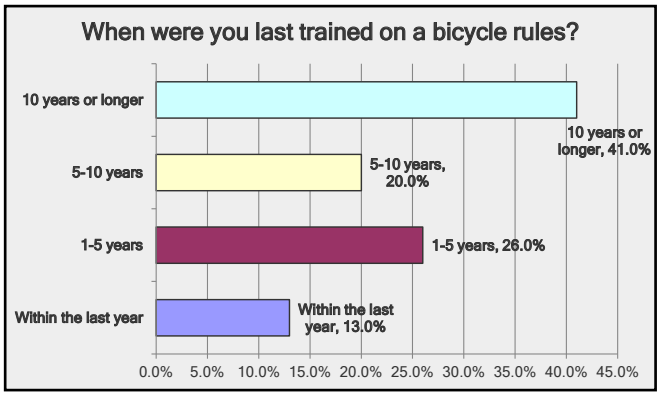

Figure 27 Latest Bicycle Training, from Survey

B. Education

From an observation study, it is impossible to conclude the bicycling education background of the users and whether they are aware of the routes on campus. It is evident that they are exhibiting poor choices and not promoting a positive bicycle culture when they are riding on the sidewalks.

Most of the bicyclists on campus have had formal training (Figure 26) on bicycle rules and regulations, (54.1%), but as shown in Figure 27 few have received training within the last year (13%), and the majority (61%) last received formal bicycle training five years ago or longer. The 54.8% shown in Figure 28, have no knowledge of the campus rules, routes, and maps that the Parking and Transit Department produced, compounds the gap in bicycle education on campus.

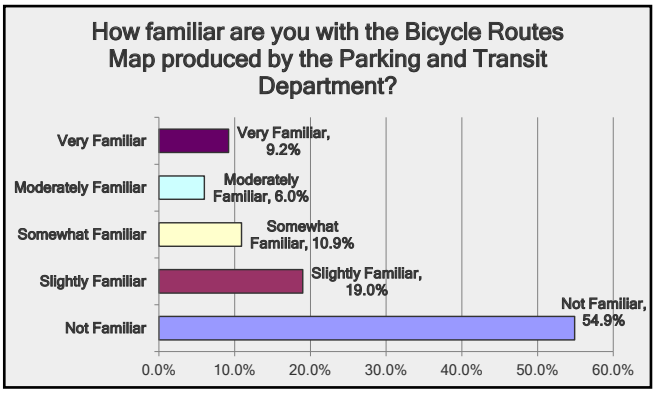

Figure 28 Campus Routes Knowledge, from Survey

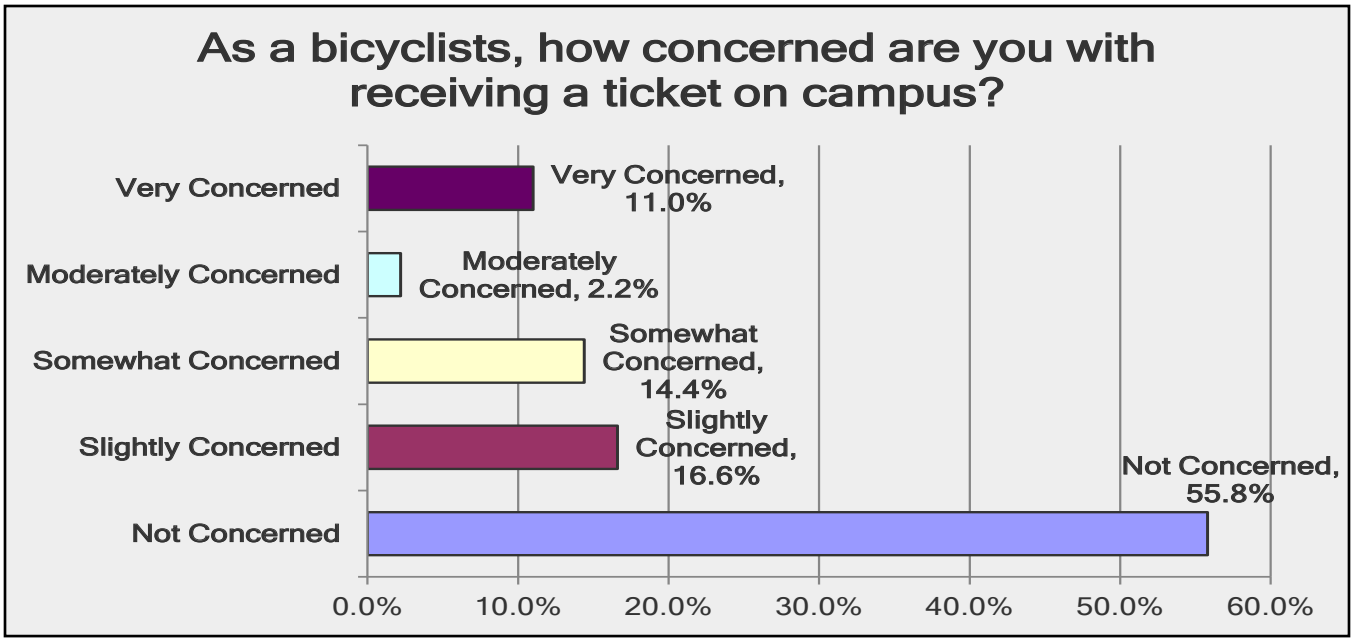

Figure 29 Campus Enforcement Concerns, from Survey

C. *Enforcement*

Bicyclists are not concerned about receiving a ticket for riding in prohibited areas, and this is evident by the rate they ride on sidewalks not intended for bicyclists. Enforcement officers were not seen in any of the observation studies recorded at the four locations.

No survey respondents who bicycle to campus have received a ticket for violating the bicycle rules and regulations on campus. Another 83.9% have never seen another bicyclist receive a ticket; therefore, it is easy to understand why 55.8% of bicyclists are not even slightly concerned about getting a ticket on campus.

D. *Overall Safety*

The sidewalks on campus are generally safe, but there is concern on sidewalks that bicyclists continue to use regardless of rules and regulations. There is a very real chance that bicyclists will collide with pedestrians. The seriousness of the situation does not put pedestrians in grave danger, but more attention needs to be given to the situation. To improve the safety on campus for pedestrians and bicyclists, infrastructure, education, and enforcement are in great need of improvement, which can easily be seen from the video-based observation study and survey results.

Bad Parking, photo by John J. Scott (2014)

Chapter V. Conclusions

1. Infrastructure

A majority of bicyclists ride in prohibited areas, which is a strong indication that the current infrastructure is ineffective. The new pavement markings are fading and barely legible after only 8 months. They are also passive, and the fading of the materials indicates a low-quality material. This information may convey to commuters that bicycling is not a priority.

The current bicycle infrastructure on campus is not understood by almost half of the bicyclists commuting to campus. Bicyclists also indicate that they are not aware of the routes and maps available to them online or in the parking services department. The office for the Parking and Transit Department is located in the parking garage, which is not an area that bicyclists use. This creates a situation where bicycle route maps and bicycle information are in an awkward location and inaccessible.

2. Education

Information gathered from the video-based observation study and survey indicates that there is a bicycling behavior problem on campus and that bicyclists are not following pavement instructions. Currently, there is no education program to teach bicyclists the proper bicycling procedures on campus. The void in bicycling education contributes to the unsafe bicycle culture on campus.

Education is not limited to teaching; it is also research and gathering information about bicycling. More observation studies could easily be conducted in different areas of campus to help understand the behavior of bicyclists. Knowing how bicyclists are using the infrastructure on campus can help determine goals for education, ascertain the level of information needed, and identify any missing components to a successful bicycle culture.

3. Enforcement

The absence of bicycle enforcement on campus is confirmed by the survey and video-based observation study. There is no involvement from enforcement in and around the core area of campus. University police officers were not seen in any of the videos. A lack of involvement from enforcement officials adds to the poor bicycling culture and is interpreted as a low-priority issue.

4. Overall

While bicycling is a popular method for commuting to campus at KSU, the current approach to bicycling is not comprehensive or successful. The current gaps in infrastructure, education, and enforcement create an atmosphere where pedestrians do collide with bicyclists. The current comprehensive plan for campus does include new bicycle routes but does not show precise locations of the proposed bicycle routes and is presented in broad general strokes instead of details. To have a positive impact on the bicycling culture, a robust and detailed plan needs to be made that includes the three key concepts of infrastructure, education, and enforcement. These three concepts need to work together in a cyclical process.

Inverse Snow Bikes, photo by John J. Scott (2014)

Chapter VI. Discussions

1. Limitations

A. Video-Based Observation Study

(1) Weather

The weather did play a part in the video-based observation study. During the observation study, the average temperatures dropped on a daily basis. There were also days that it rained and none of the date collected on rainy days was used. The delays caused by the rainy days had more impact on the post-test than the pre-test. The days recorded for the post-test were rainy and cold.

(2) Camera Locations

While three camera locations were at optimal locations, the fourth camera could have been placed at a better location. The location at Waters Hall (Camera 4) did not have the traffic volume that the other locations had. Another location with a higher traffic volume may have provided better data.

(3) Camera Viewpoint

During the review of the video recordings, it was discovered that the camera angle from Seaton Hall (Camera 2) was facing east. This made viewing the data difficult due to the sun shining directly into the camera. This slowed the process of data collection, and, at times, only silhouettes were visible. This same camera was also on auto focus causing it to lose focus on the site and focus on the screen in the window, which again required patience and watching for silhouettes in the background.

(4) Area of Study

The focus for this project was a very small part of campus, the core areas. A larger area of campus could have given a more complete picture of bicycling behavior. The campus has other areas

with dismount and yield signs that are not in the core and could have been considered in the study.

(5) Data Collection

The data collection was focused on whether or not bicyclists dismounted, and the focus could have been wider to include other bicyclist behavior. The data collection could have included basic demographics about the bicyclists, such as gender. More data could have been collected from the observation study that could have been relevant in other areas of cycling behavior.

B. Survey

(1) Development of Questionnaire

An additional question could have been added to make sure the target demographic was responding to the survey, such as "Do you currently commute to KSU Campus in Manhattan, Kansas?" While most indications show that the respondents were daily commuters, a simple question would have prevented respondents who are not current daily users from taking the test. The survey also did not allow the respondents to indicate they rode a bicycle zero times or to indicate they did not own a bicycle.

Survey questions that inquire about an attitude are hard to measure and difficult to ensure all options are accounted for. Another limitation is prior pilot studies on the survey were not conducted. Not enough pilot questionnaires were done to ensure the survey was as successful as it could be. The questions and research is specific to KSU, therefore, the generalizability of the results could be questionable.

(2) Perspective Questions

The perspective of bicyclists and pedestrians is not as clear as expected. The question for the bicyclist was worded differently than for the pedestrians. A more precise question that was the same for both pedestrians and bicyclists would have been better. This could have been answered with a more measurable response, such as a Likert scale.

(3) Sample Size

While the number of responses for the survey was valid, the survey could have been available for another two weeks. If the survey was distributed sooner, and a month was allowed, there could have been closer to 1,000 responses, which would have given a stronger validity.

2. Recommendations

Cycling and walking to campus account for 62.1% of commuters to campus. KSU and Manhattan, Kansas, have an opportunity to become a premier active transit city. The topography and compact environment make it an optimal place for cycling at all levels. Easy, safe improvements, with more visibility on campus and in Manhattan, could easily make cycling even more popular than it is. An improved cycling culture through infrastructure, education, and enforcement could easily make KSU and Manhattan, Kansas, the premier bicycling city in the Midwest.

A. Infrastructure and Design

(1) Bicycling Signs

The current signs used for bicycling are ineffective and passive. A bolder design could prove beneficial while not damaging the aesthetics of campus. The entry points for the dismount signs could span across the entire sidewalk to give a more active approach to get cyclists to dismount. Vertical signs could also work with the pavement

Figure 30 Current Dismount Sign, photo by John J. Scott (2014)

Figure 31 Bolder Larger Dismount Sign, image by John J. Scott (2014)

markings (Figures 30 & 31) could prove to be more effective than the current signs. Using purple, the school colors, could combine rules, regulations, and infrastructure with school pride. Typically, green is the color for separate bicycle lanes, but this can be changed to reflect local character. Research confirms bolder colored bike lanes are more used and safer for cyclists (Sadek, Dickason, & Kaplan, 2007).

Better materials for pavement markings are necessary to show a commitment to cycling infrastructure on campus. Tests are done to show which dyes and methods are best to prevent fading and color changes (Lin & Luo, 2004). Showing a dedication to quality materials reflects a commitment to the cycling commuters.

(2) Improving Existing Bicycle Infrastructure

The current infrastructure could be improved at a minimal cost. For example, the cycling path on Mid-Campus Drive and Anderson

Figure 32 Anderson and Mid-Campus Drive Current Conditions, photo by John J. Scott (2014)

Avenue, which is a one-way street, could become an excellent bicycle street with separated bicycle lanes on both sides of the street. At the same location, wider bike lanes could also be an easy improvement at minimal cost and not burden the automobile infrastructure on Mid-Campus Drive near the parking garage. Figure 32 shows the street in current conditions, and Figure 33 shows the possibilities with simple pavement markings. Other areas of campus that are not scheduled for large-scale improvements in the immediate future could benefit from simple upgrades on pavement markings and signage.

(3) Bicycle Parking

Bicycle parking on campus is another issue that needs more thought and planning. If the plan is to keep the campus core a pedestrian-only area, then the majority of bicycle parking needs to be on the perimeter of the campus core. The entry points on the perimeter to the campus core

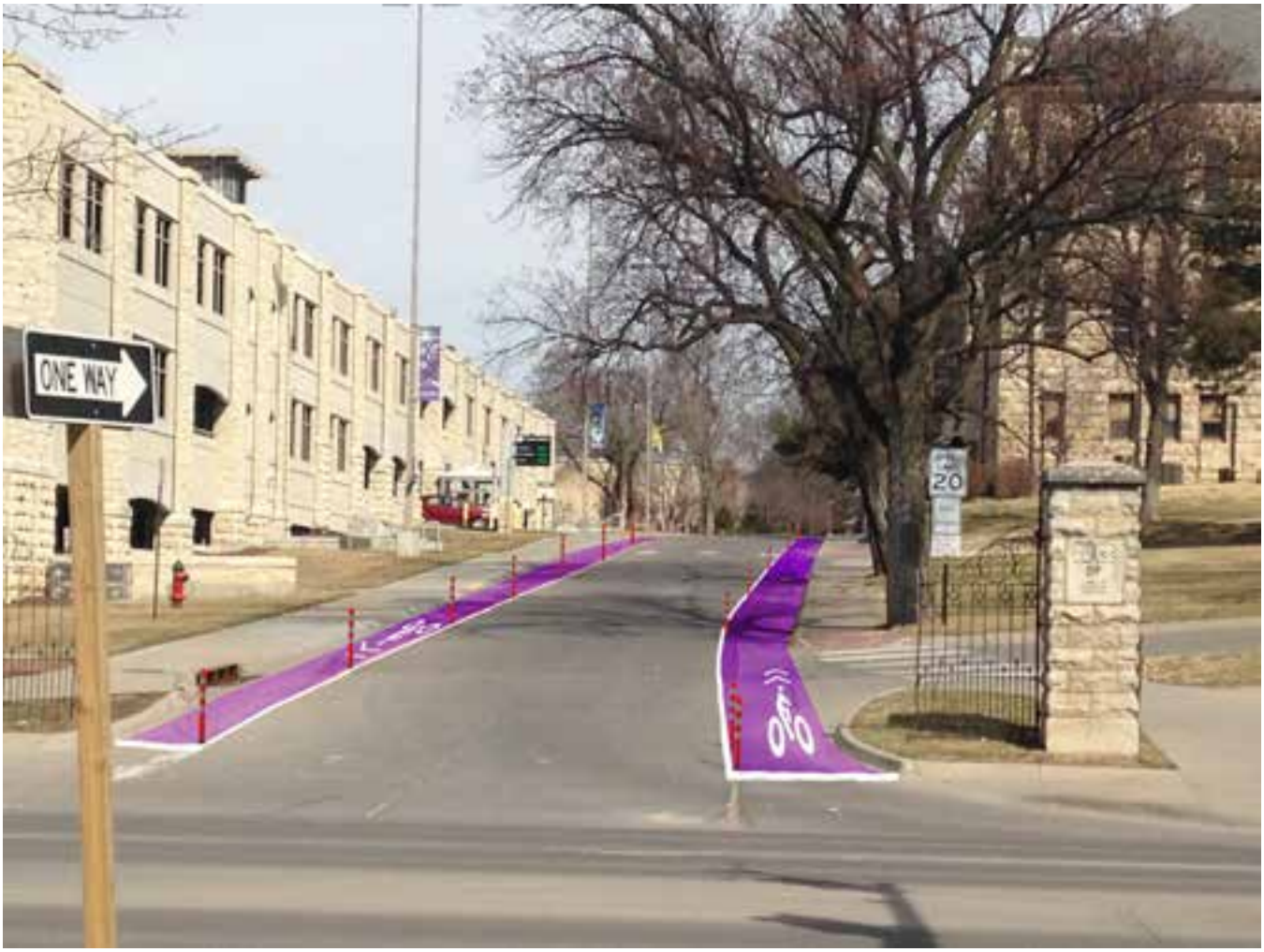

Figure 33 Anderson and Mid-Campus Drive Possibilities, image by John J. Scott (2014)

would be the most logical place for bicycles to park. Limiting the parking near buildings inside the core would encourage cyclists to park near entry points along the perimeter (Figure 34) and walk to their destinations inside the core.

Research on bicycle parking on campus is needed. Casual observation reveals that certain bicycle parking areas are constantly full, and other areas are empty. The areas that are not full could be redistributed to areas that are consistently full. Readjusting the current bicycle parking to the actual needs shown through a daily monitoring system could prove beneficial. An example is the parking area near Hale Library and Mid-Campus Drive, which is constantly full, yet the parking to the north of Seaton Court rarely meets capacity. Reducing the parking to the north of Seaton to a few spots and increasing the parking near Hale Library and Mid-Campus Drive would be a logical alteration.

(4) Bosco Plaza

Bosco Plaza has a very high level of pedestrian activity, possibly the highest on campus, yet cyclists are allowed to ride through this area. This plaza is next to the Student Union, which generates a consistently high volume of foot traffic; therefore cycling should be prohibited

Figure 34 Campus Core with Perimeter Bicycle Parking, Google Map amended by John J. Scott (2013)

in Bosco Plaza. A previous observation study determined that this area has the highest potential of pedestrian/cycling collisions on campus. Logically, Bosco Plaza should be an area for pedestrians only and should be a dismount zone for bicyclists due to its heavy use by pedestrians, frequent events, tour groups, and visitors.

(5) Campus Master Plan

An in-depth comprehensive plan that parallels the Campus Master Plan 2025 is needed. The 2025 plan does include a bicycle network, but a more detailed approach to the process is needed. A plan that focuses on active transportation and amenities could make Kansas State an exemplary model for bicycling.

B. Education

(1) Online Education Program

The survey showed that over half of the cyclists have received formal bicycle training, but 61% said that it has been five years or longer since they received formal training. Several schools and cities have excellent online interactive education components to their bicycle programs. KSU should create an online education component to remind bicyclists of proper bicycle etiquette and of the rules specific to campus. Education could easily be incorporated into the bicycle registration process and other enforcement policies.

(2) Cycling Advocacy

Bicycling to campus is a cheaper form of commuting than the automobile, and the average cost of a student parking permit is $170.00 and bicycle registration is free ("Parking Services," 2014). Therefore, encouraging bicycling on campus is logical from a fiscal stance. Advocating more bicycling is free, which is more cost efficient than building another parking garage. Bicycling is also healthy for the commuters and the environment. With a successful bicycle network, KSU and Manhattan, Kansas, could use this as a marketing tool for new students, staff, and businesses.

(3) Continued Research on Campus

Bicycling research is an aspect of education that should not be overlooked. College campuses are excellent environments to explore new territories and try new things. Bicycling infrastructure, behavior, economic impact, and other aspects could be researched and explored in many programs throughout KSU. Knowing how the infrastructure and bicyclists behavior is working on campus also helps keep a bicycle network up to date and current.

(4) Visible Routes

Bicycling route maps are currently available at the Parking and Transit Department website and office. The Parking and Transit Department office is located in the parking garage on the bottom floor, which is not visible or well traveled by pedestrians or bicyclists. The maps could easily be displayed at other map kiosks as a subset or an overlay to the entire campus circulation. The maps for the bicycling routes need to be displayed throughout campus and available at several locations. These should be handed out en masse during the first weeks of each semester.

(5) Student Organization

Bicycling on Kansas State Campus needs to have a student organization dedicated to education and advocacy. The current bicycling club is more about competitive racing rather than education and advocacy. A student-led organization dedicated to getting safer amenities for cycling on campus would help advocate for improvements. Students are the predominant users of cycling on campus and need to have an active voice in the processes that effect cycling.

(6) Bicycle Coalition

Manhattan has a Bicycle Advisory Committee, and KSU should have a similar group that advocates for cycling issues on campus. The committee should consist of members from the Facilities and Planning Department, the KSU Police Department, the Parking and Transit Department, the student body and any other interested parties. The coalition needs to work together to create a comprehensive plan to improve cycling on campus. The short-term and long-term goals need to be measured annually, and be in line with the master plan for campus. There are different processes from what the Bicycle Advisory Committee for Manhattan does, but the two should be intertwined and know what each other is planning.

C. Enforcement

(1) Active Role

The role of enforcement is to educate and advocate safe bicycling behavior. The University Police department needs to be engaged with cyclists. Similar to the education component attempted for this project, University Police could have stations at the beginning of each semester, educating and promoting safe bicycling behavior. A police presence in the campus core could play a key role and set the tone for cycling behavior that may last through a semester. The university should consider a bicycle patrol; it could improve safety in the core campus area and provide physical opportunities for officers. Riley County has a successful bicycle patrol officer who promotes and advocates cycling (Dorsey, 2013).

(2) Bicycle Parking

Abandoned bicycles are a problem on campus; they take up parking space and become a safety hazard that could entangle other bicycles or bicyclists, especially when abandon bicycles are knocked over. Twice a semester, the abandoned bicycles need to be purged. Enforcement can simply place tags on the abandoned bicycles that warn of impending removal, and then follow-up and remove the abandoned bicycles the following

week. An announcement of abandoned bicycle clean-up could be placed in the school paper and online that warns of a scheduled removal.

Another issue is what to do with all the abandoned bicycles on campus. Several programs exist that refurbish bicycles and give them to people who need transportation but cannot afford a bicycle. There are many innovative precedents dealing with abandoned bicycles that could be implemented at KSU. Some schools resell the bicycles to the students at deeply discounted prices.

(3) Ticket Diversion Program

Precedents for ticket diversion programs exist at other universities. When a ticket is issued to bicyclists, they have the opportunity to take an online class instead of paying a fine. The online class should educate and reinforce the rules and the routes on campus. Bicyclists who receive multiple tickets within a school year would be required to pay all the fines they accrued even if they took the online diversion class. The fines should be kept at a reasonable rate. This type of enforcement is not heavy-handed and does not punish the students severely, yet it does set a standard acceptable behavior for cyclists on campus. Officers should set a couple of weeks each semester to focus on bicyclists on campus.

(4) Bicycle Registration

The process to register a bicycle could be made easier, faster, and clearer. At the beginning of the year and again in the spring, booths set up in Bosco Plaza and at other locations would allow cyclists an opportunity to register on the spot. This would present an opportunity for enforcement officers or others to educate cyclists on the campus routes. The booth could be shared by advocates, educators and enforcement officers.

D. Overall

Cycling is increasing in popularity. Having a positive bicycle culture on campus and in Manhattan gives KSU and Manhattan an edge over their competitors. A safe, comprehensive infrastructure that supports cycling is a valuable marketing tool. KSU has the potential to become a leader in cycling culture, which is a community amenity that has proven to be an environmental and economic asset.

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Glossary

Active transportation- any form of transportation powered by humans like walking and biking (Government of Canada, 2009).

Animate Vertical Signs- signs that portray an activity with a human, such as a bike sign with a rider and the sign is more active (Oh, Rogoff, & Smith-Jackson, 2013).

Bicycle Amenities- refers to any tools for cyclists such as bike racks, bike repair stations, bike storage and for commuters lockers and showers (Cheney et al., 2011).

Bicycle Boulevards- are roadways that are designated to be best suited for bicyclists due to the low speed and volume of motor vehicles (Walker, Tresidder, Birk, Wiegand, & Dill, 2009).

Bicycle Box- a box marked in front of traffic at signals that bicycles move up to so they have more visibility to motorist, these are also known as advanced stop boxes or advanced stop lines (Dill, Monsere, & McNeil, 2012)

Bicycle Culture- a culture that promotes bicycle use and all bicycle related subjects (Pucher, Buehler, & Seinen, 2011)

Bicycle infrastructure- All infrastructure specifically designed for bicycle use such as roads with bike lanes, separated bike paths, bike parking, signs for bicyclists and anything else designed for cyclists to utilize.

Bicycle Lanes- clearly marked lanes on streets and roads that signify the space is intended for bicycles only (Haworth & Schramm, 2011).

Bicycle Paths- a paved or gravel path that is separate from a roadway and is intended for non-motorized vehicles and pedestrians (Walker et al., 2009).

Bicycle Share- programs that allow bicycles to be rented at one location and returned at another for users to utilize as a means of transportation in a region (Pucher et al., 2011)

Bicycle Network– The combination of bike paths, sharrows, bike boulevards and other bike infrastructure to make a region or city connected.

Complete Streets- a policy that approaches the transportation and design of a street in a manner the includes access to everyone regardless of mode of transportation (McCann & Rynee, 2010).

Inanimate Vertical Signs- signs without a human such as a bike without a rider, these signs tend to be more static (Oh et al., 2013).

Pavement Markings- markings on roadways or sidewalks that instruct inform or prohibit behavior of the user.

Sharrow- a pavement marking on roadways that indicate bicycles will share the same roadway and go in the same direction as motor vehicles (Parks et al., 2012).

Appendix A: Survey Questionnaire

Greetings,

My name is John Scott and I am a graduate student in the Department of Landscape Architecture/ Regional and Community Planning at Kansas State University. I am currently doing research on bicycle and pedestrian interactions on Kansas State campus and would like your help. This survey should require no more than 5 minutes to complete.

The response will be compiled with other respondents and used as general data. After completing the survey, no further contact will be made. Your responses are confidential, anonymous and greatly appreciated.

Completing this survey will indicate your willingness to participate in this study and if you require additional information or have questions, please contact me.

This survey is distributed by social media and it is appreciated if you pass this on to other folks that regularly visit campus.

Thank you,
John Scott
jjscott@kstate.edu
785-341-5873

Thank you for participating in this survey.

1. What is your age?

- ◯ Under 18
- ◯ 18 to 24
- ◯ 25 to 34
- ◯ 35 to 44
- ◯ 45 to 54
- ◯ 55 to 64
- ◯ 65 or Older

2. What is your gender?

- ◯ Female
- ◯ Male

3. Are you currently?

- ◯ Undergraduate Student
- ◯ Graduate Student
- ◯ Faculty/Administration/Maintenance/Staff

Other (please specify)

4. Typically, what is your main mode of transportation to campus from your home?

- ◯ Walk
- ◯ Bicycle
- ◯ Automobile (Alone)
- ◯ Automobile (Carpool)
- ◯ Bus
- ◯ Other (e.g. Skateboard)

5. Do you use a bicycle while you are on campus?

- ◯ Yes
- ◯ No

6. How often do you walk to campus in a typical week?

- ◯ 1 Day
- ◯ 2 Days
- ◯ 3 Days
- ◯ 4 Days
- ◯ 5 Days

7. Typically, how long does it take you to walk to campus from your home?

- ◯ Less than 10 minutes
- ◯ 10-15 minutes
- ◯ 15-20 minutes
- ◯ 20-30 minutes
- ◯ 30 minutes or more

8. On campus, have you ever witnessed a pedestrian have a collision with a cyclist?

- ◯ Yes
- ◯ No

9. On campus, have you ever been involved in a bicycle and pedestrian collision?

- ◯ Yes
- ◯ No

10. As a pedestrian, do you feel safe sharing sidewalks with bicycle riders on campus?

- ◯ Never
- ◯ Rarely
- ◯ Sometimes
- ◯ Often
- ◯ Always

11. As a pedestrian have you almost collided with a cyclist on campus?

- ◯ Yes
- ◯ No

12. Do you ever use a bicycle to get to campus from your home?

- ◯ Yes
- ◯ No

13. How often do you bike to campus in a typical week?

- ◯ 1 Day
- ◯ 2 Days
- ◯ 3 Days
- ◯ 4 Days
- ◯ 5 Days
- ◯ Occasionally/ Sometimes no set pattern

14. Typically, how long does it take you to bicycle to campus from your home?

- ◯ Less than 5 minutes
- ◯ 5-10 minutes
- ◯ 10-15 minutes
- ◯ 15-20 minutes
- ◯ 20 minutes or more

15. Have you ever been trained/taught bicycle rules?

- ◯ Yes
- ◯ No

16. When were you last trained on a bicycle rules?

- ◯ Within the last year
- ◯ 1-5 years
- ◯ 5-10 years
- ◯ 10 years or longer

17. How knowledgeable are you with the bicycle rules and regulations on campus?

- ◯ Not at all
- ◯ Slightly Knowledgeable
- ◯ Somewhat Knowledgeable
- ◯ Moderately Knowledgeable
- ◯ Very Knowledgeable

18. How familiar are you with designated bike routes and bike lanes on campus?

- ◯ Not Familiar
- ◯ Slightly Familiar
- ◯ Somewhat Familiar
- ◯ Moderately Familiar
- ◯ Very Familiar

19. How familiar are you with the Bicycle Routes Map produced by the Parking and Transit Department?

- ◯ Not Familiar
- ◯ Slightly Familiar
- ◯ Somewhat Familiar
- ◯ Moderately Familiar
- ◯ Very Familiar

20. Are you aware of the new pavement markings that instruct bicyclists to 'DISMOUNT'?

- ◯ Yes
- ◯ No

21. How often do you follow the pavement marking instructing bicyclists to 'DISMOUNT'?

- ◯ Never Dismount
- ◯ Rarely Dismount
- ◯ Sometimes Dismount
- ◯ Often Dismount
- ◯ Always Dismount

22. As a bicyclist, how concerned are you with pedestrian safety on campus sidewalks?

- ◯ Not Concerned
- ◯ Slightly Concerned
- ◯ Somewhat Concerned
- ◯ Moderately Concerned
- ◯ Very Concerned

23. Have you ever been involved in a collision with a pedestrian on campus?

- ◯ Yes
- ◯ No

24. Have you ever been ticketed for violating a bicycle rule on campus?

- ◯ Yes
- ◯ No

25. Have you ever seen anyone stopped on a bicycle by an enforcement officer on campus?

- ◯ Yes
- ◯ No

26. As a bicyclists, how concerned are you with receiving a ticket on campus?

- ◯ Not Concerned
- ◯ Slightly Concerned
- ◯ Somewhat Concerned
- ◯ Moderately Concerned
- ◯ Very Concerned

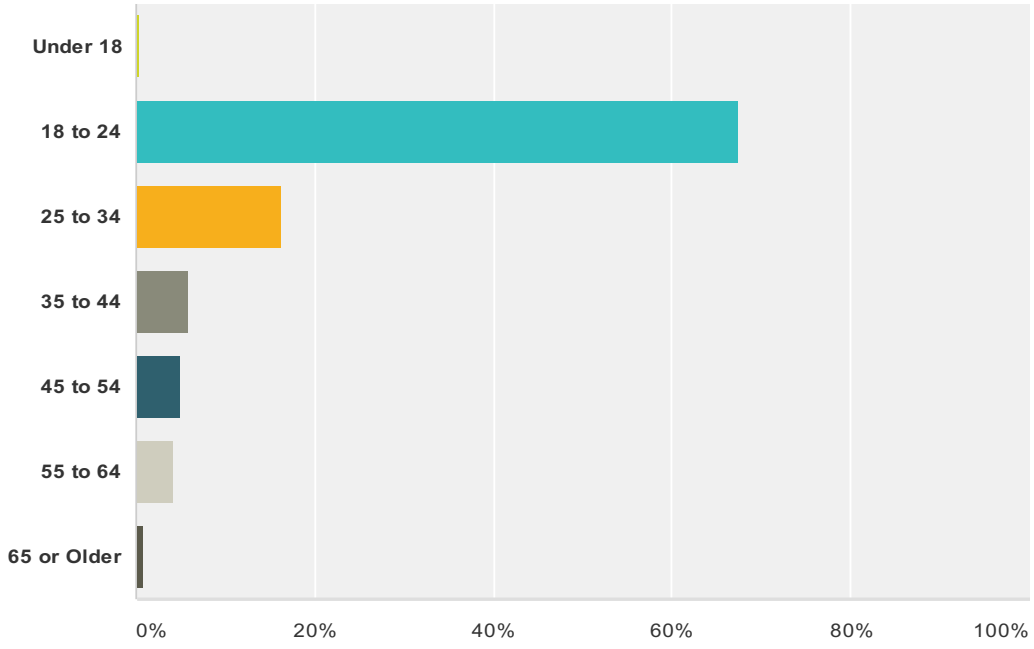
Thank your for participating in this survey.

Appendix B: Survey Results

Pedestrian and Bicycle Insight

Q1 What is your age?

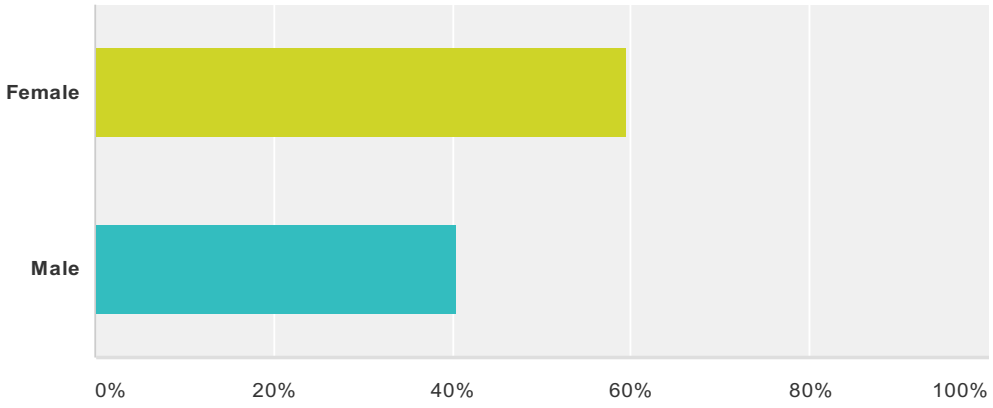
Answered: 450 Skipped: 0



Answer Choices	Responses	
Under 18	**0.44%**	2
18 to 24	**67.33%**	303
25 to 34	**16.22%**	73
35 to 44	**5.78%**	26
45 to 54	**5.11%**	23
55 to 64	**4.22%**	19
65 or Older	**0.89%**	4
Total		**450**

Q2 What is your gender?

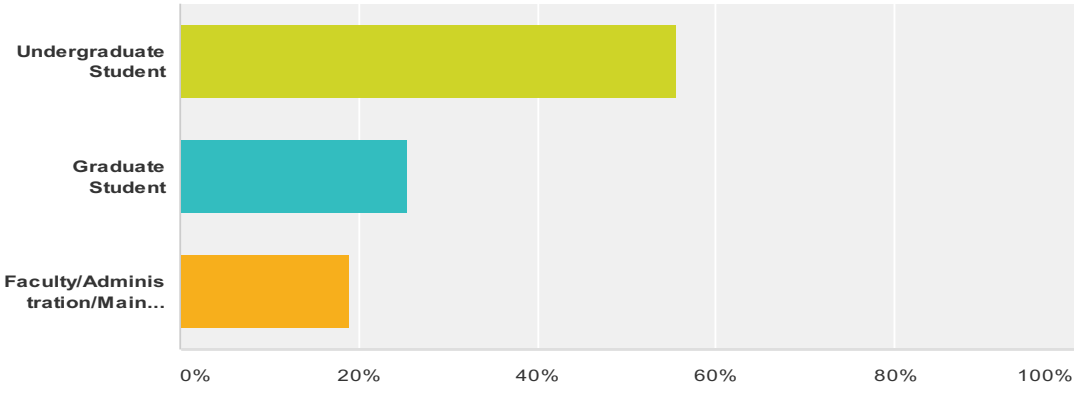
Answered: 445 Skipped: 5



Answer Choices	Responses	
Female	**59.55%**	265
Male	**40.45%**	180
Total		**445**

Q3 Are you currently?

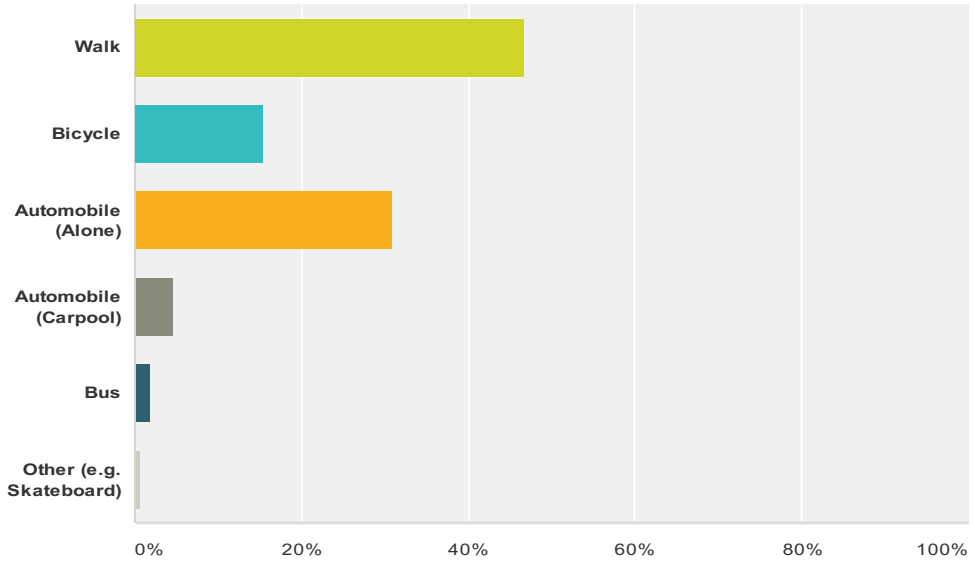
Answered: 432 Skipped: 18



Answer Choices	Responses
Undergraduate Student	55.56%
Graduate Student	25.46%
Faculty/Administration/Maintenance/Staff	18.98%
Total	

Q4 Typically, what is your main mode of transportation to campus from your home?

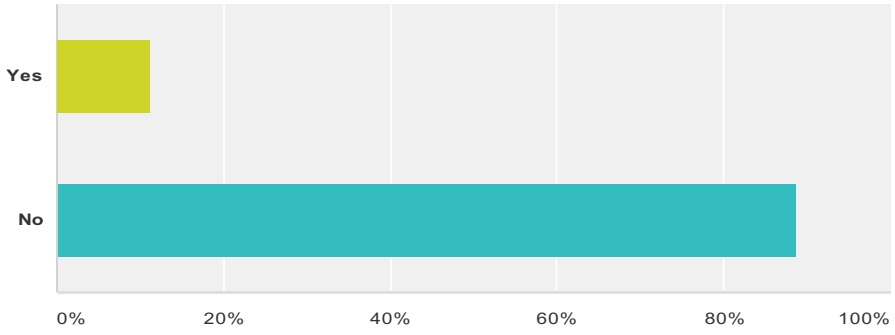
Answered: 441 Skipped: 9



Answer Choices	Responses	
Walk	**46.71%**	206
Bicycle	**15.42%**	68
Automobile (Alone)	**30.84%**	136
Automobile (Carpool)	**4.54%**	20
Bus	**1.81%**	8
Other (e.g. Skateboard)	**0.68%**	3
Total		**441**

Q5 Do you use a bicycle while you are on campus?

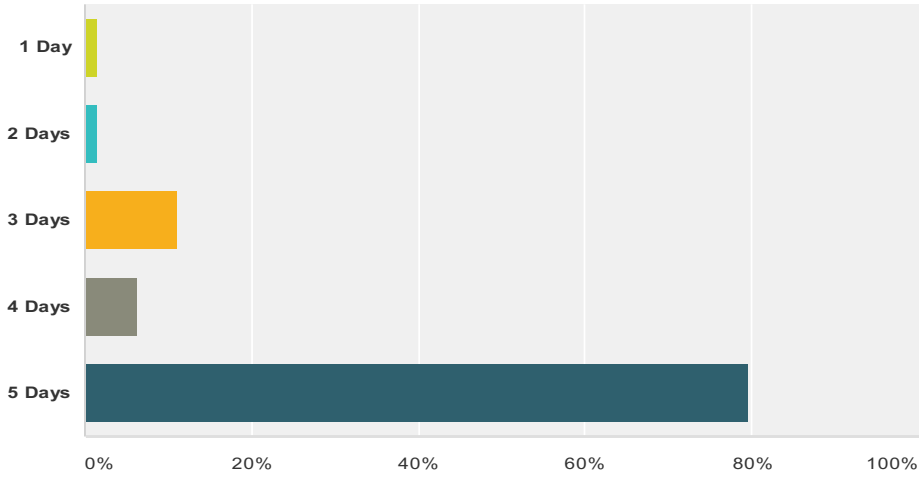
Answered: 168 Skipped: 282



Answer Choices	Responses	
Yes	**11.31%**	19
No	**88.69%**	149
Total		**168**

Q6 How often do you walk to campus in a typical week?

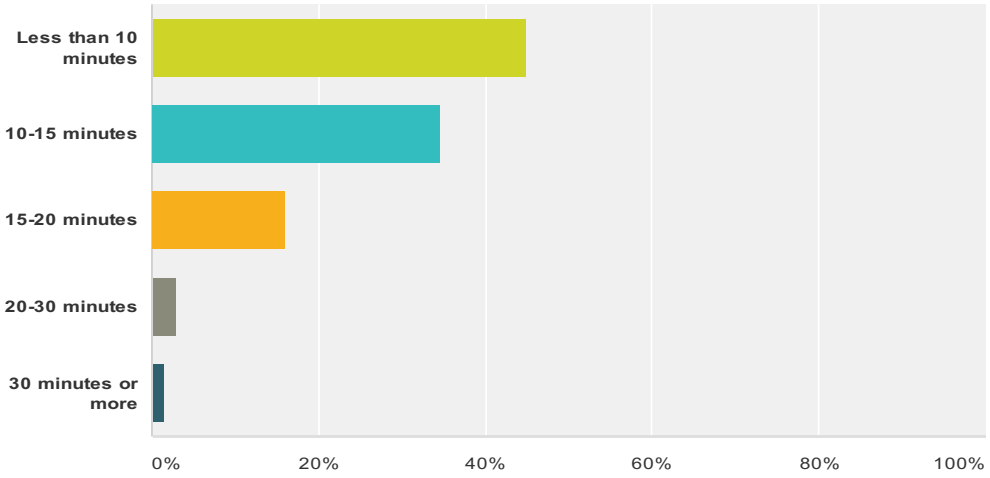
Answered: 206 Skipped: 244



Answer Choices	Responses	
1 Day	**1.46%**	3
2 Days	**1.46%**	3
3 Days	**11.17%**	23
4 Days	**6.31%**	13
5 Days	**79.61%**	164
Total		**206**

Q7 Typically, how long does it take you to walk to campus from your home?

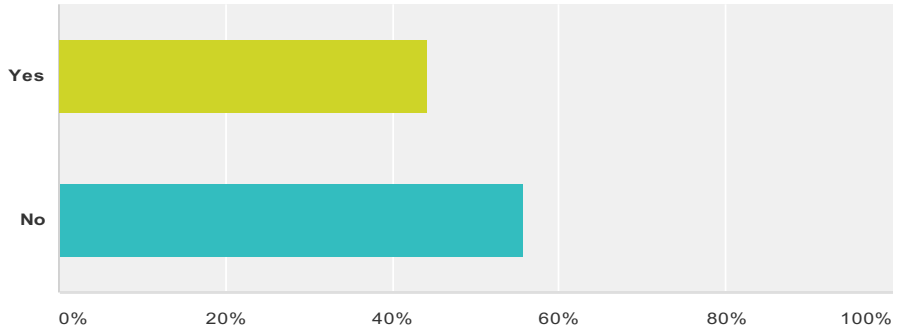
Answered: 205 Skipped: 245



Answer Choices	Responses	
Less than 10 minutes	**44.88%**	92
10-15 minutes	**34.63%**	71
15-20 minutes	**16.10%**	33
20-30 minutes	**2.93%**	6
30 minutes or more	**1.46%**	3
Total		**205**

Q8 On campus, have you ever witnessed a pedestrian have a collision with a cyclist?

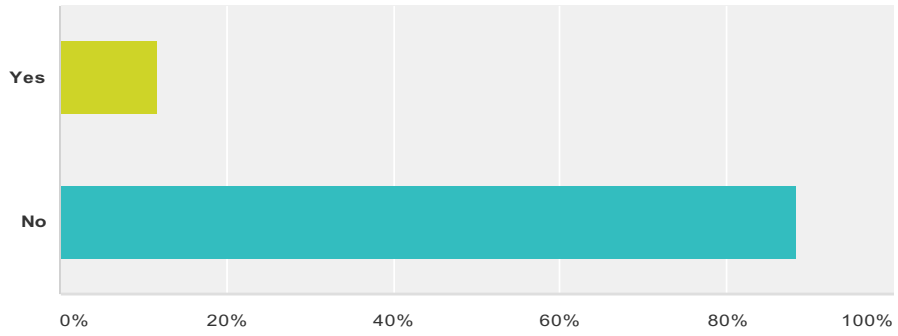
Answered: 352 Skipped: 98



Answer Choices	Responses	
Yes	**44.32%**	156
No	**55.68%**	196
Total		**352**

Q9 On campus, have you ever been involved in a bicycle and pedestrian collision?

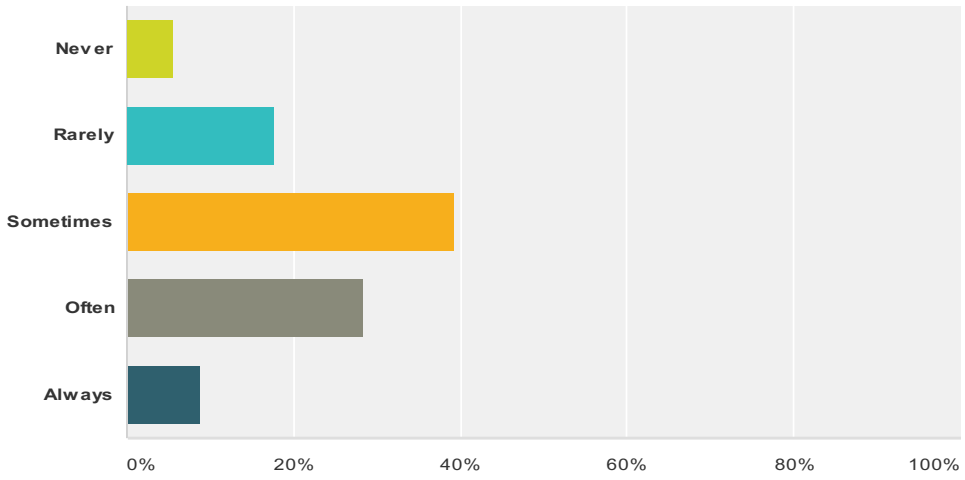
Answered: 351 Skipped: 99



Answer Choices	Responses	
Yes	**11.68%**	41
No	**88.32%**	310
Total		**351**

Q10 As a pedestrian, do you feel safe sharing sidewalks with bicycle riders on campus?

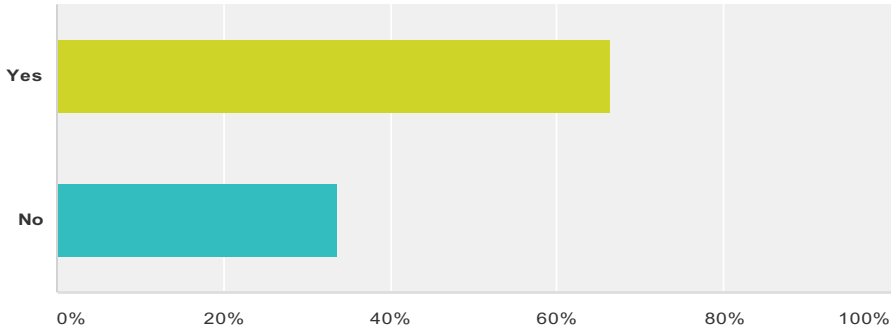
Answered: 351 Skipped: 99



Answer Choices	Responses	
Never	**5.70%**	20
Rarely	**17.66%**	62
Sometimes	**39.32%**	138
Often	**28.49%**	100
Always	**8.83%**	31
Total		**351**

Q11 As a pedestrian have you almost collided with a cyclist on campus?

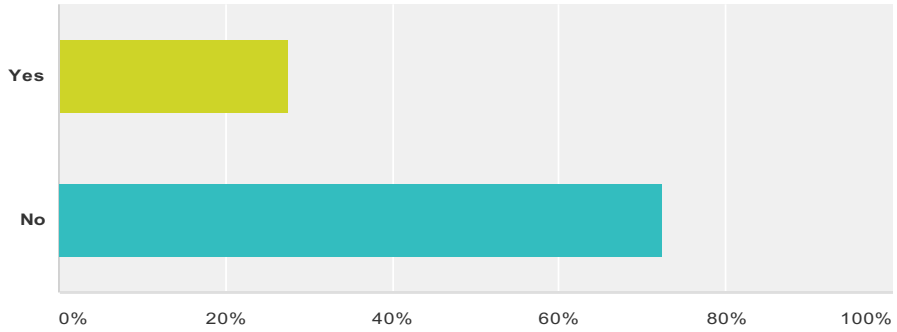
Answered: 350 Skipped: 100



Answer Choices	Responses	
Yes	**66.29%**	232
No	**33.71%**	118
Total		**350**

Q12 Do you ever use a bicycle to get to campus from your home?

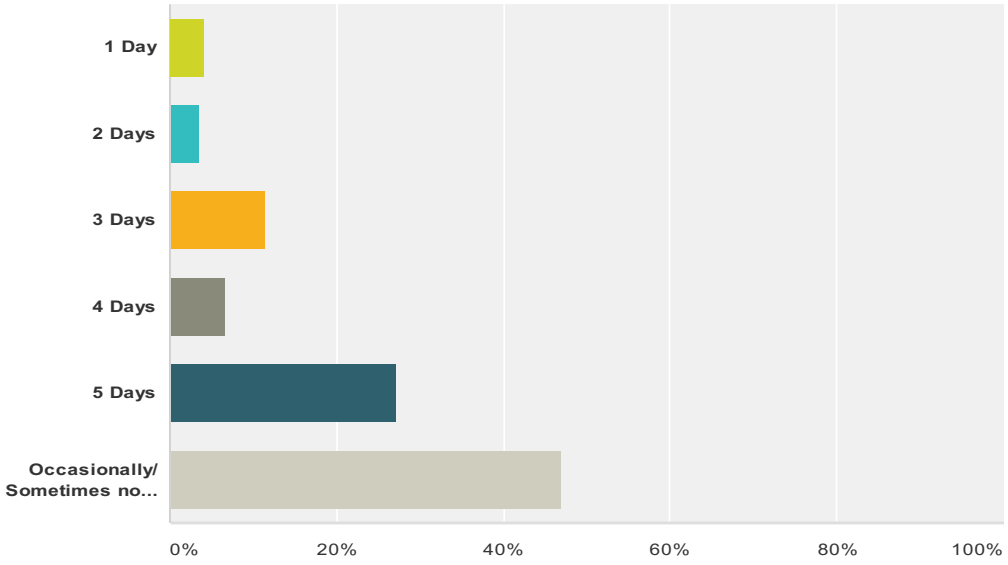
Answered: 351 Skipped: 99



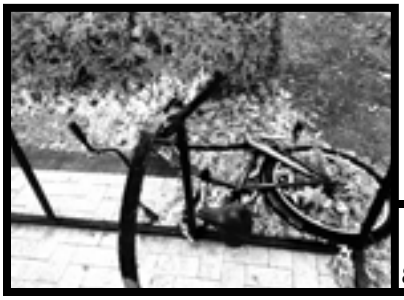
Answer Choices	Responses	
Yes	**27.64%**	97
No	**72.36%**	254
Total		**351**

Q13 How often do you bike to campus in a typical week?

Answered: 166 Skipped: 284

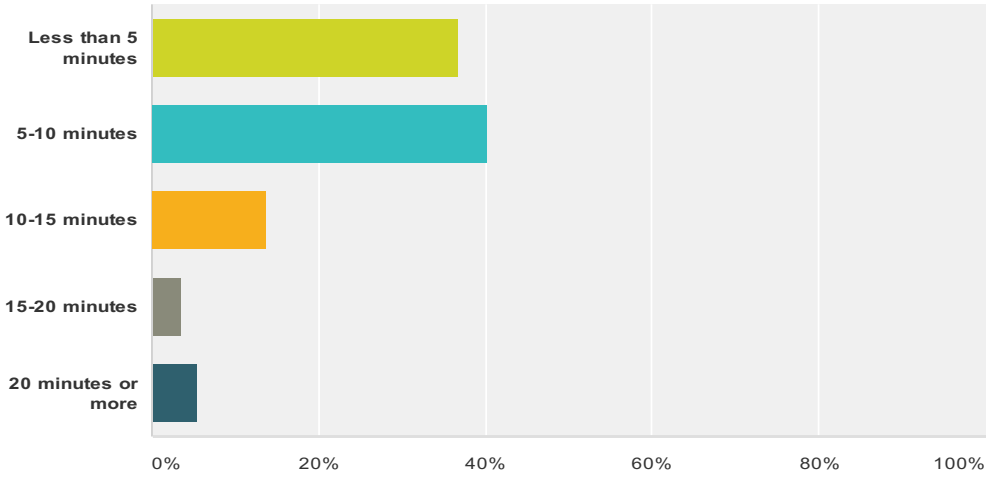


Answer Choices	Responses	
1 Day	**4.22%**	7
2 Days	**3.61%**	6
3 Days	**11.45%**	19
4 Days	**6.63%**	11
5 Days	**27.11%**	45
Occasionally/ Sometimes no set pattern	**46.99%**	78
Total		**166**



Q14 Typically, how long does it take you to bicycle to campus from your home?

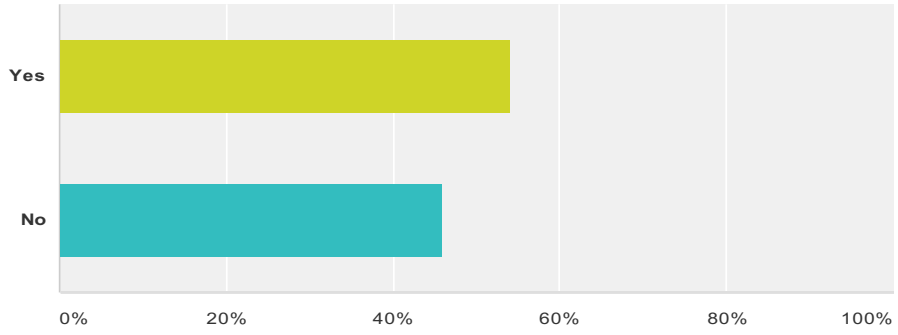
Answered: 166 Skipped: 284



Answer Choices	Responses	
Less than 5 minutes	**36.75%**	61
5-10 minutes	**40.36%**	67
10-15 minutes	**13.86%**	23
15-20 minutes	**3.61%**	6
20 minutes or more	**5.42%**	9
Total		**166**

Q15 Have you ever been trained/taught bicycle rules?

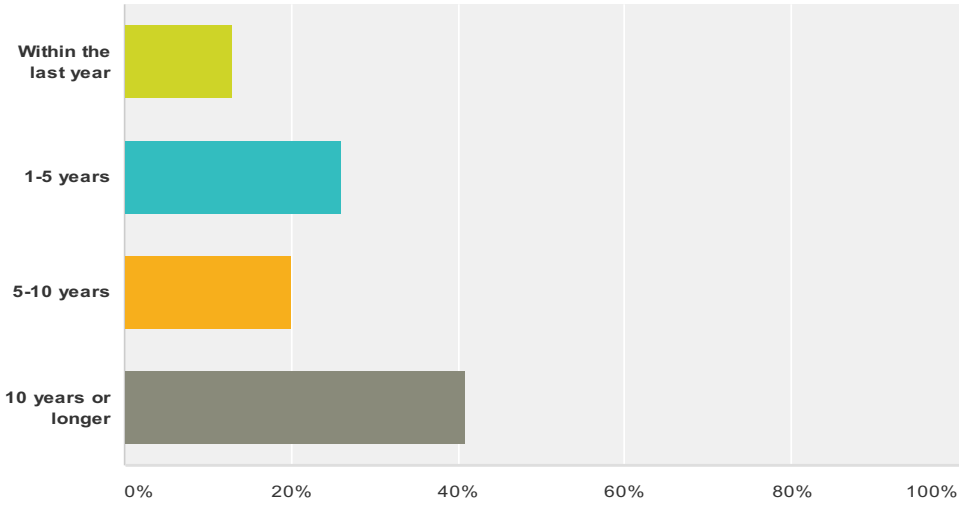
Answered: 183 Skipped: 267



Answer Choices	Responses	
Yes	**54.10%**	99
No	**45.90%**	84
Total		**183**

Q16 When were you last trained on a bicycle rules?

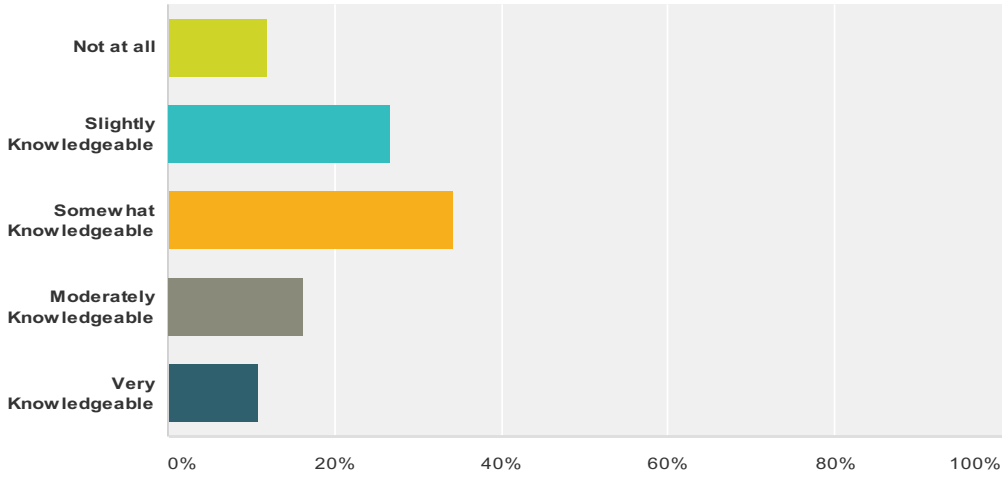
Answered: 100 Skipped: 350



Answer Choices	Responses	
Within the last year	**13%**	13
1-5 years	**26%**	26
5-10 years	**20%**	20
10 years or longer	**41%**	41
Total		**100**

Q17 How knowledgeable are you with the bicycle rules and regulations on campus?

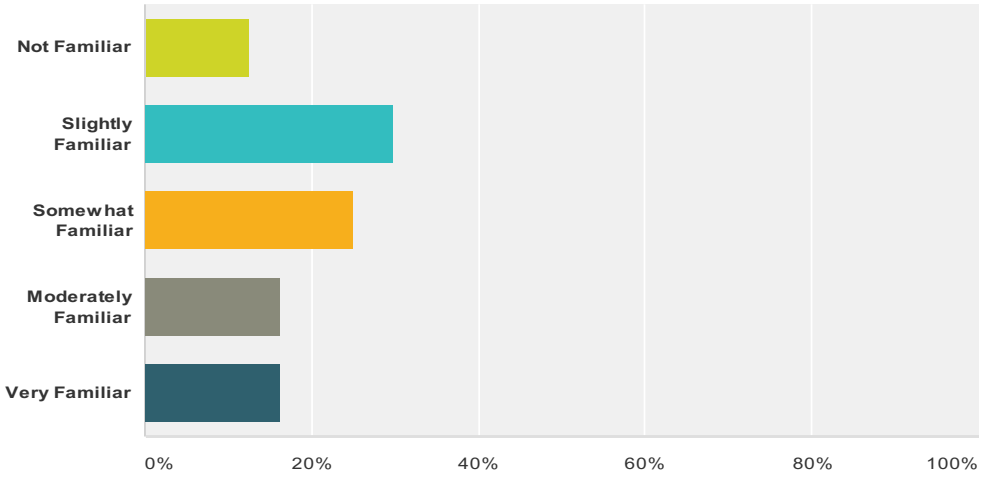
Answered: 184 Skipped: 266



Answer Choices	Responses	
Not at all	**11.96%**	22
Slightly Knowledgeable	**26.63%**	49
Somewhat Knowledgeable	**34.24%**	63
Moderately Knowledgeable	**16.30%**	30
Very Knowledgeable	**10.87%**	20
Total		**184**

Q18 How familiar are you with designated bike routes and bike lanes on campus?

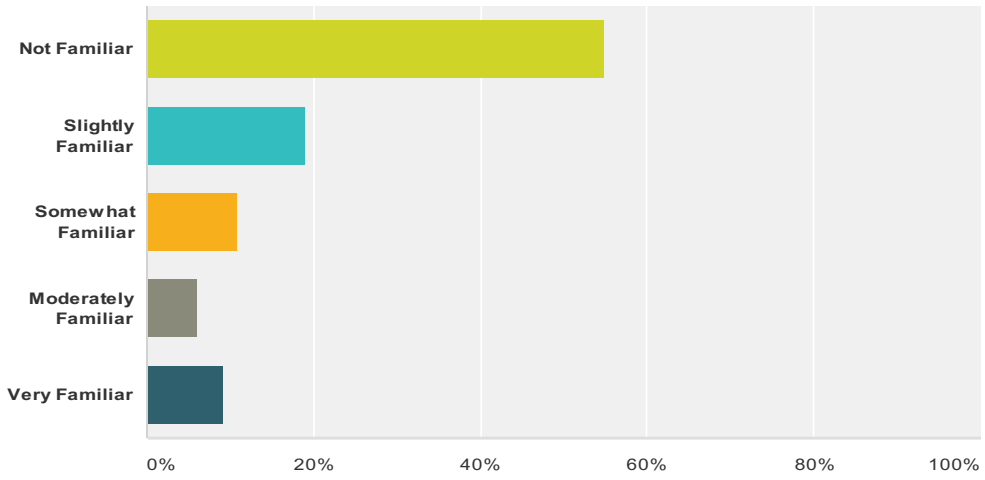
Answered: 184 Skipped: 266



Answer Choices	Responses	
Not Familiar	**12.50%**	23
Slightly Familiar	**29.89%**	55
Somewhat Familiar	**25%**	46
Moderately Familiar	**16.30%**	30
Very Familiar	**16.30%**	30
Total		**184**

Q19 How familiar are you with the Bicycle Routes Map produced by the Parking and Transit Department?

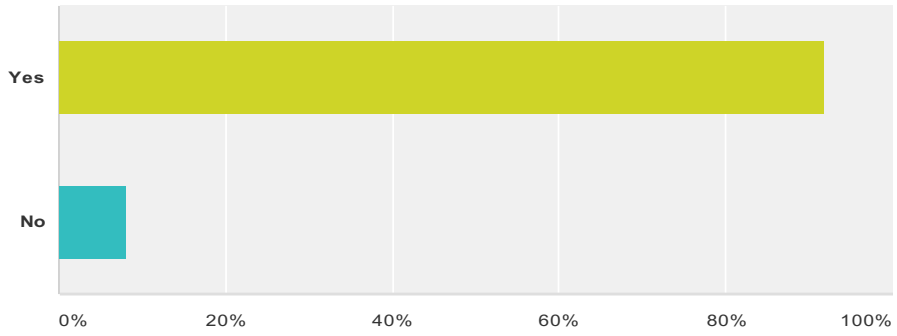
Answered: 184 Skipped: 266



Answer Choices	Responses	
Not Familiar	**54.89%**	101
Slightly Familiar	**19.02%**	35
Somewhat Familiar	**10.87%**	20
Moderately Familiar	**5.98%**	11
Very Familiar	**9.24%**	17
Total		**184**

Q20 Are you aware of the new pavement markings that instruct bicyclists to 'DISMOUNT'?

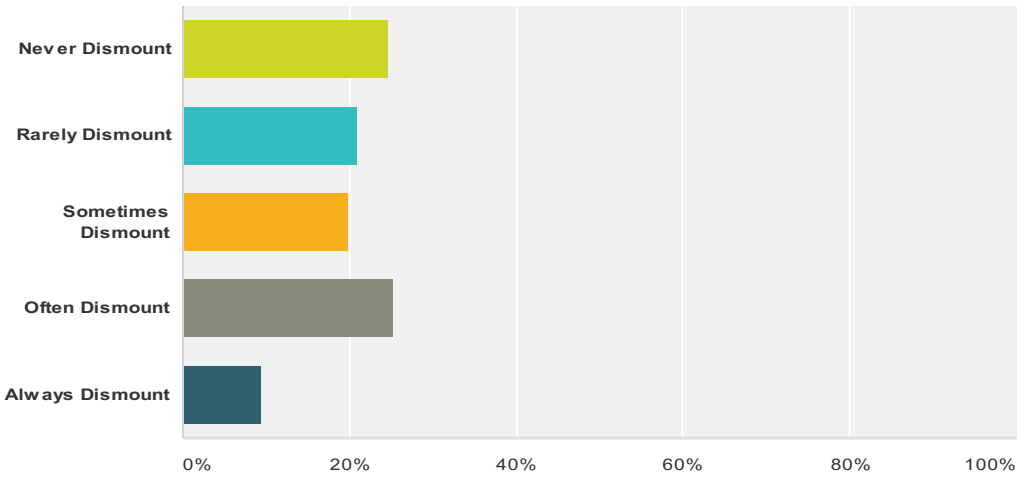
Answered: 184 Skipped: 266



Answer Choices	Responses	
Yes	**91.85%**	169
No	**8.15%**	15
Total		**184**

Q21 How often do you follow the pavement marking instructing bicyclists to 'DISMOUNT'?

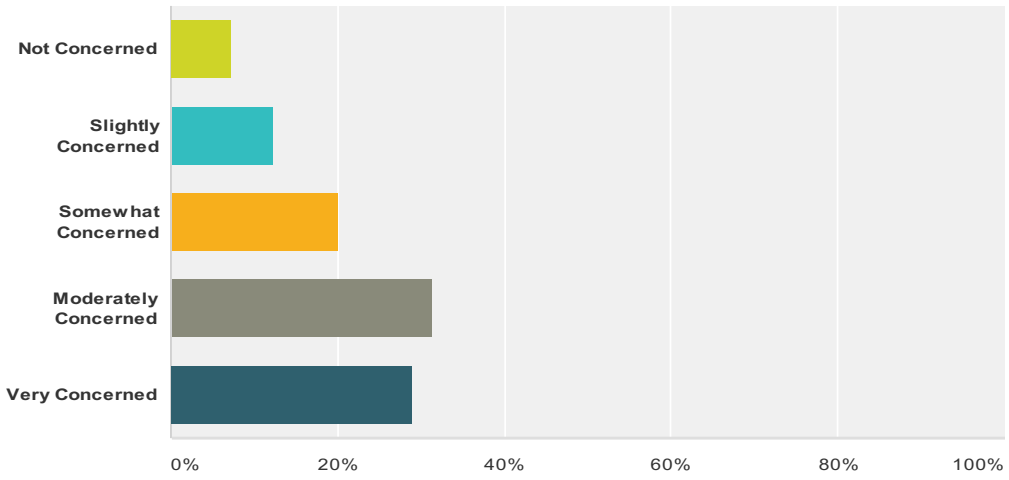
Answered: 182 Skipped: 268



Answer Choices	Responses	
Never Dismount	**24.73%**	45
Rarely Dismount	**20.88%**	38
Sometimes Dismount	**19.78%**	36
Often Dismount	**25.27%**	46
Always Dismount	**9.34%**	17
Total		**182**

Q22 As a bicyclist, how concerned are you with pedestrian safety on campus sidewalks?

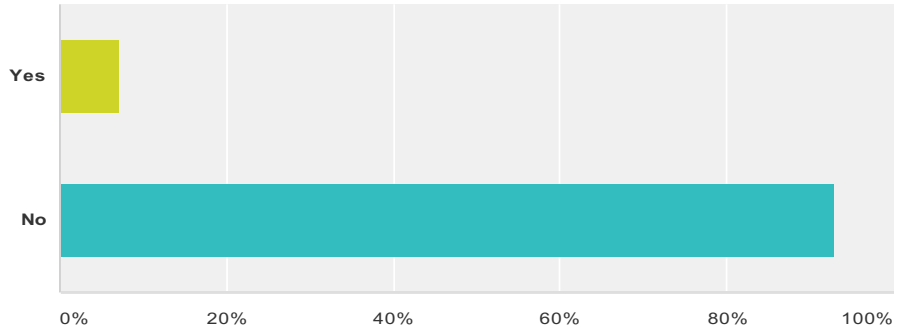
Answered: 179 Skipped: 271



Answer Choices	Responses	
Not Concerned	**7.26%**	13
Slightly Concerned	**12.29%**	22
Somewhat Concerned	**20.11%**	36
Moderately Concerned	**31.28%**	56
Very Concerned	**29.05%**	52
Total		**179**

Q23 Have you ever been involved in a collision with a pedestrian on campus?

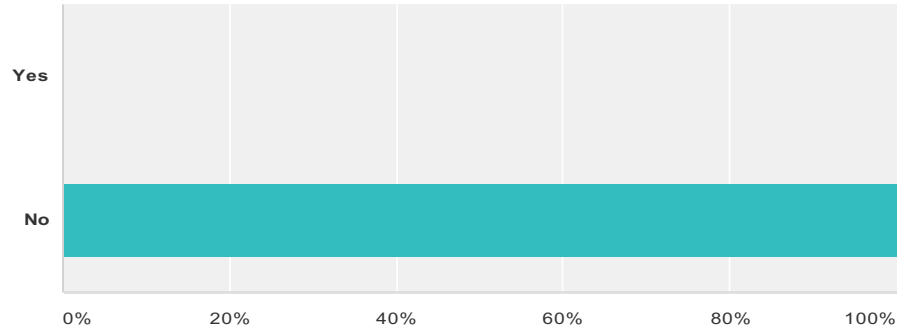
Answered: 181 Skipped: 269



Answer Choices	Responses	
Yes	**7.18%**	13
No	**92.82%**	168
Total		**181**

Q24 Have you ever been ticketed for violating a bicycle rule on campus?

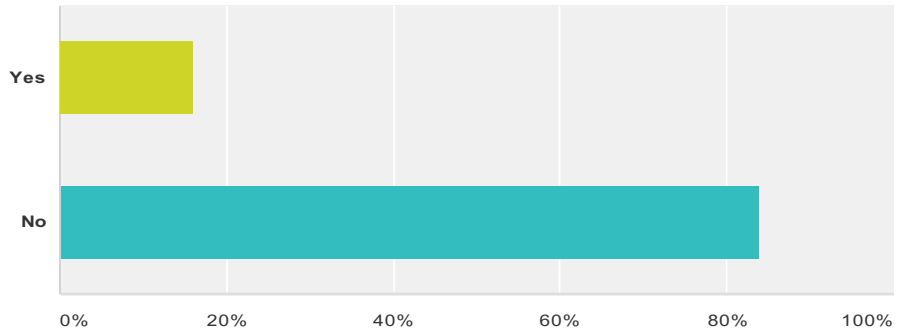
Answered: 180 Skipped: 270



Answer Choices	Responses	
Yes	**0%**	0
No	**100%**	180
Total		**180**

Q25 Have you ever seen anyone stopped on a bicycle by an enforcement officer on campus?

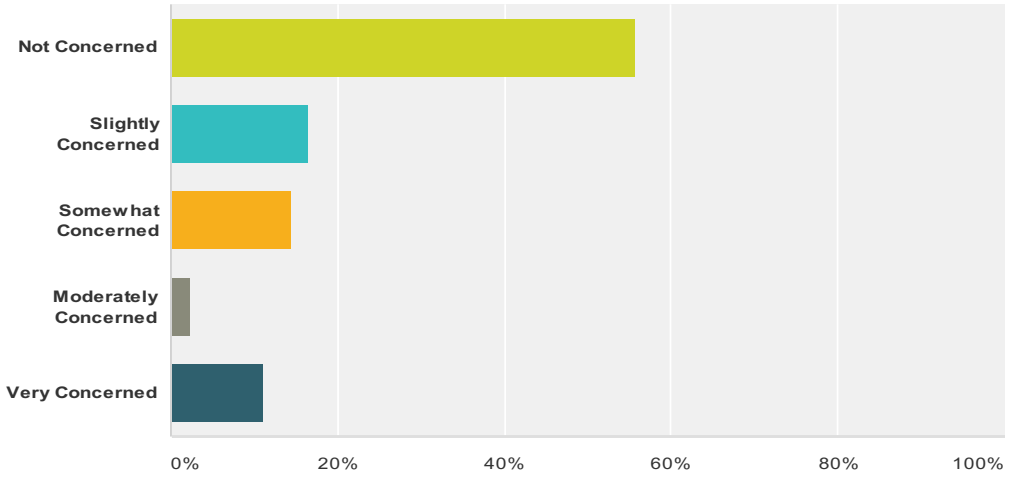
Answered: 180 Skipped: 270



Answer Choices	Responses	
Yes	**16.11%**	29
No	**83.89%**	151
Total		**180**

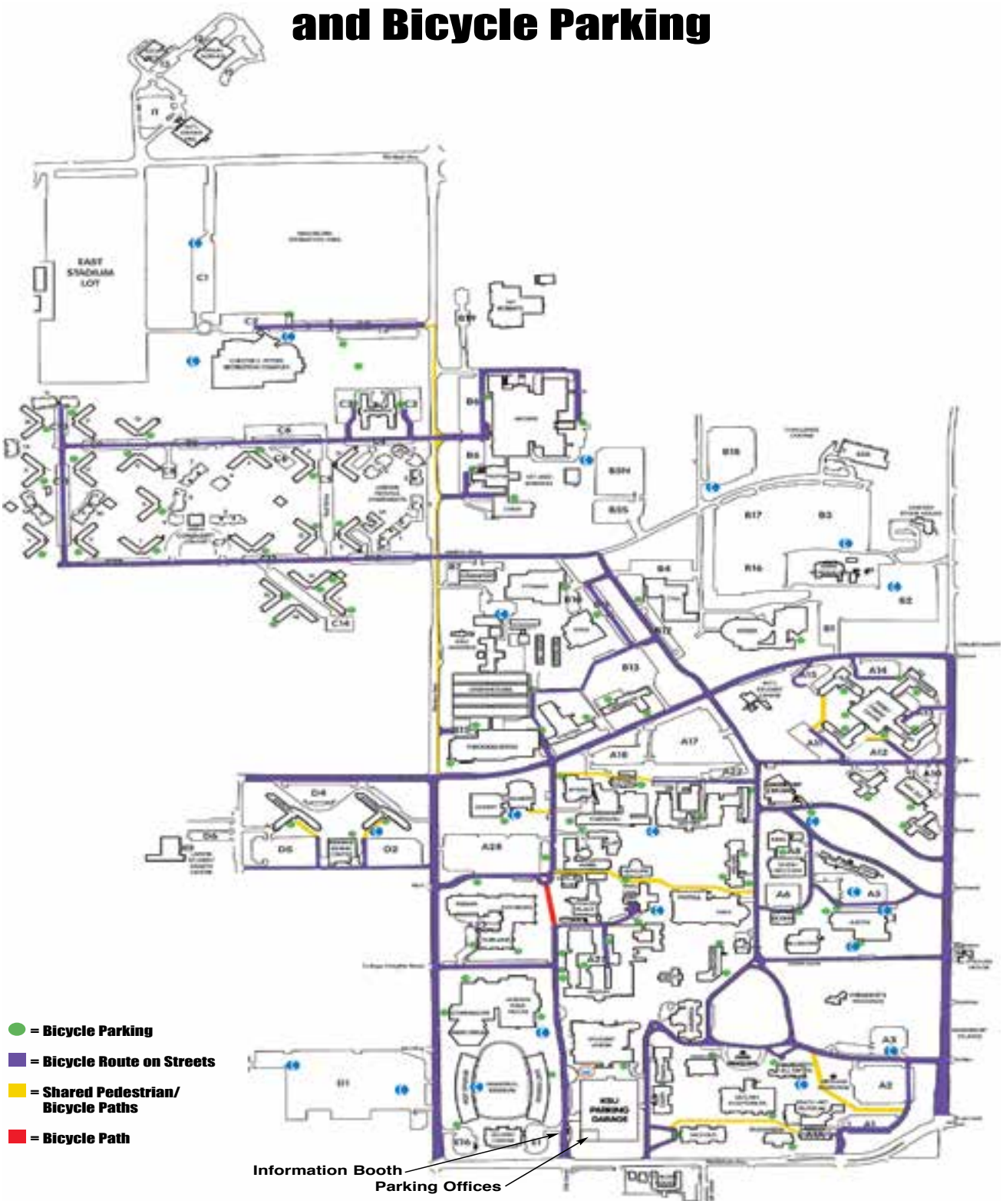
Q26 As a bicyclists, how concerned are you with receiving a ticket on campus?

Answered: 181 Skipped: 269



Answer Choices	Responses	
Not Concerned	**55.80%**	101
Slightly Concerned	**16.57%**	30
Somewhat Concerned	**14.36%**	26
Moderately Concerned	**2.21%**	4
Very Concerned	**11.05%**	20
Total		**181**

Appendix C: KSU Bicycle Route Map



Bicycle Route Map, Retrieved October 10, 2013 from: http://www.k-state.edu/parking/BikeMap2012.pdf

Appendix D: KSU Bike Rules

I. Introduction

A. The University Bicycle Program

Information about the Kansas State University bicycle program may be obtained during working hours from KSU Parking Services, 1 KSU Parking Garage, 532-PARK (7275), a department of the Division of Human Resources, Kansas State University. After hours, information may be obtained from the University Police, Edwards Hall (532-6412).

II. Regulations

A. General Regulations

1. **Bicycle Permit:** All bicycles parked on campus shall have a KSU bicycle permit displayed on the bicycle. A ticket will be issued to bikes without permits. Bicycle permits may be obtained at no cost from Parking Services. The bicycle permit shall be attached to the center post of the bicycle frame, below the seat post, and be totally visible. Counterfeiting, altering, defacing, or transferring the permit to another bicycle or person and/or giving false information on application or in hearing is a violation of these regulations.
2. **Bicyclist Responsibilities:** The person to whom the bicycle permit is registered is the one responsible for any violation of bicycle parking regulations. Moving violations will be assessed to the individual operating the bicycle.
3. **Authorities:** Every person operating a bicycle on University property is subject to these Bicycle Regulations and must obey all Police Officers and Parking Services Personnel.

B. Moving Regulations

1. **Bicycle Access:** Riding a bicycle on University lawns or planted areas is prohibited. Riding a bicycle on University walkways, Monday through Friday from 7:30 A.M. to 5:30 P.M. is prohibited except where indicated otherwise on Bike Map (see centerfold) or on weekends, holidays or school breaks.
2. **Reasonable Operation:** No person operating a bicycle on University property including exclusive use bikeways and shared pedestrian walkways, shall exceed the maximum speed that is reasonable and prudent with respect to visibility, local traffic, weather, and surface conditions that exist at the time, or that endangers the safety of any person or property. The Kansas State University Police Department Bicycle Patrol is exempt from these regulations while performing official duties.
3. **Pedestrian Right-Of-Way:** Bicyclists shall yield the right-of-way to pedestrians on all shared use walkways.
4. **Traffic Laws:** Bicyclists shall be subject to all vehicular laws including parking and traffic control mechanisms, signs and traffic lights unless there is specific signage or rules to the contrary that is applicable to bicycles.

C. Parking Regulations

1. **Bike Racks:** All bicycles shall be parked only in an approved bike rack. Bike rack locations are indicated on the Bike Map (see centerfold).
2. **Parking Violations:** Parking outside of any approved bicycle rack including:
   a. Parking on or locked to trees, plants, or other living objects, railings, fences, posts, signs, fire hydrants, gas pumps, trash receptacles.
   b. Parking in or on any service drive, building entrance, driveway, bikeway, rail, or stairway.

III. Fines or Impoundment

A. Fine Assessment

Violation of any bicycle and/or traffic regulations may result in the assessment of fines, impounding of the bicycle and/or filing of criminal charges.

B. Fine Payment

1. **Payment/Appeal:** Any person receiving a KSU bicycle citation shall submit fine payment or submit an appeal to Parking Services, or deposit payment in yellow misuse fees boxes. If a bicycle is ticketed for a violation and is found not to have a valid registration, the owner of the bicycle shall register the bicycle at that time. Additional fines and charges must be paid when applicable; or
2. **Appeal:** The ticket may be appealed.
   a. Appeals must be filed by the owner of the bicycle, before 14 calendar days after the date of issuance of the citation.
   b. Appeal must be in writing on the prescribed form from Parking Services.
   c. Appeals will be handled in accordance with the KSU Parking Citations Appeals Board (PCAB).
   d. Initiation of an appeal stays the penalty until a ruling is made by PCAB.
   e. Tickets may be appealed only once. Decisions of PCAB on any violation is final. Paid tickets may not be appealed.
3. **Nonpayment:** Nonpayment of fines may result in loss of parking privileges, transport impoundment, and/or administrative action. Fines are delinquent if not paid within eight (8) business days of the date of ticket.

C. Fine Amounts

1.	No Registration Permit Fine	$ 5.00
2.	Moving Regulation Fine	$ 15.00
3.	Parking Fine	$ 15.00
4.	Delinquent Payment Fine	$ 5.00
5.	Field Impoundment Fine	$ 10.00
6.	Transport Impoundment Fine	$ 30.00
7.	Impoundment Storage Fine Per Day	$ 1.00
8.	Maximum Impoundment Storage Fine	$ 20.00

D. Impoundment

1. **Impoundment Authority:** Whenever a bicycle is found in violation of the KSU Bicycle Regulations, any University Police Officer, Parking Control Officer or other person authorized by the University Police may field impound the bicycle or, remove the securing mechanism if necessary, to transport or the bicycle. The University shall not be liable to the owner of the securing device or the owner of the bicycle for the cost of repair or replacement of such securing device. Release of an impounded bicycle requires proof of ownership to the satisfaction of the University Police and payment of all fines and charges.

   Reasons for bicycle impoundment include:

   a. Bicycle impoundment will occur when bicycle is not parked in a bike rack but is parked in another location. Bikes parked along access routes or attached to handrails may interfere with emergency access or the access of those with physical limitations. Bikes parked on the lawn or planted area may hinder maintenance or cause damage. Bikes parked in buildings may impede access, disrupt maintenance and cause damage.
   b. Bicycles that appear to be abandoned may be impounded. Bicycle parts, equipment and locks abandoned in the bike parking areas will be removed.
2. **Field Impoundment:** A bicycle is field impounded when it is locked by University personnel in the location it was found. Removal of the impounded bicycle or securing mechanism by unauthorized personnel is against the law. Criminal charges may be filed. Bicycles field impounded longer than two days may be transport impounded.
3. **Transport Impoundment:** A bicycle is transport impounded when it is removed from its location, its lock cut if necessary, and stored by the University Police. Storage charges will begin fourteen (14) calendar days of the date of the ticket. If the bike owner does not recover the bike after a period of 60 days, the bike becomes the property of KSU Parking Services and may be sold at public auction as provided in K.S.A. 22-2512 Annotated.

E. Use of Fees

Fees collected from the enforcement of this regulation will be used to purchase additional bicycle racks, improve bicycle lanes, and/or enhance the campus bicycle program.

IV. Supplemental Information

A. Granting Authority–Kansas State University

By the authority vested in the Kansas Board of Regents through the provisions of Kansas Statutes Annotated 74-3209—74-3216, regulations pertaining to the operation and parking of bicycles are hereby established and set forth.

B. Scope of Regulations

These bicycle regulations are issued supplemental to all applicable state laws. These regulations apply to all persons operating bicycles on the University campus, except Certified Police Bicycle Officers in the performance of their official duties. These regulations are in effect at all times, including holiday, weekend and break periods.

C. Approval of and/or Revisions To Regulations

These regulations are approved by the KSU Council on Parking Operations. This council is a joint organization of students, faculty, and staff. Inquiries may be made to the KSU Council on Parking Operations, Kansas State University, Manhattan, c/o Parking Services, 1 KSU Parking Garage. The University reserves the right to change these regulations as necessary.

D. City/State Laws

City of Manhattan and State of Kansas laws will apply to you when you ride on city streets and bikeways. Consult the Manhattan Revised Code for complete information on City bicycle laws. Two important State Laws are summarized below:

1. A front white light is mandatory between sunset and sunrise shall be visible from 500 feet. The bicycle shall also have a red reflector mounted on the rear of the bicycle that is visible from a distance of 100 to 600 feet to the rear when exposed to the head lamps of a motor vehicle. Leg lights or rim mounted red lights do not meet these requirements-, however, they are encouraged as a supplement.
2. Stop signs and stop light devices must be observed.
3. Bicyclists must dismount in crosswalks.

E. University Liability

The University assumes no duty for the care of protection of bicycles or their contents while the bicycle is on property owned, leased, or otherwise controlled by the University.

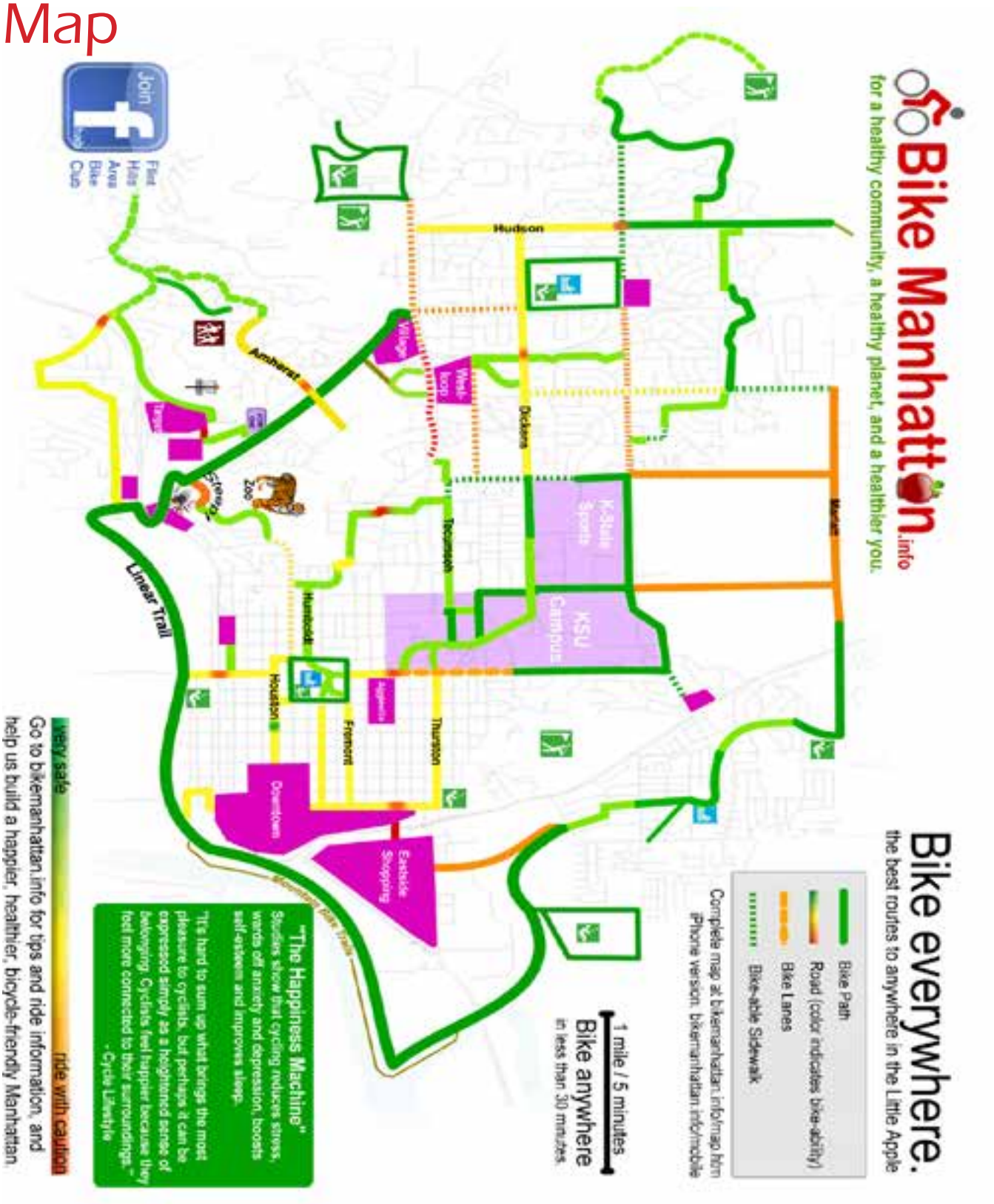
Bicycle Guide and Regulations

KANSAS STATE UNIVERSITY

Parking Services Office
1 KSU Parking Garage
Manhattan, KS 66506–4809
(785) 532-PARK (7275)

Bicycle Guide and Regulations, Retrieved October 10, 2013 from: http://www.k-state.edu/parking/BikeRegs2012.pdf

Appendix E: Manhattan, KS, Bicycle Map



Manhattan Bicycle Route Map, Retrieved October 10, 2013 from: http://www.ci.manhattan.ks.us/DocumentCenter/Home/View/9654