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A final project presented to the faculty of the
Instructional Design Master's Degree Program
University of Massachusetts at Boston

MASSACHUSETTS URBAN BICYCLE PREPAREDNESS

Submitted by
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in partial fulfillment for the requirement of the degree
MASTER OF EDUCATION

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Abstract

Since 2007, Boston has made tremendous strides in shedding its designation by Bicycling Magazine as one of the “Worst Biking Cities” (Zezima, 2009, p. A12) by designating over 92 miles of bike lanes throughout the city and introducing bicycle initiatives like Boston Bikes, the Hubway bicycle sharing program. These efforts have resulted in a dramatic rise in the number of cyclists in Greater Boston and a decrease in accidents involving bicycles ((Pedroso, Angriman, Bellows & Taylor, 2016). While the quantitative research has been primarily positive, a 2017 survey initiated LivableStreets and the Longwood Area Cyclists of commuters in the Longwood area of Boston reveal fear and anxiety over the claustrophobic riding conditions with motor vehicles and urban infrastructure in desperate need of updating to improve cyclists’ safety (McFarland, 2017). While the Massachusetts Department of Transportation has introduced a public outreach campaign that encourages motorists to be cognizant of the threat they represent to cyclists and pedestrians through the “Scan the Streets for Wheels and Feet” campaign, there hasn’t been a serious push to empower cyclists to prepare themselves for riding in aggressive, high-density urban areas and to advocate for improvements to transportation infrastructure that will promote their safety. This paper addresses the development of an online course that addresses urban bicycle commuter preparedness and how it can be an effective resource for both novice and seasoned commuters to connect and further advance a bicycle culture in Greater Boston. It also explores a potential partnership with a bicycle sharing program such as Hubway to encourage their patrons to participate in the course.

Keywords: bicycle, Massachusetts, preparedness, safety, urban, infrastructure, bike share

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Phase I – Analysis

Background

Between 1999 and 2006, Boston was rated three times by Bicycling Magazine as one of the United States' "Worst Biking Cities" (Zezima, 2009, p. A12). Between 2007 and 2013, in an effort to shed that undesirable designation, the city has adopted a holistic approach to addressing commuting by not only focusing on motor vehicle traffic patterns and density, but they have broadened their focus to creating safer urban infrastructure that incorporates improvements for pedestrians and bicyclists as well. Two major bicycle programs were instituted in Boston during this time with major support from the Mayor's Office. With both public and private financial support, the first initiative, Boston Bikes, encouraged residents and visitors to the city to consider riding a bicycle by offering resources such as maps and an annual city-wide bicycle tour called Hub on Wheels. In 2011, the highly successful bike share program Hubway was introduced to Boston. This program places rental bicycles at a growing number of docking stations in Boston and has spread into the neighboring communities of Brookline, Cambridge, and Somerville where patrons can conveniently pick-up and drop-off the bike they have rented. This program has been embraced by residents for work commuting and tourists for leisurely sightseeing excursions (Vision Zero Boston, 2015, The evolution of Vision Zero).

From 2007 to 2014, the city of Boston also significantly increased infrastructure to support safer bicycle commuting opportunities by constructing over 92 miles of bike lanes. Pedroso, Angriman Bellows, and Taylor (2016, p. 2171) credit this rapid increase in bicycle roadway demarcations with drastically reducing bicycle injuries. "The multivariable logistic regression analysis showed that for every 1-year increase in time from 2009 to 2012, there was a 14% reduction in the odds of being injured in an accident" (Pedroso, Angriman Bellows, and

Taylor, 2016, p. 2171). While the number of bicycle injuries and fatalities were decreasing, Boston was experiencing a rapid increase in the number of bicycle commuters. According to the U.S. Census data report, “Modes Less Traveled—Bicycling and Walking to Work in the United States: 2008-2012,” Boston ranks as one of the highest bike commuting cities with 1.7 percent of its 317,930 commuters traveling by bike to work. This percentage is up from the 1 percent that was recorded in the 2000 Census (McKenzie, 2014, p. 8). This critical mass of cyclists is more than double the national statistic, which is 0.6 percent of commuters that make their commute by bicycle (United States Census Bureau, 2014).

The Hubway bike sharing program has been considered an unprecedented success with a rapid increase in ridership since being launched in Boston in 2011 and its expansion into Brookline, Cambridge, and Somerville in 2012. Annual membership has more than quadrupled between 2012 and 2016, rising from 3,203 to 14,096 (Hubway, 2017, “Hubway media kit”). Besides Boston area residents that are the primary holders of annual memberships, tourists and visitors to Greater Boston are also a significant portion of Hubway patrons, utilizing the 24 to 72 hour passes the service offers. There were 30,655 users of these temporary passes in 2011 and this offering peaked in 2015 with 102,445. In 2011, Hubway had 60 stations with 610 available bicycles exclusively in Boston. As of 2017, there are 185 stations and 1,800 available bicycles available in Boston, Brookline, Cambridge, and Somerville. The season that the bicycles are available has expanded from April to November between 2012 and 2015 to many stations remaining open year-round in 2017 (Hubway, 2017, “Hubway media kit”).

In March 2015, Boston Mayor Marty Walsh announced that the city had committed to Vision Zero, which seeks to eliminate fatal and serious traffic crashes altogether by 2030. Measures to achieve the goal of protecting vulnerable bicyclists and pedestrians include lowering

speed limits, increasing traffic calming on city streets, discouraging distracted and impaired driving, engaging the public to be involved in the initiative, and remaining accountable to achieving this goal (Vision Zero Boston, 2015, Overview).

Neighboring cities to Boston such as Somerville which boasts 7.8 percent of residents, the highest percentage of bicycle commuters in a New England, joined the Vision Zero campaign in September of 2017. Somerville has not only invested in urban infrastructure to improve safety on city streets, but it has also instituted “safety programming including an informational poster and PSA campaign, increased police enforcement, and cycling education in schools” (City of Somerville, 2014).

Pedestrian and cyclist safety is not only a concern for individual municipalities, but it is also a concern of the Massachusetts state government. The Massachusetts Department of Transportation (MassDOT) initiated the “Scan the street for wheels and feet” campaign in 2017 to raise the profile of this issue. MassDOT is collaborating with the Massachusetts Executive Office of Public Safety and Security, the Massachusetts Department of Public Health, Boston Vision Zero, Walk Boston, Massachusetts Bicycle Coalition, and the Safe Roads Alliance on this effort (Jessen, 2017). A post on the official blog for the state reported, “Although Massachusetts has experienced a decline in overall motor vehicle fatalities and injuries during the past eight years, the fatalities and injuries involving people walking and cycling actually increased” (Jessen, 2017, para. 3). Materials that have been released for this public awareness campaign include billboards on city buses and a series of animated videos that are accessible on YouTube. The featured statistics of the campaign are:

- 1 in 4 deaths in motor vehicle crashes involve people walking or bicycling
- 31% of fatal or serious injuries from bicycling occur when vehicles are turning

- 33% of fatal or serious injuries from crashes happen to pedestrians walking at an intersection

(MassDOT, 2017, Scan the Street)

While “Scan the street for wheels and feet” addresses commuter safety, the messaging of the campaign primary targets motorists to be cognizant of the threat they pose to pedestrians and the importance of being alert and implementing simple practices that protect bicyclists and pedestrians from the harm that automobiles pose (Jessen, 2017).

Two, 30-second videos were produced for the “Scan the streets for wheels and feet” campaign to address specific dangers that motorists pose to pedestrians and bicyclists with the videos MassDOT Dutch Reach (MassDOT, 2017, *MassDOT dutch reach*) and Double Threat (MassDOT, 2017,). MassDOT’s Double Threat video (2017, *Double threat*) addresses safety precautions that both drivers and pedestrians can take. The narrator of the video warns cars and bicyclists to be attentive to pedestrians crossing the street when cars are stopped in the lane adjacent of traffic. This video does place onus on pedestrians by recommending that they wait for all lanes of traffic to stop before attempting to cross the street. In contrast, the Dutch Reach video targets motorists exclusively as it encourages drivers to reach over their bodies with the arm further away from the car door, leaving the driver open to looking backwards when opening their door and monitoring the road for approaching bicyclists to avoid clipping them and potentially causing serious injury or death (MassDOT, 2017, *MassDOT dutch reach*). The video does not address the role that bicyclists can actively play in avoiding the path of a car door while commuting.

A National Cooperative Highway Research Program report designates an open door width of 45 inches and that the open door zone extends approximately 11 feet from the curb, so

bike lanes should be designed to encourage bicycle riders to travel outside of the door clearance (Torbic, Bauer, Van Houten, LaPlante, & Roseberry, 2014, p. 3). The Urban Bicycle Preparedness course which is being proposed in this paper employs images from the National Association of City Transportation Officials (2011) and the California Association of Bicycling Organizations (2010) to visually depict recommended distance a bicycle should be from a parked car in order to be outside of the door zone. By including a description of a safe distance that bicyclists should maintain between themselves and a parked car to avoid being doored by a parked car, the resource would be beneficial to both motor vehicle operators and cyclists, instead of drivers exclusively. The resources and materials that are included in this report on the Greater Boston Urban Bicycle Safety Course fills a void that is missing from recent public safety offerings, encouraging bicyclists to be active stakeholders in ensuring safe cycling practices while commuting.

With both municipalities and the state of Massachusetts as a whole looking to protect the growing number of bicycle commuters, a campaign that specifically targets the role of cyclists could be of great benefit. Encouraging cyclists to remain alert while obeying traffic laws and advocating for updates to urban infrastructure could reduce commuter tension and improve safety on congested urban streets.

Analysis Plan

My needs assessment incorporates peer-reviewed journal research, one-on-one interviews, and survey results. The findings display a disconnect that exists between quantitative research that has recorded a rapid reduction in the number of bicycle injuries reported in Boston since 2009 and the introduction of major cycle-related initiatives by the city

and a dramatic increase in designated bike lanes throughout Boston (Pedroso, Angriman, Bellows & Taylor, 2016) and qualitative research collected by a survey of riding conditions in Boston's Longwood area and an interview of an urban commuter reveal fear and anxiety surrounding navigating the streets of Greater Boston by bicycle (McFarland, 2017; L. Milton, personal communication, November 6, 2017).

Responses to a 2017 survey of commuters in the city's Longwood Medical Area describe deteriorating road conditions where bicyclists are placed in perilous position, riding in such close proximity to motor vehicle traffic (McFarland, 2017). LivableStreets collected data through a comprehensive survey targeting Boston's Longwood Medical Area (LMA). The nonprofit organizations LivableStreets and the Longwood Area Cyclists canvassed commuters in the spring and summer of 2017 about their impressions of commuting in the highly congested LMA. The preliminary findings of the survey were released on September 26, 2017, during LivableStreets' presentation at the Fall Longwood Area Cyclists Summit.

There were 1,575 responses to the survey which included a broad cross-section of commuters to the LMA. Fifty-four of the respondents were Emergency Medical Technicians, 141 were MBTA bus riders, 206 were MBTA rapid transit passengers, 225 pedestrians, 259 motorists, and 483 cyclists. Here are some of the key findings that were featured in the Summit presentation:

- Of the motorists surveyed, 37% reported that they would prefer not driving to the LMA: 50% of those motorists would rather ride a bicycle and 47% would rather take transit.
- The top two reasons preventing motorists from biking were that 70% of the motorists felt unsafe biking on the street and 60% cited a lack of protected biking infrastructure.

- One driver commented “I would consider biking from my home to LMA I could do [sic], within LMA is scary! I’ve had colleagues who have been hit by cars too many times to feel safe.”
- Two participants commented on the lack of investment in the infrastructure, with one declaring, “I’m an EMT, but also a cyclist. I love cycling. Longwood is horrible for cycling. The bike lanes, if present, are congested and full of obstacles (parked cars, construction equipment, pot-hole craters).” The other participant commented “I have seen tremendous growth in the number of bikes in my 25 years commuting to LMA. I have not seen concomitant improvements in bike infrastructure” (McFarland, 2017).

Responses to this survey reveal that steps that Boston has made to improve the urban infrastructure have not resulted in a resounding satisfaction amongst bicyclists and those considering commuting by bicycle. This survey focuses specifically on Boston’s Longwood community, so a survey that measures the attitudes of a broader swath of commuters in Greater Boston is called for to better understand the sentiment of commuters of the larger community.

An interview with Lyndi Milton, who both resides and is employed in Greater Boston, reports “minimal comfort levels” commuting by bicycle. She specifically points to “narrow streets, aggressive drivers, distracted drivers, transplant/tourist drivers who are not used to driving in the city (let alone with bikers on the road)” as areas of major concern. Her discomfort biking in these conditions have factored into her decision to walk twenty to thirty minutes to her office rather than bicycling. She reports that walking is less stressful (L. Milton, personal communication, November 6, 2017).

An educational program that addresses the fears and concerns of city residents and visitors who are currently overwhelmed by the idea of navigating the congested urban streets of

Greater Boston by bicycle could assist them in reconsidering cycling as a viable option. Milton currently only rides while she's being accompanied by her partner in mild weather conditions because of the anxiety that riding in Greater Boston causes her. She reports that she would be interested in taking a course that addresses cycling preparedness if the course addressed "safe intersection protocol, bike repairs, biking in suboptimal conditions, and what-to do-when situation.." If these topics were adequately addressed, she would be more apt consider cycling in Greater Boston (L. Milton, personal communication, November 6, 2017).

The intended audience for the Urban Bicycle Preparedness Course ranges from novice riders that are exploring the feasibility of commuting in high-traffic areas to seasoned bicycle commuters that are looking to re-energize their commute with exploring alternative routes and actively pursuing improving increasing improvements to urban infrastructure and support laws that aid in protecting cyclists and pedestrians. The only prerequisites for this course are a basic understanding of traffic laws and the ability to ride a bicycle without adult supervision.

One concentrated group of riders that represent the ideal target for an educational outreach campaign is bike share patrons. While the introduction of bicycle share programs has resulted in a heightened fear amongst the public of a rise in bicycle accidents, limited research has shown this not to be true. Reports show a decrease in accidents in cities that have instituted bike share programs. One legitimate concern surrounding bike share riders is the low rate of helmet usage amongst patrons. Five case-control studies from different countries attribute bicycle helmet usage as a legitimate way to protect riders from serious head, brain, and facial injuries (Thompson, Rivara & Thompson, 1999). Ride share systems around the world have struggled with a way to institute a system to disburse helmets to users, and it can be assumed that the majority of bike share users have not invested in purchasing a personal helmet. An

observational study in Boston and Washington, DC, of 3,073 found that 80.8% of cyclists using a ridesharing bicycle did not wear helmets versus 48.6% riding a personal bicycle without a helmet. Bike share users were 1.6 times more likely to be riding without a helmet than cyclists riding a personal bike (Fischer, et al., 2012, p. 230). With growing numbers of users utilizing bicycle share programs resulting in greater numbers of riders on urban streets, it could be assumed that this would result in an increase in head injuries especially with such a high percentage of those riders not using helmets. Research shows this not to be true and, instead, there has been a reported decrease in traumatic head injuries in cities that have implemented bicycle-sharing programs (Graves, et al., 2014; Fishman & Schepers, 2016). Fishman and Schepers (2014) research incorporated two substudies. The first substudy analyses information from Graves, et al. (2014) longitudinal data surrounding bicycle injuries that resulted in emergency hospital visits in cities that have implemented bicycle sharing programs and emergency reports in control cities that do not offer such a service. In the second substudy, bike share operating companies were contacted by the researchers and questioned about injury data for riders that have used their service, and this data was matched to corresponding police accident statistics to confirm the validity of such claims (Fishman & Schepers, 2016). The results from both of these substudies represent a reduction in serious injuries in cities that have implemented bike-sharing programs.

There are two primary factors that may responsible for the decrease of bicycle accidents in cities that offer bicycle sharing programs. The first is that higher volumes of pedestrians and bicyclists appear to result in lower rates of altercations with motor vehicles. A program such as bike sharing that increases the critical mass of cyclists appears to increase drivers' awareness of bicyclists and pedestrians and they tend to drive in a more cautious manner, thereby improving

safety (Jacobsen, 2003, p. 208; Fishman & Schepers, 2016, p. 41). The second factor is that limited research has recorded that bike share users travel at slower speeds than people on their personal bicycles and reduced speeds have been found to reduce the frequency and severity of bicycle crashes. Schepers, Fishman, den Hertog, Wolt and Schwab (2014, p.174) report an uptick in serious accidents on electrically assisted bicycles that can reach maximum speeds up to 25 km/h (approximately 15.5 miles/h). A study in Lyon, France, the first city to widely adopt a bicycle share program, reported an average speed of 13.5 km/hr (approximately 8.4 miles/h) (Jensen, Rouquier, Ovtracht, & Robardet, 2010, p. 524). The bike share users in Lyon are traveling at a bit more than half the speed of the electrically assisted bicycles. Lower speeds have been linked to longer reaction time, providing riders with greater opportunities to avoid a traffic altercation (Fishman & Schepers, 2016, p. 42). All of this considered, it is still a worthy cause to encourage all cyclists including bicycle share patrons to wear a helmet because they decrease the risk of traumatic head injuries (Thompson, Rivara & Thompson, 1999).

Analysis Report

The City of Boston's Vision Zero initiative has the formidable goal of eliminating traffic-related fatalities and serious injuries by 2030. As stated in the campaign's promotional material "Mayor Walsh is not content to accept 20+ fatalities and 200+ serious injuries on city streets every year" (Vision Zero Boston, 2015, Overview). Within the next 13 years, the city intends to bridge the gap between the current injury and fatality numbers and desired goal of zero and keeping all travelers in the city safe from traffic-related injuries or death. While the steps that have been taken so far in the Vision Zero campaign have primarily been reducing traffic speed limits on arterial roadways throughout the city, the initiative calls for a year-long

outreach program that intends to mobilize citizenry into becoming active stakeholders in achieving this vision. The means in which Boston plans to engage commuters is vague and not easily deciphered on the Vision Zero website. Multiple mouse clicks are required to reveal that Boston encourages victims or those associated with a victim of a traffic-related injury or fatality to share their stories with the media and their community (Vision Zero Boston, 2015, Action plan to engage Bostonians in Vision Zero). While personal stories allow the public to empathize with an issue and potentially rally around it, a wider variety of resources and educational tools bolster public engagement and dedication to striving to achieve such a lofty goal.

Charlotte Fleetwood, a Transportation Planner for the City of Boston, acknowledges that the educational component of Vision Zero requires additional attention. She explains that the Vision Zero initiative would have originally been addressed by the Public Health Department which is currently overwhelmed managing the response to the opioid crisis, so the effort is being managed by Boston's Active Transportation Group (C. Fleetwood, personal communication, October 11, 2017). The Active Transportation Group commissioned a brochure that provides helpful tips for potential riders interested in acclimating themselves to city riding. The brochure is split into 2 parts, with part 1 covering the tangible items such as purchasing a bike or participating in a bike sharing program, accessorizing your bike, and outfitting yourself. The second part addresses appropriate behaviors to promote safe riding. While a brochure is a compact tangible mode of relaying information, it must be physically presented to people who are interested in the material. It lacks the capacity to reach a wider audience that materials disseminated on a website that is easy to access can provide. The majority of the information presented in the brochure has been incorporated into the City of Boston's website on a page called *Ride Your Bike* (City of Boston, 2017, Ride your bike). This site has a concise

descriptions of how to prepare for a ride, important procedures to follow to practice safe riding practices, and riding in a variety of weather conditions. Both the brochure and website are part examples of a recent push by the city to provide beneficial resources to prepare riders to navigate the city in a safe manner. While there is a great deal of beneficial tips incorporated into the *Ride Your Bike* webpages, what is missing from these materials is a manner to assess whether the recommended practices resonate with individuals and whether or not they are implementing these skills into their cycling routine.

One of the few organizations that are creating educational programming in Massachusetts on a statewide level is the Massachusetts Bicycle Coalition ([MassBike](#)). This non-profit organization has been advocating for bicycling as a safe commuter, recreational, and fitness option in Massachusetts since 1977. The organization is headquartered in Boston and has regional chapters around the state. Sean Condon, MassBike's Educational Program Director, credits the organization's primary educational offering as *Safe Routes to School*. This is a collaborative effort between MassBike, MassDOT, and public elementary and middle schools in the state to encourage students to walk or cycle to and from school and equips them with the skills and practices to do so in a safe manner (Mass.gov, n.d., Massachusetts safe routes). In 2017, MassBike began offering Traffic Skills 101, which is a two-day course based on the League of American Bicyclists' curriculum that specifically targets bicycle commuters. Condon points out the first day is held in a classroom where theory and best practices are the focus and the second day primarily takes place on the bicycle where instruction is put into practice. The course was first offered in Western Massachusetts but was cancelled due to low registration numbers and a second offering occurred in mid-October in Boston's Allston community. Condon reports that there were 13 or 14 participants, which was not full capacity and that the

course could have comfortably accommodated up to 20 participants. Condon characterized the participants in the Allston course as being experienced riders that were looking to bolster their riding skills. He reports that the participants were generally satisfied with the training. Condon acknowledges the difficulty of attracting novice and inexperienced riders to participate in such an educational program before or during their first experiences commuting by bicycle (S. Condon personal communication, November 11, 2017).

An initial way to encourage participation and steer potential participants to the course is by linking it to Hubway bicycle sharing program, as well as private companies that have begun to offer dockless bike sharing options in Worcester and Waltham in 2017 (Murtishi, 2017; City of Waltham, 2017). The bike share websites and docking stations represent locations where the bicycle safety course can be marketed to individuals interested in signing up for the service. Information on the experience levels of Hubway riders is not included in the information that the company collected when signing up for a membership (Hubway, n.d., Join). Research has revealed a low percentage of helmet usage amongst bike share users (Fischer, et al., 2012), so targeting individuals upon sign-up to encourage bicycle safety would be a worthy endeavour. Individuals signing up for the ride share program could be initially enticed to complete the Urban Bicycle Preparedness course by offering incentives such as a reduced annual membership fee or a free helmet as an additional measure to reduce the risk of incurring an injury while cycling.

Eligibility for a Massachusetts' license requires applicants under the age of 18 to complete a licensed driver's education program which consists of classroom instruction and on-road motor vehicle training before performing the driver's exam through the state's Registry of Motor Vehicles. Instruction includes motor vehicle safety, the rules of the road, defensive driving to prevent accidents (The Official Website of the Massachusetts Registry of Motor

Vehicles, Drivers education requirement, n.d.) These are practices that have been deemed valuable enough to aspiring drivers that instruction has been mandated by state law. While cyclists share many roadways with automobile drivers and are expected to adhere to the rules of the road, there is no mandatory training or licensing requirements. While the degree of damage that an automobile can cause in an accident due to their speed and size generally far exceeds what a bicycle can inflict on fellow travelers, this should not excuse cyclists from pursuing substantial training before taking to the roadway. While cycle commuter training offerings for adults are a rare offering in Massachusetts and attracting enough participants to hold an in-person course in one specific location has been difficult to fill, a course that is conducted online represents a viable option. The Urban Bicycle Preparedness course's curriculum covers beneficial information to promote cyclist safety such as abiding by the rules of the road and exemplifying practices in-line with differential bicycle etiquette. This training targets bicycle commuters of all levels, but the first two modules will be especially beneficial to riders that are new to urban areas. The focus of the first module provides riders with recommendations on beneficial bicycle gear and accessories to have while commuting during New England's four distinct seasons and techniques check to fix common bicycle issues such as a flat tire. The second module focuses on safe riding practices and respectful bicycle etiquette. The third and final module requires the participant to look at their current riding conditions and to explore alternative route options and infrastructure improvements that would result in a safer cycling experience. While many of the practices and behaviors that are described in this training may be exemplified by seasoned riders, the training has the power to reinforce current behaviors and enhance their cycling experience in beneficial ways. Each module will incorporate activities that call for novice and experienced riders to collaborate in a way that encourages community

building around bicycle safety and achieving the goal of empowering bicycle commuters to advocate for urban infrastructure improvements that achieve the goal of safer commuting conditions.

Multimedia resource materials are incorporated into the Urban Bicycle Commuter Safety course include videos, animation, still graphics accompanied by concise text (See Appendix A-Original Course Video). Similar materials were used by the “Bike Smart” program in the Pacific Northwest, which utilized the E-Health software to teach kindergarteners to third graders safe bicycling skills. A random control design conducted in a suburban school district where the treatment group’s instruction was presented by the E-Health software, which is an interactive computer program that gives students the opportunity to analyze and respond to a situation and receive feedback on their responses. The control group relied strictly on observational measures for their instruction and they were assigned the task of watching a safety video. Both groups were given a posttest and the treatment group exemplified greater gains than the control group.

For example, the treatment participants were 3.2 times more likely to place two fingers width from the eyebrows when securing their helmets. Likewise, the treatment participants were 6.9 times more likely to identify the first dangerous car in the computerized program compared to the control participants. (McLaughlin & Glang, 2010, p. 348)

There is a high degree of interactivity incorporated into the Urban Bicycle Commuter Preparedness course, which includes analysis and feedback from classmates and the course instructor.

Sean Condon, the Director of Education for MassBike, sees merit in an online training platforms ability to act as a repository for valuable references and resources for course

participants to easily access, but he places a high degree of importance on the hands-on experience that takes place on the bicycle performing practical exercises (S. Condon, personal communication, November 11, 2017). While the design for the Urban Bicycle Preparedness course does not require any in-person contact between the instructor or fellow students, the majority of activities incorporate activities that require photographic documentation of specific performances and operations on a bicycle. The course also requires group work where the instructor will assign teams to collaborate on course submissions. While the majority of the course work can be performed asynchronously utilizing document sharing software such as Google Docs and Google Drawings, some group coursework may be more easily expedited through the use of synchronous video conferencing communication options like Google Hangouts, Skype or Zoom.

Phase II – Design

Learning

The goal of the Urban Bicycle Preparedness course is to equip participants with the tools and skills to commute safely in dense urban communities and to advocate for infrastructure improvements that strengthen the cycling climate. The course specifically encourages cyclists to follow protocols that represent respectful bicycle etiquette (e.g., signaling and following traffic laws) and rider preparedness for cycling in adverse conditions. You will also be encouraged through group activities to advocate for infrastructure improvements that enhance safety for all commuters.

Performance Objectives

By fully participating in this course, you will:

- Commit yourself to making safe navigational decisions that reduce the likelihood of accidents and altercations with other commuters.
- Actively obey traffic laws and regulations and be respectful to fellow commuters.
- Outfit yourself with pertinent gear to promote safety and preparedness to address riding in high-traffic areas in a variety of weather conditions.
- Advocate for improvements in urban infrastructure and laws to improve safety for all commuters.

Instructional Strategy

The training employs Horton's interconnected absorb, do, connect approach to designing e-learning interventions. Absorb activities require the learner to consume relevant information through readings and multimedia presentations. The learner then applies the content that was passively consumed during the absorb stage to perform active tasks that demonstrate a command of the material known as do-type activities. Connect activities represent a heightened level of instruction that extends beyond isolated and/or contrived intervention and challenges the learner to apply what is has been learned to his or her prior knowledge in real world situations (Horton, 2012, p. 67-214).

All three modules of the Urban Bicycle Preparedness Course begin with absorb activities that include a mix of instructor-created multimedia content as well as a curated selection of acquired multimedia resources and handbooks that are embedded or linked to in the courses' learning management system (LMS). The do activities include an assignment that utilizes Poll Everywhere (See Appendix B - Poll Everywhere Top Five Bicycle Accessories Site) as a well as a few submissions that require the use of a smartphone's camera to document and post the

performance of specific activities. The connect activities are group projects that require the use of web-based document sharing applications such as Google Docs and Google Drawings for instructor-selected group-pairings where collaboration between classmates is required to complete the assignments.

Course Outline

Module 1: Gearing-Up – 34 pts.

(Allow 6 hours within one week to complete the assignments associated with this module)

Objective 1: You will outfit yourself with pertinent gear and accessories that promote safe riding at all hours of the day, in a wide range of climate conditions.

Assignments

- Contribute your top 5 important gear items to have on hand when cycling and your rationale for choosing each item. Comment on at least 2 of your classmates' posts.
– **6 pts.**
- Contribute your top 5 important gear items to a Poll Everywhere survey, which will tally up classes and chooses as a whole in order of importance. – **6 pts.**
- Record and submit a video of yourself performing the ABC Quick Check. – **11 pts.**
- Record and submit a video of yourself switching out a rear inner tube on your bike. – **11 pts.**

Interactions**Learner-Content Interaction:**

- Absorb – You will read articles and watch videos about the recommended gear you should incorporate into your commute to improve safety and address emergency repairs.
- Do – Using the group discussion board, you will post your top 5 list of items you currently carry or plan to carry on your bicycle commutes. You will give a short description of why you have placed that particular level of importance on each item.

Learner-Instructor Interaction:

- Do – You will post a video of yourself performing the pre-ride ABC Quick Check, which your instructor will review for accuracy.
- Do – You will post a link to a video of yourself switching out a bicycle tube and inflating it, which your instructor will review and provide comments on accuracy.

Learner-Learner Interactions:

- Connect – Utilizing the course discussion board, compare your top 5 gear list to that of at least 2 of your fellow classmates' lists.
- Connect – Post your individual list to a Poll Everywhere survey that will tally all of the students' rankings to create a combined “Top 5 List” that incorporates all of the classes' choices.
- Connect – The instructor will post this combined LMS for the entire class to view and you will comment on the findings on the discussion board. Poll Everywhere

Module 2: Navigation and Etiquette – 33 pts.

(Allow six hours within one week to complete the assignments associated with this module)

Objective 2: You will be hyper-vigilant in making safe navigational decisions that reduce the likelihood of serious accidents and altercations.

Objective 3: You will actively obey traffic laws and regulations and be respectful to fellow commuters.

Assessment

- Submit selfies performing the 4 primary bicycle hand signals. – **11 pts.**
- Submit a map of a ride delineating at least 5 directional changes and your classmates' photos of the hand signals that correspond with the move. Comment on at least 2 of your classmates' posts. – **22 pts.**

Interactions**Learner-Content Interaction:**

- Absorb – You will review articles and videos on respectful bicycle etiquette and obeying traffic laws
- Do – Using a ride mapping program such as MapMyRide, you will map a bicycle ride that includes at least 5 direction demarcations (e.g., signal to move into the left lane, turn right at light, slow down, etc.).
- Do – You will take a screenshot of the map with the outlined route from the ride mapping program and post it to the discussion board in the LMS.

- Do – You will also list the specific directions including photos of your classmates from the Google Doc to illustrate the hand signals that should be used to alert other commuters to their travel intentions. Participants will review and comment on at least 2 of their classmates' posts.

Learner-Instructor Interaction:

- Do – Instructor will review your hand signal selfies and provide necessary feedback if signals were demonstrated unclearly or incorrectly.
- Do – Instructor will review your mapping and signaling submissions and provide necessary feedback if hand signals or directions were demonstrated unclearly or incorrectly.

Learner-Learner Interaction:

- Connect – You will download the selfies of your classmates performing the signaling exercise
- Connect – You will comment on at least 2 of your classmates mapping and signaling submissions and respond to your classmates' responses to your plan.

Module 3: Advocacy – 33 pts.

(Allow eight hours over the course of two weeks to complete the assignments associated with this module)

Objective 4: After completing this module, you will identify improvements to the urban landscape that make bicycling a safe and viable commuter option by recommending traffic calming elements.

Assessment

- Submit an aerial rendering or photo of a dangerous traffic area (i.e., a narrow roadway, a dangerous intersection, etc.) with a description of the factors that contribute to the difficulties navigating that area. – **10 pts.**
- The instructor will assign you a partner(s) and as a team, you will choose one of your group member's dangerous traffic area and propose viable ways to reduce the hazard by depicting alternative routes and traffic calming elements that could be implemented to improve cycling safety. Groups will use an illustration sharing application such as Google Drawings to illustrate the alternative routes and traffic calming elements and/or signage and describe with accompanying text improvements to the commuter traffic flow that ease the stress and makes for a safer bicycling experience.
- Your group will submit one proposal that includes illustrations of potentially safer alternative routes as well as renderings of traffic calming and/or signage improvements as well as a text description explaining your rationale for how this will make for a safer commute. – **21 pts.**
- Comment on at least 2 of your classmates' design plans and respond to your classmates' comments on your plan. – **2 pts.**

Interactions**Learner-Content Interaction:**

- Absorb – You will review text and video content on traffic calming measures that can be implemented to improve commuter safety in a variety of communities.

- Do – You will then select one specific troubled area you have experienced (e.g., a narrow stretch of road or a busy intersection, etc.) and use Google Maps to take an aerial screenshot of that area. You will share the aerial photo on the discussion board along with a specific description of what traffic elements present a safety hazard.

Learner-Instructor Interaction:

- Do – You will be assigned a partner by the instructor with whom you will exchange the aerial photo of a troubled area (e.g., a narrow stretch of road or a busy intersection, etc.) that you have experienced. You will accompany the photo with a description of the hazardous elements in this area.
- Do – You will share your design plan with your instructor, who will comment and make additional recommendations to your design plan, if deemed necessary

Learner-Learner Interaction:

- Do and Connect – You will be assigned a partner with whom you will exchange the aerial photo of a troubled area (e.g., a narrow stretch of road or a busy intersection, etc.) that you have experienced. You will accompany the photo with a description of the hazardous elements in this area.
- Do and Connect – Your group will devise alternative routes that avoid the troubled traffic situation. Your group will also put on your urban planner's hats and integrate traffic calming measures in the troubled area to improve bike commuter safety by placing your partner's photo into a program such as Google Drawings that allows the user to draw and add text descriptors to the photo onto your partner's photo. You

will superimpose shapes and text over the aerial shot of the troubled traffic area using Google Drawings to illustrate their proposed redesign.

- Do and Connect – You will also submit text explanations justifying the changes you have made, taking into account the economic feasibility and impact to other commuters such as automobile drivers and pedestrians that such a change would impact. This simulation will empower you to hone your advocacy skills by taking a real-world problem, proposing a course of action to improve the situation and rationalizing their position.
- Do and Connect – You will respond to your partner’s post on the discussion board with your firsthand insight into a specific troubled traffic area. You will describe your personal impression of what traffic calming measures you foresee improving the area and work together to submit a final proposal with their partner for improvement that incorporates both members’ input.
- Connect – You will respond to at least 2 other teams’ design plans with comments and recommendations.

Instructional Materials

The Urban Bicycle Preparedness Course is housed within Canvas Instructure learning management system (LMS). The LMS works as a repository to organize and structure the course materials such as resources, assignments, submissions, and discussion boards. LMSs such as Canvas Instructure allow the course designer to distribute course materials into a templated structure at the same time allowing for some degree of customization.

The resources include customly produced videos for the course (See Appendix A- Original Course Video) and acquired video content to introduce pertinent materials during the absorb phase of the instruction. Additional resources for course participants to absorb include the National Association of City Transportation Official's Urban Bicycle Design Guide (2014) as well as acquired graphics to illustrate major course concepts. The customly produced videos were scripted, recorded, and edited by the course designer.

Course assignments incorporate information sharing application tools to encourage student engagement and collaboration with fellow classmates. In an assignment for *Module 1: Gearing-up for the Ride*, student will register their personal response to the question, "what are the five most important accessories to have on hand while cycling?", and compare their selections to the combined responses of the entire class as a whole through the use of web application Poll Everywhere. This tool will allow students to see how their selections match-up or differ from fellow classmates.

Three of the assignments utilize smartphones video recording and photo taking applications to document specific performances. These activities serve as means to reinforce a desired behavior. Students are much more apt to internalize a procedure if they perform it rather than just watching or reading about it. MassBike's Sean Condon stresses the importance of hands-on learning experiences in a cycling education program (S. Condon personal communication, November 11, 2017). The smart phone's ability to record and share material with others makes it an invaluable tool within an online course setting to share materials with classmates and for the instructor to view and critique. Module Two: Navigation and Etiquette includes an assignment where students photograph themselves performing bicycle hand signals (See Appendix C - Smart Phone Photo for Hand Signaling Assignment). Students upload these

photos into the LMS discussion board where they can be downloaded by classmates. The follow-up assignment requires the students to replace the directional text descriptions (e.g., left, right, stop) in a list of travel directions with a photo of the corresponding hand signal (See Appendix D - Mapping and Signaling Assignment). This assignment displays some resemblance to a virtual simulation where a series of correct procedures play an integral role in successfully accomplishing a task. It is the hope that these desired behaviors from the simulation will be internalized by the student and incorporated into real world situations.

The third module of the course is a team exercise with document sharing tools like Google Docs and Google Drawings. The focus of this module is to explore one's surroundings to determine safe commuting routes and advocating for beneficial improvements to urban infrastructure. With an active internet connection, document sharing applications allow groups the opportunity to collaborate on a synchronized design plan without meeting in person or avoiding the confusion of sending updated documents back and forth between group members as an e-mail attachment. Once the assignment is complete, it can be exported out of Google Docs in a variety of formats including Microsoft Office programs, PDF documents, or Rich Text.

One additional tool that could expedite the collaboration on the group project is utilizing a video conferencing application such as Google Hangouts, Skype or Zoom for synchronous communication and content sharing purposes. This decision will be at the discretion of each group. Individuals may find that scheduling a specific time to discuss the delegate roles, brainstorm ideas and flesh out specific details may be more easily accomplished in a concurrent session.

Phase III: Develop

Instructional Materials

The instructional materials were described in the Phase II: Design portion of the course, so the development phase will address the course's presentation including the timing of the course and how the course will be administered.

This course is designed to be an instructor-led. The instructor is responsible for addressing questions and concerns of course participants, assigning team members to group activities, and judging and assigning scores to student performance on course assignments. The instructor will monitor the course discussion boards and provide input when it is requested by course participants or if the instructor deems it necessary to address course expectations. The maximum point value that a course participant can accumulate is 100 points with points evenly disbursed between the three course modules. Assignments include the maximum points that can be acquired by completing it and a rubric to address what benchmarks must be achieved to be awarded a designated point value (See Appendix E: ABC Quick Check Rubric).

Course participants will have four weeks to complete the course. This course takes into account the busy lives of those participating in it, so it should take under twenty hours to complete the entire course in the four weeks.. Modules One and Two will take a week each to complete and it will take approximately six hours to complete each of these modules. The third module that focuses on advocacy involves a large degree of group work which can result in a greater time commitment so two weeks have been scheduled for the completion of this module. Students can expect to spend eight hours working on this module. The time commitments are

posted in the introduction page for each module along with deadlines for when assignments should be completed.

The course can accommodate up to twenty students with one facilitator. It is the course designer's intention to provide every course participant with the opportunity for direct interaction with the course facilitator for feedback, questions and concerns. In order to manage that demand, the course has been capped at twenty participants until further assessment determines that the course instructor can adequately address an expanded class size.

Phase IV– V: Implementation and Evaluation

Implementation

The tight deadline schedule did not provide sufficient time to run a pilot for this Urban Bicycle Preparedness Course. Course access was supplied to David Ginnings, who holds a Doctorate in Distance Learning and is Learning Designer at the Harvard T.H. Chan School of Public Health. Ginnings is new to the Boston area and an avid cyclist.

Within the LMS, Ginnings recommended changing the landing page from the table of contents page that reveals the full architecture of the course modules to the welcome page. He felt that would be a less intimidating introduction to the course. This is a recommendation that will be incorporated in the next group of revisions to the course.

Ginnings found the instructions for the primary assignment within the Module 3: Advocacy entitled “Rethinking a Troubled Traffic Situation” to be a bit convoluted and difficult for the student to follow (See Appendix F: Rethinking a Troubled Traffic Situation). The decision was made to simplify the assignment to both avoid confusion and encourage more meaningful collaboration between the group members. As a new bicyclist in Greater Boston,

Ginnings stressed the importance of exploring a variety of routes to determine the safest option (D. Ginnings, personal communication, November 11, 2017). Instead of only making this assignment about recommending improvements to the infrastructure, the groups now also recommend viable alternative routes that avoid hazardous areas. While advocating for a safer cycling climate in Greater Boston is one of the primary course objectives, determining alternative routes represents a more easily implementable way to improve a precarious commuting situation.

In addressing the feasibility of launching an instructor-led course of this nature, Ginnings emphasized that this program has the potential to be quite labor intensive for the facilitator. That would translate to expectations of higher compensation, which may result in higher student fees to sign-up for the course. That said, he feels as though this would be an exciting course to facilitate.

Ginnings agreed with the idea of Hubway as a potential partner for the course and that it would be helpful to incentivize the course by providing reduced insurance rates to students that complete the course. He also envisions the course as an ideal introductory edX offering.

Evaluation Plan

The course will be evaluated utilizing formative and summative means following Kirkpatrick 4 level evaluation model (Kirkpatrick, & Kirkpatrick, 2006). Upon completion of each module, the student will complete a short survey that documents the reaction and education levels of evaluation. Questions that address reaction will utilize a Likert scale to measure how much the student liked or disliked the education materials and the assignments that were structured around this content. Quantitative information can be drawn from survey results that

address whether or not students find the content and assignments motivating and whether or not changes should be considered to improve student engagement (Kirkpatrick & Kirkpatrick, 2006, p. 27-41).

This formative survey will also evaluate the education level. Student will be asked to respond to the question, “What have they learned from educational materials and assignments?” and whether or not their attitudes have changed about performing specific actions while cycling. Analysis of this information will assist the instruction team to address whether riders are actively incorporating the desired performances that are represented in the instructional materials into their bicycle commuting routine (Kirkpatrick & Kirkpatrick, 2006, p. 42-51).

A summative evaluation will be conducted two months after the participants have completed the course. A survey will be e-mailed to the students to once again address the Kirkpatrick’s education levels of evaluation to address whether or not students have continued performing the desired performances from the instruction materials and if that proves true, it can be inferred that it has become or is becoming an ingrained behavior, which thereby achieves the third tier on Kirkpatrick’s levels model. If this proves not to be the case, further investigation is warranted to address why the desired performances have not successfully evolved into behaviors (Kirkpatrick & Kirkpatrick, 2006, p. 52-62)

Evaluating the results level of Kirkpatrick’s model is beyond the scope of the instructional team as it would require a well-designed study with treatment and control groups which is overwhelmingly resource intensive. Results level evaluation may be feasible at a later time if a municipality, a company, or scholarly researchers investigate and assess accident statistics between cyclists that have taken the course and those that have not to address its effectiveness (Kirkpatrick & Kirkpatrick, 2006, p. 63-70).

References

California Association of Bicycling Organizations. (2010). Door zone buffered bike lane.

Retrieved from <http://www.bikepgh.org/message-board/topic/bike-lane-less-safe-than-sharrows/>

City of Somerville. (2014, November 4). Somerville #1 in Northeast, #5 in nation for bike commuting [Press release]. Retrieved from

<https://www.somervillema.gov/news/somerville-1-ne-5-nation-bike-commuting>

City of Boston. (2017, October 30). Ride your bike. Retrieved from

<https://www.boston.gov/departments/boston-bikes/ride-your-bike#when-you-ride>

City of Waltham. (2017, November 9). Exciting news -- Vbikes, a dockless bikeshare operator, will be conducting a pilot through November 30th in Waltham! Retrieved from

<https://www.city.waltham.ma.us/home/news/exciting-news-vbikes-a-dockless-bikeshare-operator-will-be-conducting-a-pilot-through>

Fischer, C.M., Sanchez, C.E., Pittman, M., Milzman, D., Volz, K.A., Huang, H., Gautam, S.,

Sanchez, L.D. (2012). Prevalence of bicycle helmet use by users of public bike share programs. *Anal of Emergency Medicine*, 60 (2), 228-231. Retrieved from [https://ac.els-cdn.com/S0196064412002880/1-s2.0-S0196064412002880-main.pdf?_tid=ef030522-cd52-11e7-aa79-](https://ac.els-cdn.com/S0196064412002880/1-s2.0-S0196064412002880-main.pdf?_tid=ef030522-cd52-11e7-aa79-00000aaccb35e&acdnat=1511114362_2683d43d69ccb315235de0cb1b220329)

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Fishman E, Schepers P. (2016, February) Global bike share: what the data tells us about road

safety. *Journal of Safety Research*, 56, 41–45. Retrieved from

<http://www.sciencedirect.com.ezproxy.lib.umb.edu/science/article/pii/S0022437515001024?via%3Dihub#bb0070>

Graves, J.M., Pless, B., Moore, L., Nathens, A.B., Hunte, G., & Rivara, F.P. (2014, August).

Public bicycle share programs and head injuries. *American Journal of Public Health*, 104(8), 106-111. Retrieved from

<http://web.b.ebscohost.com.ezproxy.lib.umb.edu/ehost/pdfviewer/pdfviewer?vid=1&sid=cca0e2fe-687d-43dd-a95e-71b0370f7190%40sessionmgr104>

Hubway. (2017). Hubway media kit. Retrieved from <https://www.thehubway.com/about/media-kit>

Hubway. (n.d). Join. Retrieved from

<https://secure.thehubway.com/register/step1?edPurchaseId=5a1b311923d79>

Jacobsen, P.L., (2003). Safety in numbers: More walkers and bicyclists, safer walking and bicycling. *Injury Prevention*, 9(3), 205-209. Retrieved from

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1731007/pdf/v009p00205.pdf>

Jensen, P., Rouquier, J.B., Ovtracht, N., Robardet, C. (2010, December). Characterizing the speed and paths of shared bicycle use in Lyon. *Transportation Research Part D: Transport and Environment*, 15(8), 522-524. Retrieved from

<http://www.sciencedirect.com.ezproxy.lib.umb.edu/science/article/pii/S136192091000101X>

Jessen, K. (2017, July 14). MassDOT: “Scan the street for wheels and feet” Bicycle and pedestrian safety campaign [Web log post] Retrieved from

<https://blog.mass.gov/transportation/massdot-highway/massdot-scan-the-street-for-wheels-and-feet-bicycle-and-pedestrian-safety-campaign/>

- Kirkpatrick, D.L. & Kirkpatrick, J.D. (2006). *Evaluating training programs* (3rd ed.). San Francisco, CA: Berrett-Koehler Publishing, Inc.
- Mass.gov. (n.d.). Massachusetts safe routes to school: About this project. Retrieved from <https://www.massdot.state.ma.us/saferoutestoschool/Home.aspx>
- MassDOT. (2017, June 29). *Scan the street for wheels and feet*. [Video File]. Retrieved from https://www.youtube.com/watch?v=_gEcSubcnHk
- MassDOT. (2017, August 17). *Double threat* [Video File]. Retrieved from <https://www.youtube.com/watch?v=8Ys9yXzwbjo>
- MassDOT. (2017, August 17). *MassDOT Dutch reach* [Video File]. Retrieved from <https://youtu.be/AD50tVXIXB4>
- McFarland, A. (2017) Longwood area cyclists summit. [PowerPoint Slides]. Retrieved from <https://www.longwoodcyclists.org/media>
- McKenzie, B. (2014, May). Modes less traveled—Bicycling and walking to work in the United States: 2008-2012. *American Community Survey Reports, United States Census Bureau*. Retrieved from <https://www.census.gov/prod/2014pubs/acs-25.pdf>
- McLaughlin, K., & Gland, A. (2010, May). The effectiveness of a bicycle safety program for improving safety-related knowledge and behavior in young elementary students. *Oxford Journals: Journal of Pediatric Psychology*, 35(4): 343-353. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2858437/>
- Murtishi, A. (2017, Aug. 31). Bike-share company ofo to bring 400 bicycles costing \$1 per hour to ride to Worcester. *Masslive.com*. Retrieved from http://www.masslive.com/news/worcester/index.ssf/2017/08/four_hundred_bikes_costing_1_p.html

- National Association of City Transportation Officials. (2011). Urban bikeway design guide: April 2011 edition. Retrieved from http://www.ocpcrpa.org/docs/projects/bikeped/NACTO_Urban_Bikeway_Design_Guide.pdf
- National Association of City Transportation Officials. (2014). *Urban Bikeway Design Guide* (2nd Ed.). Washington, DC: Island Press. Retrieved from <http://nacto.org/publication/urban-bikeway-design-guide/>
- The Official Website of the Massachusetts Registry of Motor Vehicles (n.d.). Drivers Education Requirements. Retrieved from <http://www.massrmv.com/LicenseandID/JuniorOperatorLicense/DriversEducationRequirements.aspx>
- Pedroso, F. E., Angriman, F., Bellows, A.L., & Taylor, K. (2016, December). Bicycle use and cyclist safety following Boston's bicycle infrastructure expansion, 2009-2012. *American Journal of Public Health, 106*(12), 2171–2177. Retrieved from <https://www.ncbi.nlm.nih-gov.ezproxy.lib.umb.edu/pmc/articles/PMC5105001/>
- Thompson, D.C., Rivara, F., & Thompson, R. (1999). Helmets for preventing head and facial injuries in bicyclists. *The Cochrane Library, Issue 4*. Retrieved from <https://pdfs.semanticscholar.org/b2fb/3d0060a647abf0070c3e21ef4b4e1e00059c.pdf>
- Schepers, J.P., Fishman, E. den Hertog, P., Wolt, K.K., Schwab, A.L. (2014, December) The safety of electrically assisted bicycles compared to classic bicycles. *Accident Analysis and Prevention, 74*, 174-180. Retrieved from <http://resolver.ebscohost.com.ezproxy.lib.umb.edu/openurl?sid=EBSCO%3aeoah&genre=article&issn=00014575&ISBN=&volume=73&issue=1&date=20141201&spage=174&>

pages=174-

180&title=Accident+Analysis+&title=The+safety+of+electrically+assisted+bicycles+co
mpared+to+classic+bicycles&aulast=Schepers%2c+J.P.&id=DOI%3a&site=ftf-live

Torbic, D.J., K.M., Bauer, Fees, C.A., Harwood, D.W., Van Houten, R., LaPlante, J., &

Roseberry, N. (2014). Recommended bicycle lane widths for various roadway
characteristics. *National Cooperative Highway Research Program. National Academy of
Sciences*. Retrieved from [https://www.ssti.us/wp/wp-](https://www.ssti.us/wp/wp-content/uploads/2014/08/nchrp_bike_lanes.pdf)
[content/uploads/2014/08/nchrp_bike_lanes.pdf](https://www.ssti.us/wp/wp-content/uploads/2014/08/nchrp_bike_lanes.pdf)

United States Census Bureau. (2014, May 12). Census bureau reports 1.3 percent of workers
commute by bike in Chicago. [Press Release]. Retrieved from
<https://www.census.gov/newsroom/press-releases/2014/cb14-r01.html>

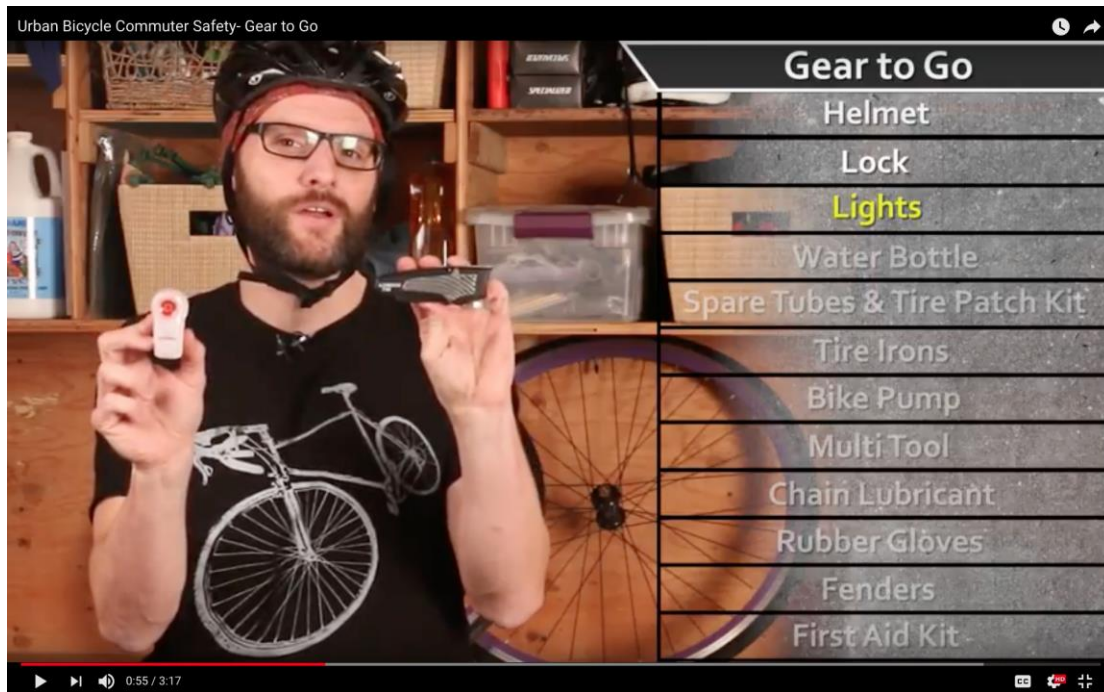
Vision Zero Boston. (2015). The evolution of Vision Zero. Retrieved from
<http://www.visionzeroboston.org/evolution>

Vision Zero Boston. (2015). What does Vision Zero mean for Boston? Retrieved from
<http://www.visionzeroboston.org/overview>

Zeizima, K. (2009, August 8). Boston tries to shed longtime reputation as cyclists' minefield.
New York Times: p. A12. Retrieved from
<http://www.nytimes.com/2009/08/09/us/09bike.html>

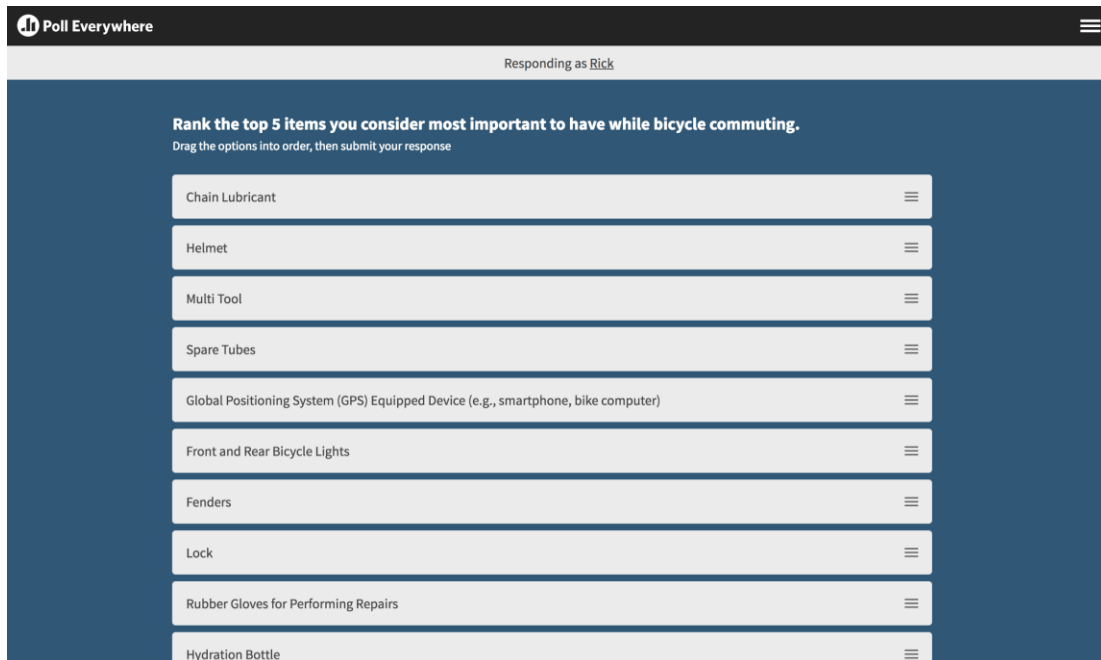
Appendix A

Original Course Video



Appendix B

Poll Everywhere Top Five Bicycle Accessories Site



The screenshot shows a web interface for a Poll Everywhere poll. At the top, there is a dark header with the Poll Everywhere logo and a hamburger menu icon. Below the header, a light gray bar indicates the user is "Responding as Rick". The main content area has a dark blue background. It features a poll title "Rank the top 5 items you consider most important to have while bicycle commuting." and a subtitle "Drag the options into order, then submit your response". Below this, there is a list of ten bicycle accessories, each in a light gray box with a three-line drag handle on the right. The items are: Chain Lubricant, Helmet, Multi Tool, Spare Tubes, Global Positioning System (GPS) Equipped Device (e.g., smartphone, bike computer), Front and Rear Bicycle Lights, Fenders, Lock, Rubber Gloves for Performing Repairs, and Hydration Bottle.

Rank the top 5 items you consider most important to have while bicycle commuting.
Drag the options into order, then submit your response

Chain Lubricant	≡
Helmet	≡
Multi Tool	≡
Spare Tubes	≡
Global Positioning System (GPS) Equipped Device (e.g., smartphone, bike computer)	≡
Front and Rear Bicycle Lights	≡
Fenders	≡
Lock	≡
Rubber Gloves for Performing Repairs	≡
Hydration Bottle	≡


Appendix C


Smart Phone Photo for Hand Signaling Assignment





Appendix D


Mapping and Signaling Assignment



Account



Dashboard


Courses


Calendar


Inbox


Commons


Help

Modules

Assignments

Discussions

Pages

Grades

People

Files


Outcomes

Quizzes

Conferences

Collaborations

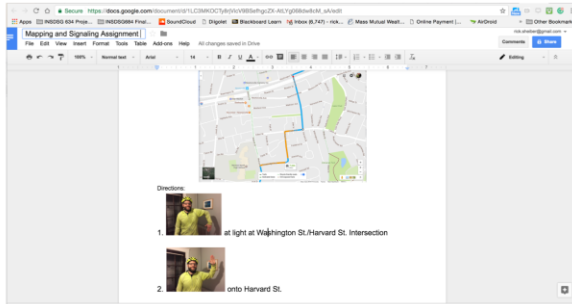
Settings

 **Mapping and Signaling Assignment** Apr 20 at 1:56pm

In this assignment, you will map out a bicycle route, preferably one that you are familiar with, and supply a text description of your ride including turns and the names of the roads you are turning onto. The directions must include at least 5 demarcations (e.g., stop at the light, turn left onto Park St). You can use a mapping app such as [MapMyRide](#) or [Google Maps](#) to plot your course. Take a screenshot of the map with your route highlighted and include that in your post.

For the written portion of your submission, you should replace all of the text directional demarcations (e.g. turn left, turn right, stop) with a photo of the bicycle hand signal that corresponds to it. This is where you will use the downloaded selfies of your classmates performing the signals from the [Bicycle Signal Selfies](#) discussion. Just to review, your final submission will include the map of your bicycle route (with at least 5 directional demarcations) and text descriptions of your directions with hand signal selfies of you classmates replacing the text demarcations.

Please refer to this screenshot for an example of a submission.



Comment on at least 2 of your classmates' posts by **June 18, 11:59 pm (EST)**.

Appendix E

ABC Quick Check Rubric

ABC Quick Check Assignment

 Published Edit

Submit Assignment


 ▾

Using your smartphone, please post a short video of yourself completing the ABC Quick Check on your bicycle. This can either be done as a selfie or have someone else videotape. The video can be uploaded to YouTube and linked in your response or the MP4 can be uploaded directly to your response. *The instructor will grade and provide you feedback on this assignment.*

Points 11

Submitting a text entry box, a website url, a media recording, or a file upload

Due	For	Available from	Until
Jun 9	Everyone	-	-

Assignment Rubric (1)   				
Criteria	Ratings			Pts
Description of criterion	11.0 pts Full Completion of Assignment	5.0 pts Partial Completion of Assignment	0.0 pts Assignment not Submitted	11.0 pts
Total Points: 11.0				

◀ Previous

Next ▶

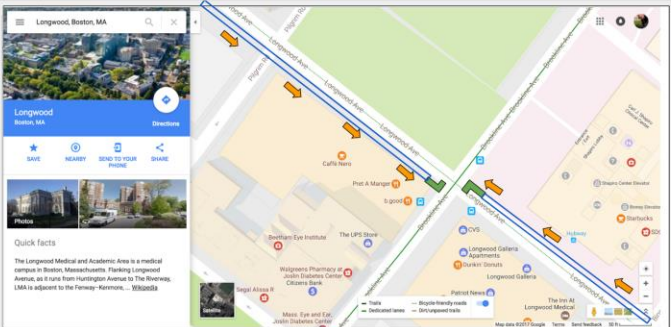
Appendix F

Rethinking A Troubled Traffic Situation

Longwood Ave./Brookline Ave. Intersection Reimagined

File Edit View Insert Format Arrange Tools Table Help All changes saved in Drive

Comments Share



Quick facts

The Longwood Medical and Academic Area is a medical campus in Boston, Massachusetts. Flanking Longwood Avenue, as it runs from Huntington Avenue to The Riverway, LMA is adjacent to the Fenway-Kenmore - Downtown Crossing area.

Your description of the heavy congestion you've described at the intersection of Longwood Ave. and Brookline Ave. leads me to believe that it could use a bike lane and a bike box as traffic calming measures for cyclists commuting both ways on Longwood Ave. The graphic rendering above features the bike boxes in green and the bike lanes outlined in blue and orange directional arrows to depict the traffic pattern.

I'm interested to hear back from you with your reaction to my design plan and any input on what could improve this situation.