

University of Worcester Bike Share:

Woo Bikes

An Interactive Qualifying Project Report
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WPI



**University
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Abstract

The team collaborated with the University of Worcester and other agencies in the surrounding area to expand the pilot bike share program within the city of Worcester. Current students of the University and employees of these agencies were evaluated to help the team better understand the motivations of current cyclists and the barriers to non-cyclists. The team used this data to formulate recommendations for how e-bike usage could be increased, thus, another stride can be made towards a green future.

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Executive Summary

The stated goal of the University of Worcester Sustainability Department is “Change today, protect tomorrow.” In 2012 the University of Worcester established a pilot for a larger bike share program with the help of the Worcester City Council, Worcestershire County Council, and the Nesta Foundation. That program, known as “Woo Bikes,” has now blossomed into a successful program with 50 standard bikes and 50 e-bikes. Part of this pilot was that once a bike share program on campus was established, additional e-bikes would be distributed to local agencies. These were to be used in whatever way the agencies felt would be most effective. The local agencies the team focused on were Fortis Living, the Worcester City Council, and the West Mercia Police. The team worked with these agencies to develop a plan to implement this e-bike share program as well as develop recommendations for how to improve the current on campus program.

To gather information about how to improve the on campus program, the team interviewed current users and surveyed 34 current students of the University of Worcester. The current users of Woo Bikes provided strong insight into the strengths and weaknesses of the e-bike technology, as well as the issues with riding a bike in Worcester. They indicated that they were happy with the program, and generally used it exclusively for commuting. When asked why they did not use the program for shopping, interviewees consistently brought up the lack of easy ways to carry items on the bikes. They also listed the lack of bike racks at their destination as a reason to not ride to unfamiliar places. The team's recommendation to the director of sustainability, Katy Boom, was to install baskets on 3-5 of the on campus e-bikes and then

including this in the Woo Bikes marketing. This would make potential users that are interested in using the program for shopping more likely to join.

Current University of Worcester students were surveyed to better understand barriers to cycling within the city and the obstacles that prevent them from joining the program. When asked what prevented these students from joining they listed primarily that they were happy with their current forms of transportation and the cost of the program. This led the team to make the recommendation of implementing a directed marketing campaign to educate potential users on other uses of the program such as: recreation, exercise, or shopping. This campaign should also include materials highlighting the potential cost savings of joining. While £45 a year is insignificant when compared to the cost of owning a car, when compared to the cost of the on campus gym or walking, for example, it can appear quite expensive. The team recommended the implementation of a payment plan with more frequent, smaller payments. This would reduce the perceived barrier of entry to get more students to join, without requiring them to commit for a whole year. These changes should increase usage of the Woo Bikes program while simultaneously reducing the carbon footprint of the University and encouraging sustainable habits.

To develop a plan for the deployment of e-bikes to agencies, the team interviewed agency administrators, and surveyed the employees. The team received 69 combined survey responses from the employees of Fortis Living, the West Mercia Police Department, and the Worcester City Council. The team developed promotional materials that highlighted the benefits of cycling to help boost support for the program. When asked how likely they would be to use the e-bikes for commuting, 48% said they would be interested, or very interested. 42% employees of Fortis Living were also interested in using the program for going out to lunch. The City Council

received three e-bikes in early October, but had not begun using them due to delays with the risk assessment. Fortis Living will be moving to a new, larger, facility in February, and will receive six e-bikes then. The West Mercia Police were most interested in using the e-bikes for commuting, and based on the number of interested respondents who said they would use the program regularly, the team recommends they receive six bikes as well.

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Chapter 1: Introduction

“Change today, protect tomorrow,” one of the primary principles of the University of Worcester, guides the university's goal to significantly reduce their carbon footprint in the coming years. Road travel accounts for over 22% of the CO₂ emissions in the United Kingdom (Environmental Protection UK, n.d.) and Worcester has the third worst rush-hour traffic in the United Kingdom (Connell, 2014). To alleviate these issues, alternative methods of transportation are being explored and incentivized. One such possibility is cycling; which provides health benefits to riders, in addition to reducing car traffic and the resulting pollution in the city. In 2012, the university was awarded a £10,000 grant from the Nesta foundation to start a bike share program, which is known as Woo Bikes (University of Worcester, 2018).

The University of Worcester supports this initiative by offering electric bikes to select local agencies. The Woo Bikes bike sharing program is currently available to all members of the University of Worcester community, including students, faculty, and staff. The program has been successful with the university community, with 2890 rentals during the 2016-2017 academic year (University of Worcester, 2018). It was the team's job to help expand the program to local agencies. With the expansion of the program to agencies in the city of Worcester, the project worked toward the goal of reducing carbon emissions within the university, while also engaging the greater Worcester population in sustainable practices.

Having bikes available to employees and students is not enough to get people cycling, people also have to be motivated and actively make the decision to cycle. The decision to cycle as compared to driving or walking is a conscious choice of the individual. Evaluating the motives of the individual users, both ones that use the program and ones that do not, will provide the

team with an understanding as to why users choose one mode of transportation over another. To do this, interviews were conducted with the current users of the program, and surveys were distributed to the employees of the agencies that were worked with. This data was then carefully evaluated to determine the motives, barriers, and attitude that affect the potential users of the program.

Chapter 2: Background

This chapter will discuss cycling culture and the merits of existing bike share programs in order to better understand bike share as a whole. The first section states the advantages as well as the shortcomings of existing bike share programs. Following that, is a summary of the culture and regulations for cycling in Great Britain. Next, the team discuss other sharing programs, such as a corporate car share. Finally, there is an examination of the environmental impact of conventional, electric share bike share programs.

The University of Worcester, located in Worcester, United Kingdom, has a goal of saving more energy and building a strong, sustainable campus through its Sustainability Committee. The committee was founded in 2005 and earned the university a finalist position in the Green Gown Awards. The Green Gown Awards is an international set of awards for the recognition of exceptional sustainability for universities and colleges. Between 2009 and 2016 the University of Worcester have reduced their energy usage per square meter by 38% (Annual Sustainability Report, 2018). In the 2015-16 academic year, the University of Worcester successfully reduced their carbon footprint by 8%. In 2012, The University of Worcester started start a bike share program on the campus with the help the Nesta Foundation, The Worcester City Council, and the Worcestershire county council. The system has been a rousing success with their 100 bikes being loaned 2890 times during the academic year 2016/17. Faculty and Staff frequently use the bikes to ride between the schools three campuses that are all located less than two miles apart (Annual Sustainability Report, 2018).

Bikes in the Woo Bikes program can be checked out and returned at either the St. John's campus or the City campus. They are maintained at a central bike shop located on the St. John's

campus. The University of Worcester maintains the shared bicycles in a partnership with the Emily Jordan Foundation.

What is a Bike Share

A bike sharing system is a subscription-based program that allows members to enjoy the benefits of bike ownership without having to worry about maintenance, storage, or initial purchase cost. The system revolves around renting a bike for a set period of time, and once finished with it, either returning it to a docking station, or just parking the bike anywhere with a ‘dockless’ station. These systems can be combined into a hybrid system.

With a docked bike share program, a user will obtain a bike which is parked at one of many stations across the city, from there they will enter either payment information or some form of personal key used to unlock the bike. A user is typically able to ride the bike for a set rental period, ranging from a few hours to an entire week. Once finished with the bike, it may be returned to any of the program’s stations, not necessarily from where it was rented. The major drawbacks of a docked system are, the availability of empty spaces at the destination, bike availability at the departure station, and the large overhead cost of installing, and maintaining the stations. Some bike share programs, such as the *Bicing* program in Barcelona, overcome this by strategically moving bikes from station to station during the day (Kaltenbrunner, 2010).

A dockless system offers increased flexibility as rather than having to pick up and drop off a bike at a specified location, the bikes can be parked anywhere within reason. “Dockless bike share adds even more convenience for users who no longer need to worry about empty bike share stations at the front end of the trip or full stations upon arrival” (Alta Planning, n.d.). This provides a benefit to the bike share user, allowing them to not have to worry about finding a

station to dock at, but greatly increases the complexity of organizing the system and can result in conflict with city authorities over where the bikes are parked. If bikes begin to cluster at popular destinations, the system must have a way to redistribute the bikes, allowing more people to have access to them. This procedure is more costly than the comparable process in a docked system; rather than travelling from dock to dock, staff must collect bikes from all across the service area and distribute them evenly across the area. This process must also seek out safe locations where the bikes can be placed, and not all public spaces will be receptive to having the bikes parked there. Many of these systems allow the bikes to be tracked and unlocked via a smartphone app.

A third type of bike share system is the hybrid docked/dockless system. In this type of scheme, bikes can be located at and checked out from docks spread throughout the service area. After a user checks out a bike, they are free to either return it to another dock within the service area, or simply lock it in a safe location. There is typically an increased cost associated with these out-of-dock returns, or some other incentive to return the bikes to their docks. One example of a successful hybrid system is eBikes Derby.

Cycling Culture in Great Britain

To best understand how a bike sharing scheme fits into the daily lives of commuters and students in Worcester, the laws and regulations regarding their use must be reviewed. There are two aspects of the law that must be discussed, firstly the regulations that forbid usage in certain areas or conditions, and second, the regulations that may make cycling too inconvenient for the average citizen. One major obstacle to operating the Woo Bikes program on a college campus is the prohibition of bikes on footpaths. ('An Act to Consolidate...' 1835 p.396). Another consideration is the requirement of lights for cycling after dark (Gov.UK 2015). The Woo Bikes

program offers both lights and helmets to members of the program as part of the £45 annual fee (University of Worcester, 2018).

Another aspect of riding a bicycle is the protective equipment that is required or suggested to be worn while riding. Although there is no compulsory helmet law in the United Kingdom (Gov.UK 2015) the program does offer a helmet as part of the annual fee. Although not enforced by law, some people prefer to wear a helmet for increased safety. A US Department of Transportation Survey found that 50% of cyclists surveyed never wear a helmet, and only 24% reported that they wear a helmet for all of their rides. Additionally, the report found that helmet usage increases in ages beyond teenage and young adult years (Dept of Transportation, 2008).

Bicycles on standard roadways must follow all typical traffic laws and regulations, such as stopping at stop signals. Cyclists in the UK can ride on all standard roadways, and are permitted even in high traffic areas such as roundabouts or ‘dual carriageways’ (known as divided highways in the US). Cyclists on the road also have the advantage of being able to use bike lanes where available, offering a safer alternative. In addition to bike lanes, cyclists on the roadway are permitted to ride in bus lanes. While not as safe as dedicated bike lanes, they offer a safer alternative to riding with the main traffic. The cycling legislation in the UK is implemented to ensure the safety of riders, and while cycling offers some advantages over driving, there are safety concerns and limitations on where you can ride.

In addition to standard bike laws, the type and power of an electric bike can cause it to be interpreted as a motor vehicle if the motor provides more than 250 Watts of power, or if the bikes electric assist stays active above 15.5 MPH. The Gtech bikes available as part of the Woo Bikes program “will help you up to 15 miles per hour.” (GTech, n.d.) They fall under the

classification of electronically assisted pedal bikes. No motor vehicle license is required to ride one, the only additional prerequisite compared to a standard bike is that riders must be above 14 years of age (Busca 2016).

One incentive as to why people may want to ride bikes around the city instead of walking or driving is the possible time savings. According to a recent article by *Worcester News*, the city of Worcester has the third worst rush-hour traffic in the UK. The average speed of a vehicle during rush hour was a mere 12.8 miles per hour, not much faster than the average bike speed. Worcester's traffic congestion adds 8.6 minutes for every half hour on the road. For people whose commute is relatively short, riding a bike could save significant time. This information comes from a study conducted by Direct Line Drive Plus, a major insurance company in the UK, and based on more than 20 million miles worth of data (Connell, 2014). A survey conducted by *Worcester News* in June 2013 also shows the traffic is a major concern for the people of Worcester. In the survey, which had over 700 responses, 69% of people said that traffic is bad in Worcester. (Edwards, 2013) By increasing the number of bikes used for intra city travel, the number of cars on the road at any given time would be decreased.

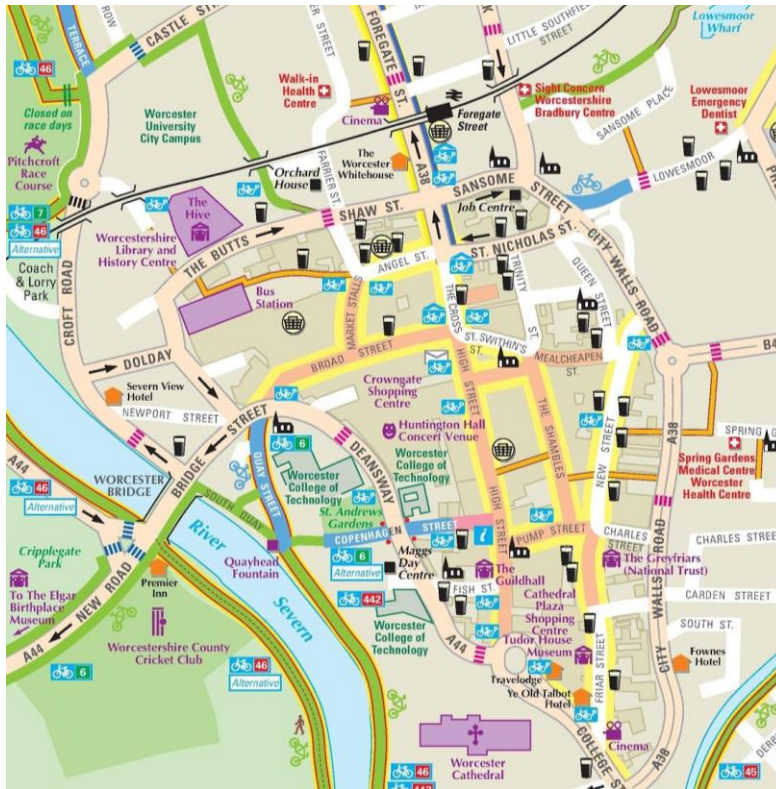


Figure 1: Worcester Bike Path Map

Figure 1 above highlights many of the available options for cyclists in Worcester. The large green routes are the preferred routes for cyclists, they are “traffic-free” meaning that no automobiles are allowed on those roads. The light blue and pink routes are roads which local cyclists prefer to use; they are determined to be less busy or otherwise more cyclist friendly. There is only one bus/cyclist lane indicated on the map, running along Foregate St. through the center of the city. This catalog of preferred routes and bike friendly paths created by the Worcester City Council show that the city is promoting bike use throughout the city. The combination of bike-only routes, and streets which are recommended by cyclists on this map allow a new cyclist in Worcester to easily determine the best and safest ways to cycle through the city.

Success of Other Similar Programs

In the United States and the EU, bike share programs have proved extremely successful in providing a cost-effective and environmentally friendly solution over the last 10 years. One very successful bike program in the United States is the Denver “B-Cycle Program.” It started in 2008 and has grown to over 700 bikes and more than 80 stations. In 2015 it was estimated that, with an average ride of 2.13 miles and an average of 21.3 miles per gallon, the Denver “B-Cycle” program has saved 1.7 million vehicle miles and 80,000 gallons of fuel (Marshal, Duvall, Main 2015). In 2017, a survey of people in Denmark was conducted and it was found that under most circumstances people will choose a shared e-bike over a car if they are traveling less than 2 miles (Hiselius, Svensson 2017). All 3 of the University of Worcester campuses are within 2 miles of one another as well as Downtown Worcester, which is home to many resources and activities for University of Worcester students.

The eBikes Derby program which serves Derby, England, operates a hybrid docked/dockless scheme. The eBikes Derby program operates with 200 e-bikes across 30 stations. In the Derby program, users are charged an additional £2 for parking the bikes away from a dock. This system also incentivizes users to rent the bikes which were parked out of docks by other users, and return them to a dock at the end of their rental, providing a £1 credit. (Social Bicycles Inc., 2018). The eBikes Derby program capitalizes on the large student population in Derby, with 30% of the share’s usage coming from University of Derby students. More information on eBikes Derby can be found in “Appendix D: Derby bike share”

Health Benefits of Cycling

One motivation of the users of a bike sharing program is the health benefits that cycling can provide an individual. Whether a person cycles regularly as part of their commute, or cycles for recreation, there is a significant health benefit associated with the activity. A study conducted by the University of Glasgow of over 200,000 individuals who commute to work in England, Scotland, and Wales, explored the health benefits of making an “active commute,” either walking or cycling, as opposed to driving or riding public transportation. This study concluded that people who cycle to work had a 52% lower incidence of cardiovascular disease mortality, and a 46% lower chance of developing cardiovascular disease. (Celis-Morales, 2017).

Cycling is a type of green exercise, defined as physical activity that takes place while connected directly to nature, or more broadly, exercise which takes place outdoors. Green exercise was found to have a significant positive impact on the physical and mental health of participants in a study conducted by the University of Essex. This study concluded that participants had significant improvements in several areas of mood, including reduced confusion and tension/anxiety, as well as increased vigor; the full findings of this study are summarized in Figure 2 below. Participants in a bike share program would enjoy the benefits of improved physical and mental health if they use the program regularly (Pretty, 2005).

Measures	Before Exercise	After Exercise	Significance of Difference
Physiological			
Systolic Blood Pressure	121.74 ± 1.25	118.02 ± 1.31	***
Diastolic blood pressure	74.22 ± 0.90	72.47 ± 1.01	*
Mean arterial pressure (MAP)	90.06 ± 0.89	87.65 ± 0.98	**
Psychological			
Self-Esteem	19.43 ± 0.40	18.09 ± 0.43	***
Anger-Hostility	38.19 ± 0.25	37.86 ± 0.29	NS
Confusion-Bewilderment	36.94 ± 0.41	35.90 ± 0.40	**
Depression-Dejection	37.75 ± 0.17	37.55 ± 0.18	NS
Fatigue-Inertia	40.08 ± 0.54	39.92 ± 0.51	NS
Tension-Anxiety	35.10 ± 0.34	32.64 ± 0.28	***
Vigor-Activity	36.97 ± 0.62	39.91 ± 0.73	***

Values are mean ± standard errors.

Significance tested with 1-tailed t-test (* p < 0.05; ** p < 0.01; *** p < 0.001).

Figure 2asdf

Corporate Car Sharing

Many businesses own and operate a fleet of company cars for employees to use for business trips and work-related travel. The Woo Bikes program will be entering this space by offering electric bikes for employee use in a similar manner. Offering a fleet of company cars to employees creates a more efficient and cost-effective scheme for business travel than having employees take public transportation, taxis, or submit expense reports after using their personal vehicles. Employees at Google's Mountain View facility are able to book and use the company's fleet of cars for both personal and business purposes (Olson, 2009). An efficient sharing scheme can reduce a company's carbon footprint as an added bonus. Specifically, in the case of Google's car share, they maintain a fleet of plug-in hybrids, an environmentally friendly alternative to traditional gas or diesel-powered cars. Implementation of a company car share is financially beneficial to the employer and the employees; the employer will save on reimbursing personal travel expenses over taxis or another service, and employees can take better advantage of public transportation, saving on costs associated with using their personal vehicles (Reed, 2017).

Another benefit of a company car share is the power it gives to employees, enabling them to take public transportation to and from work, without ever having to worry about a personal vehicle. Traditionally, a personal vehicle may be needed to make trips during the day, meaning that an employee must take their personal car to work, or hire a taxi during the day, both of which are inefficient solutions to which a car share provides an alternative.

Environmental Impact

The World Wildlife Fund's 2018 Living Planet Report states that the current generation may be the last who can take action and effectively reverse the impact that humans have had on the environment. If no action is taken between now and 2020, humanity will have set in motion a chain of events which will lead to total environmental collapse. Unchecked consumption by humanity is quickly leading towards this total environmental collapse, and with it will come a total economic collapse. "All economic activity ultimately depends on services provided by nature ... business and the finance industry are starting to question how global environmental risks will affect the macroeconomic performance of countries" (WWF, 2018).

The Woo Bikes bike share program is a small piece of the larger picture of sweeping social and economic change, driving people and businesses towards taking action to reverse the devastating effects human consumption are having on the planet's environment. Sustainable methods of transport and travel such as bike share aim to reduce the emissions and environmental impact that the current amount of cars and trucks on the roads cause.

Vehicles and Air Pollution

A major goal of the Woo Bikes program is reducing the number of cars and trucks on the roads of Worcester. Reducing the number of cars and trucks on the road will help to alleviate the environmental damage that these vehicles are doing. “Road travel accounts for 22% of total UK emissions of carbon dioxide (CO₂)” (Car Pollution - Environmental Protection UK). All vehicles currently operating in the UK must pass an annual Ministry of Transport (MOT) test. This test ensures that vehicles are operating at or below a certain standard of greenhouse gas emissions (Department for Transport, 2017). The environmental damage done by cars and vans also translates into an economic effect. Total annual health costs from air pollution in the UK are estimated between £22.6 billion and £71.3 billion. Of that, an estimated £5.9 billion a year is directly due to the pollution caused by cars and vans (University of Nottingham, 2018). Vehicle pollution is most concentrated in urban areas like Worcester and London, due to their increased population density. This effect is multiplied by the car traffic issues present in Worcester, causing more cars to be on the road for longer periods of time. More information on traffic on the city can be found in “Cycling Culture in Great Britain” in this chapter.

Electric Bikes’ Environmental Impact

The inclusion of electric ‘e-bikes’ into the program adds an additional layer of environmental concern, the batteries. “At the heart of e-bike technology is the rechargeable battery” (Weinert 2007 p.939). Batteries face issues with safe disposal, as they contain potentially hazardous chemicals and they must be recycled safely to ensure minimal environmental impact. Lithium-Ion batteries consist of heavy metals, organic chemicals, and plastics, all of which must be specially disposed of (Zeng 2013). As the program matures, proper

disposal of the batteries must be considered as the dangers of incorrectly discarding the batteries may effectively nullify any environmental benefit the program provides. Although the batteries are a potential environmental risk, the reduction in air pollution that riding a bike instead of driving outweighs this risk.

Target Agencies for Woo Bikes Pilot

Fortis Living

Fortis Living is a provider of affordable or low-cost housing in Worcester and surrounding areas. Fortis Living is part of Platform Housing Group which also includes Fortis Property Care, Waterloo Housing and Waterloo Homes. The group employs over 1,200 individuals and manages 45,000 homes. Fortis living owns 15,000 of those 45,000 properties (Fortis Living, 2018). Fortis living was evaluated to be a good candidate for bike share due to the frequent site and home visits that many members of the Fortis Living team make. Many of the properties managed by Fortis Living are within a cycleable distance to their central campus, usually within five miles. Fortis Living will be moving to a new facility within Worcester, away from their current facility in Malvern Link. This new facility will be equipped with infrastructure to support employees biking to work, and can also support Woo Bikes bike share.

West Mercia Police Department

West Mercia Police Department is the law enforcement body local to Worcester and Surrounding areas. The department was formed following a merger of Worcestershire Constabulary, Worcester City Police, Herefordshire Constabulary and Shropshire Constabulary. The department as a whole serves the fourth-largest geographic area of any other in England and

Wales, covering Herefordshire, Shropshire and Worcestershire with more than 1.2 million people living within these areas (West Mercia Police, 2018). The officers and staff working out of the department's Castle Street station were chosen as a target for the Woo Bikes Program. Officers and staff alike could use the bikes to commute to and from the station, or, if deemed suitable, Officers could use the e-bikes for cycling patrols.

Worcester City Council

The Worcester City Council provides services to Worcester's 95,000 residents. The services provided by the City Council include: housing services, refuse/garbage collection, parks and museum services, among others. The City Council employs over 250 people, making it one of Worcester's largest single employers (Worcester City Council, n.d.). The council was determined as a candidate for Woo Bikes bike share due to its standing as one of the largest employers in Worcester, as well as certain departments within the council, such as planning and development, having to make frequent site visits across the city.

Chapter 3: Methodology

Introduction

The goal of the project is to understand the motivations and behaviors of users of the University of Worcester's Woo Bikes bicycle sharing program, and to use that understanding to build an implementation for Woo Bikes with local agencies. This chapter discusses different methodologies used in the process of collecting data on the Woo Bikes and the program's users. The main objectives of the project were first to understand how bike share fits into the workflow of local agencies. Second, to identify barriers to cycling. Third, to examine specific characteristics and motivations of Woo e-bike users, and finally to explore people's attitude towards becoming a more active cyclist. Using data collected, the team will design, and effectively implement a e-bike sharing scheme to local agencies.

Objective 1: Market E-Bikes to Local Agencies in Worcester

To market the E-bikes to agencies in the local area, the team first established contact with the agency to begin the conversation and set up an in-person meeting. At this meeting information on the bikes and talks about what the program could be like at the agencies were discussed. The next step was to set up a "have a go" trial session at the agency so more employees could try the bikes and a survey of employees could be administered. Finally, a recommendation on how many bike would be useful and how best to utilize those bikes was given to each participating agency.

Establish Contact with Agencies

Contact information from each of these agencies was obtained from the project sponsor, Katy Boom. This initial email explained who the team was and what the goal was, the individuals who were contacted were already aware of the existence of the program. The email explained to them that the team was interested in meeting in person to discuss the implementation of a bike program using the Woo Bikes e-bikes. If no response was received from the email in three business days a follow up email was sent, gently reminding them about the goal. After this if no response was achieved a phone call or in person visit was made if possible.

Informal Interviews

Once a dialog had been started with the contact at each agency, an semi-structured interview was set up to discuss how a bike share could be best implemented at each agency and what the next steps were. These interviews were held in a convenient place for the employee of the agency, and lasted about an hour. The conversation started out by explaining what ways that the team thought would best promote the usage of the program. Following that, a discussion on how bikes best fit into their workplace took place with these contacts. Together a plan was developed to promote the bikes and promote them to the employees that would be using them. It was explained that after some data were collected on the interest in the program a recommendation would be made on the number of bikes that would be available to the agency. These semi-structured interviews were guided by the list of interview questions that can be found in, “Appendix B: Interviews” under “Interview with Agency Administrators.” The semi-structured form allowed the administrator to convey what they want to get out of the program,

while allowing flexibility due to the difference in each agency.

Promotional Materials

In the time between talking with the contact at each business and the set date for the “have a go” promotional material was made and distributed to promote the fact that the team would be visiting and promote cycling culture in general. These materials were made in the form of a poster or pamphlet and individualized for each agency. Included on these materials were a link to the specific survey for the agency, so people would have access to this after they left the “have a go.” Promotional materials were colorful and attractive to the eye in order to catch people’s interest and get them to look closer at the content. When possible, the materials were specific to the agency that it was distributed to. An example can be seen in “Appendix 3: Promotional Materials” under “Fortis Living.”

“Have a go” Sessions

“Have a go” demo sessions were held at each of the available agencies. For these sessions the team would bring a varying number of e-bikes, depending on the size of the agency. Promotional material such as the branded gazebo or banners that are available to Woo Bikes were also set up at these sessions. A reasonable area was found that is safe for cyclist to ride and close to a well-traveled area to help promote it to more people. The team actively engaged the employees and invited them to try the e-bikes. For safety and liability reasons participants needed to sign a release form and wear a helmet and high visibility vest before riding the bikes. After riding the bike, the team continued the conversation about the bikes and asked the participant to take a quick survey to gather their options on their potential usage of the bike.

These surveys can be found in “Appendix B: Surveys”.

Employee Surveys

The team administered surveys to employees of the agencies to gauge interest in Woo Bikes. At “have a go” sessions, surveys were given to employees who tried the e-bikes, as well as any other individuals who the team discussed the program with. The surveys were about 13 questions and specific to each agency so that each set of data could be analyzed individually, while still being able to compare the results as a whole. The survey was split into sections about commuting, lunch travel, and off-site meetings. After talking with the contact, the team would tailor a survey to their specific agency. The surveys can be found under “Appendix B: Surveys.” The employees were given the option to take the surveys on a provided tablet or on a device of their own by scanning a QR code on the promotional material available. The survey itself was all multiple-choice answer and made using a software available to University of Worcester called Online Surveys. The data was analyzed for each individual agency and for all employees in general using google sheets so visually appealing charts could be made. When working with West Mercia Police, the team were unable to host a “have a go,” instead the survey was distributed by the contact within the department through e-mail.

After the data was analyzed and charts were made to back up the findings, this data was shared with the agencies. Then a discussion was had and a recommendation on how many bikes should be available to the agency was made.

Objective 2: Examine Specific Characteristics and Motivations of E-Bike Users

The Woo Bikes program has been present on the University of Worcester campus for a six years. Understanding the current users of the Woo Bikes program, how they use the program, and what they believe are its strengths and shortcomings was critical to developing a plan to effectively distribute e-bikes to local agencies. The team achieved this goal through the use of interviews. This data helped to identify bottlenecks in the program and recognize potential limiting factors.

Interviews

To gather data regarding the success of the Woo Bike rental program, the team implemented interview research methodologies, specifically the semi-structured interview. The team chose to use interviews due to the small sample size and the opportunity to gather a large of amount of data from the small population. The interviews allowed data collection from a single, well informed source (Berg, 2012). Interviews were conducted with current users of the Woo Bikes program. These interviews aimed to identify why members of the program choose cycling over other forms of transport and discuss their opinions about the success of the Woo Bikes program.

To set up these interviews, the team developed and sent out personalized emails to each member of the Woo Bikes program. This email served as an introduction to the member, and asked them if it would be possible to setup an in person interview when it was convenient. The personalized emails addressed the members by name, and thus increased the response rate. The template for this email can be viewed in “Appendix F: Emails” under “email to current users.”

Conducting a semi-structured interview requires an understanding of the key elements that must be included in an interview, as well as how to properly conduct the interview, and record/analyze the data collected. Interviews were a preferred way to gather this type of information as an interviewer was able to gather more than just facts. One element specific to the semi-structured interview as opposed to other types of interviews is “the ability to digress” (Berg, 2012, p. 112). The ability to deviate from a set series of questions was important when researching people’s opinions; if someone raises a thought that was not considered when the interview questions were developed, the flexibility of the semi-structured interview allowed the team to dig deeper into an aspect that may not have been previously considered. This broadened the scope of information collected, but also increased the difficulty of recording and analyzing the information gathered. Another element considered while analyzing the data was the identification of repeating themes in the responses. If several interviewees shared strong thoughts on a particular topic or raised a similar question which was not in the interview ‘script,’ it was beneficial to include that suggestion in the script for future interview iterations. An interview given to a current member of the Woo Bikes program contained the questions located in “Appendix A: Interviews” under “Interview for Current Woo Bikes Users.”

These interviews were hosted in public locations on the University of Worcester campus, such as The Hive or City campus canteen. To use the time efficiently, and so as not to intimidate the people being interviewed, the interviews were in a two on one setting. One interviewer focused on taking notes while the other carried on the conversation. If the interviewee consented, the conversation was recorded and transcribed for future reference, while the notes taken during the meeting were about the key points that directly responded to the questions asked and the body language of the interviewee. The process took an average of 25 minutes. After the

interviews, the data were processed by identifying key or recurring topics throughout all of the interviews.

Objective 3: Identify Barriers to Cycling

In order to determine the barriers between the University Community and the Woo Bikes program, the team utilized participant observation as a means of analysis. To gather information from the point of view of a typical user, the team participated in the Woo Bikes program ourselves to better identify issues and gauge the usability of the program. Interviews were also conducted with current Woo Bike users to recognize and record inconveniences within the program, as well as what changes the current users believe will improve the program.

Participant Observation

By directly participating in the Woo Bikes program, the team experienced how bikes are rented, how the roads of Worcester accommodate bike traffic and the responsibilities of renting a bike. From these experiences, the team analyzed the rideability of the roads, the reliability of the bikes, and the usability of the bike share itself. Field notes, photographing, and post logging were the main forms of gathering data from these experiences (Fine, 2015). Photographs will provide direct support to the claims made in the notes, and provide a view best not told by words. Post logging was performed after the experience and is a more detailed summary based off of the field notes and photographs. Within these notes, the team determined the difficulties of biking within the city. A test the team conducted involved measuring the time needed to travel between popular destinations via car, on foot, and by bike, to see the benefits of each. While traveling, the

team aimed to observe specific activities of other cyclists, car and pedestrian traffic, road conditions, and bike lanes, along with other significant obstacles.

Interviews

To better understand the difficulties specific to electric bikes, the team interviewed current users of the Woo Bikes electric bikes. By talking to current users, the team gained valuable insight into what circumstances might influence a user to choose an electric bike over a conventional bike. Current Woo Bikes e-bike users allowed the research team to better understand issues that riders have with the bikes. Information on how far these users ride the bikes, and some specific challenges of riding in Worcester, allowed the team to better answer questions asked by the target agencies.

Objective 4: Explore People’s Attitude Towards Cycling

By exploring how cycling is viewed by the Worcester community, the team aimed to better understand how e-bikes could be beneficial to students and employees in Worcester. To gather information regarding opinions and attitudes from the community towards cycling, the team created surveys for the students and employees. The students were surveyed on the St. John’s campus, and asked questions pertaining to cycling, travel, and daily routine. The surveys were specific to each agency, including Fortis Living, the Worcester City Council, and the West Mercia Police, and were administered during the “have a go” sessions when possible, or via email.

Student Surveys

To better understand the University of Worcester student population, a general survey was administered to the students studying on the St. John's campus. To easily manage survey distribution, the team distributed leaflets which held a QR code to the survey. Students then scanned the QR code and the survey became available on their mobile device. These leaflets were both left in high traffic areas, such as the cafe, for students to find. They were also actively distributed by the team during busy times of the day, such as lunch time (12:00 - 14:00). An example of one of these leaflets can be seen in Figure 3. The survey inquired whether the students had a car and/or a bike on campus, and asked more specific question like use cases for bike or car transportation. The survey also asked for opinions about the program and whether the students previous interest in the program. The survey can be found under "General Interest Survey" in "Appendix B: Surveys."



Figure 3: Woo Bikes QR Code Leaflet

Agency Surveys

Another group surveyed were the employees of the agencies the Woo Bikes program plans to expand to. The surveys given out asked questions relating to daily commuting and cycling lifestyle. Based on the responses from each agency, the team then determined how to distribute the e-bikes among the agencies involved. The surveys were constructed on an online platform called Jisc Online Surveys (formerly Bristol Online) and sent out via a mass email. Jisc Online Surveys allows the sponsor to continue to administer the surveys after the team has left. To increase the response rate, administrators send out the survey to the employees. The surveys were around 13 questions and took the user no more than five minutes to fill out. To keep the response short and quick, the survey stayed clear of open response questions and opted for multiple choice type questions often using the Likert scale, or a select all that apply. These surveys were also actively distributed by the team during “have a go” sessions. One example of the survey can be found under “Potential Users: Fortis Living” in “Appendix B: Surveys.”

“Have a Go” Sessions

To explore the attitudes of people towards the Woo Bikes e-bikes, the team conducted “have a go” sessions which allowed students and community members to test the bikes first hand, in hopes to motivate support of the program. The team took field notes of the different demographics most interested in taking a ride on the bikes. A short survey was also given to those who rode the bikes and the full survey can be found under “Have a Go: Open Day” in “Appendix B: Surveys.” The team specifically targeted several groups with these “have a go” sessions, including prospective University of Worcester students and employees of the target agencies: Fortis Living, the Worcester City Council, and West Mercia Police Department.

During university ‘Open Days,’ the team ran sessions to allow individuals who plan to attend the university to be exposed to the bike share, motivating them to join the program if they choose to attend the University of Worcester. Sessions hosted with the target agencies had similar goals, demonstrating to the employees how the bikes work, as well as raising awareness that the e-bikes are being deployed to their employer. A similar survey to the open day survey was given during these sessions, the full survey can be found under “Potential Users: Fortis Living” in “Appendix B: Surveys.”

Chapter 4: Results

Introduction

This chapter will discuss how the research team implemented the methods detailed in *Chapter 3: Methodology*, and the data that the team collected. The team conducted four interviews with current University of Worcester students, who were active members of the Woo Bikes program, as the primary method of gathering initial information about the program. To achieve the objective of increasing usage of the bike share program on campus, the team hosted several trial sessions where the team would demonstrate the e-bikes, and offer students and anyone interested an opportunity to try them. “Have a go” sessions were also held within Worcestershire county; trial sessions were held with the Worcester City Council, Fortis Living, and on the university campus. The team actively participated in cycling around Worcester and took note of significant issues or situations when biking in the city. To explore people's attitudes towards cycling, the team actively distributed a survey via QR codes to students studying around campus.

Meetings with agency officials

Worcester City Council

The team met with Jabba Riaz, Mayor of Worcester, to offer him use of an e-bike. The Mayor's motive was to promote the use of bicycles and e-bikes in the city, with hopes to reduce car traffic and car emissions. The Mayor expressed concerns about the pollution and air quality of certain areas of the city. He stated that he hopes his habits of using a sustainable source of

travel will influence others, including councilmen and the public, to follow his lead and choose a sustainable mode of transportation. This “have a go” session involved the team riding around the city with the Mayor, and discussing the goals of both the university and the City Council. During this ride, the Mayor discussed his concerns about the city of Worcester’s environmental issues and voiced his support of the Woo Bikes program. The City Council aims to reduce inner-city travel, while the University of Worcester hopes to reduce the number of cars on campus. Both groups see bike shares as a solution, and the success of the Woo Bikes program may lead to larger more ambitious projects supported by a larger market. Cycling with the mayor increased public image of the Woo Bikes Program and promoted the use of sustainable travel.



Figure 4: Mayor of Worcester with team member Brandon Terry

“Have a Go”: Agencies

Fortis Living

The team met with Tom Piotrowski to expand the Woo Bikes program to Fortis Living employees. Fortis Living currently operates out of two facilities, one in Worcester, and one in nearby Malvern. In this meeting, the team determined that Fortis will not be receiving the Woo e-bikes until the completion and opening of their new facility in February 2019. The new facility in Worcester will have all the necessary infrastructure installed to support a bike share program. This late-winter launch date will allow Fortis Living to do ample planning and promotion for the Woo Bikes launch at its new facility.

The team worked with Fortis Living to set up the framework around how the bikes will be used by the employees, and how the system will be administered. The first step with Fortis Living was to set up two “have a go” sessions for their employees. The “have a go” sessions were held at the Malvern facility, one in the morning and one in the afternoon of the same day. The goal of these sessions, like the university campus sessions, was to get employees interested in and trying out e-bikes.



Figure 5: Woo Bikes Team at Fortis Living

During these “have a go” sessions, the team spoke with 12 of the Fortis Living employees, and when asked about e-bikes, a majority of employees were interested in learning more about the program, and said they would plan on using it. When asked about how they would make use of the bikes, 60% said they would use them for commuting to and from work, and 68% said they would use them for travelling to lunch or off-site meetings. A survey was also administered at these “have a go” sessions, the results of which are discussed in the “surveys” section of this chapter.

Yeovil City Council/South Somerset District Council

Although not in the Worcester area the team also worked with a council member of South Somerset District, Marc Dorfman. Unfortunately, because of the location the team was unable to host “have a go” sessions ourselves, but all the material needed was provided to Mr. Dorfman. Besides the e-bike and safety equipment, he was also provided with promotional material to

promote the bikes, and a post-survey to collect user's opinions after they had a go on the bike. However, as of submitting this report there has been no response to the survey and no follow up response from Mr. Dorfman, despite the team's efforts to contact him.

West Mercia Police

The team met with Inspector David Troth of the West Mercia Police, to discuss the use of e-bikes in their daily work routines. The meeting led to an understanding that the e-bikes would not be a good fit for official police work, as the police already had a fleet of mountain bikes, which were rarely used to begin with. One main reason they stated these mountain bikes sat unused is due to the unfavorable climate in the winter. Also, if the police used the Woo Bikes e-bikes for official use, it could lead to unnecessary damage to the e-bikes, as the police have already caused considerable damage to their mountain bikes. Thus, after the meeting, a follow up email was sent by Inspector Troth to the employees of the police station with a survey asking about interest in personal use of the e-bikes by West Mercia Police employees. The responses are discussed in the "surveys" section of this chapter.

Interviews

Current Users

To examine the motivations of University of Worcester students, the team hosted interviews with current users of the Woo Bikes program on campus. These interviews helped the team gain valuable information regarding the opinions of current users and how the program can be improved. After contacting all the 36 current users of the program twice through personalized emails, the team received a response rate of 17% and set up four interviews. The questions asked

can be found in “Appendix A: Interviews” under “Interview with Current Woo Bikes Users.” These responses are analyzed in the Analysis section.

These users initially joined the Woo Bikes program due to marketing at the start of the year, specifically during freshers week. When discussing the possibility of students joining mid-year with interviewees, they argued that the lengthy membership with a major payment of £45 may be deterring new members. The interviewees recommended that the price of membership change, or the membership be the same price, but divided into shorter periods. Most recommendations from these interviews involved revising the payment plan and providing lengthier rental periods for the conventional bikes and e-bikes.

From the interviews, the team found that most of the users of the program perpetually check out a bike. In other words, they constantly renewed their rental week after week, and keep the same bike for most of the year, only returning it when they are not going to be on campus for an extended period of time. Most people prefer to use a conventional bike as compared to an e-bike. For the way the users are currently using the program a 24-hour rental for the e-bike did not fit their intended use.

A typical ride for the interviewees was between two to five miles. For travel shorter than two miles, 75% preferred to walk. Weather affects how frequently they cycled, while precipitation and temperature tended to prevent or deter cycle usage, safety was not an issue for these cyclists, as all interviewees felt comfortable riding through Worcester and knew the safe routes to take between common destinations, such as the two major campuses. However, when cycling to new destinations, the interviewees found that there was a lack of bike racks readily available in the city.

Fortis Living Administrators

The team interviewed Tom Piotrowski of Fortis Living to discuss the deployment of bikes to the agency. Fortis Living is moving to a new location in February 2019 and the use of e-bikes at the new facility piqued the interest of Mr. Piotrowski. The team suggested the possible use of e-bikes for employees' lunch commuting and short travel, where e-bikes are checked out at their convenience. The new facility will have bike racks available to employees and the Woo Bikes program. During the interview, the team determined that questions regarding daily travel and interest in the program would be better answered by a survey to Fortis Living employees rather than Mr. Piotrowski. The team was able to set up two "have a go" sessions as well as the distribution of a survey to the other employees of Fortis Living.

Participant Observation

As part of the research, the team had complete access to the e-bikes and aimed to determine the challenges faced by daily users. This section presents the observations made by the research team during the two-month timeline of the project. Participant observation allowed the team to gauge how well bike travel is accommodated in and around the city of Worcester. Before cycling, the team knew to look for different road conditions, and the locations of bike racks and shared paths.

A few of the positive observations, which highlight the benefits of cycling, included presence of bike lanes on major roads, shared bike paths out of the city, and well-maintained roads. The bike lanes of the inner city allow cyclists to travel most of the way to their destination on safe dedicated lanes. Yet, the final portion of the trek may force the cyclist onto sidewalks or into the road, which is not ideal. Luckily, the bike lanes are connected to shared bike/walk paths

that are widely scattered around the city. These shared bike paths tend to travel away from the inner city and are located away from the congested roads. The bike paths along the river, the canal, and back hills of Worcester are perfect for recreational cycling, but not beneficial to those who require inner city travel. All of these paths and roads are in good condition, with minor or no obstructions, allowing for safer, higher quality travel.

In addition to the positives of biking in Worcester, the team made note of some issues that need to be resolved. Most will require infrastructure or policy changes beyond the scope of this project, made either by the University of Worcester, or by the Worcester city council. One of the most glaring issues with riding bikes within the city center is the ban on bikes between 10:30 am and 4:30 pm (Barnett, 2018). This ban was initiated in October, 2018, to reduce the number of cyclist-pedestrian accidents. A majority of the city center is closed to all car traffic except for delivery vehicles. These wide closed roads would be ideal under normal circumstances. Another issue the team observed while biking around Worcester was the lack of bike lanes and good interactions on some major streets, making it quite difficult to get to and from certain places in the city. One of the key examples is the Worcester bridge, which can be quite difficult to ride a bike across without a bike lane. On the river side of this intersection of bridge street and croft road, it can be very difficult to cross despite strong bike paths on both sides of the street. There are alternatives, both up and down river, but if it is necessary to cross at that bridge it is safest to walk a bike across the bridge on the sidewalk. The final issue the team observed was the lack of bike racks at some of the university's housing, which makes it difficult to own a bike. One example of a university accommodation without a bike rack is Albany Court. There is a large courtyard, where a bike rack could easily be added. The team spoke to the director of

sustainability, Katy Boom, about this issue and she said she is working with the accommodation team to get bike racks installed.

Surveys

To collect data about people's attitudes towards cycling, both within agencies, and the University of Worcester, the team developed a series of surveys. The student survey provided insights into why students became members of the Woo Bikes program, and what could be done to improve the program. The team also surveyed employees of Fortis Living, the West Mercia police department, and the city council. These surveys were tailored to each agency, based on the interview with their administrators, and this helped the team understand how the program could best be implemented at each of the individual agencies.

Current students of the University of Worcester

To understand student's attitudes towards cycling, the team developed a survey that was distributed to current students of the University of Worcester. The full survey can be found in "Appendix B: Surveys" under "Survey of Current Students." The survey received 33 responses from students in the Canteen at St John's Campus, and from students in the Peirson building. All of the participants were an even distribution of males and females. 52% of people were not aware of the Woo Bikes program, and those who were, are not members of the program. 33% of students surveyed felt that the £45 fee was too expensive. Only one of the respondents listed that they were a member, and only 3% of them expressed any interest in joining the program. When asked why they were not interested in joining, students overwhelmingly listed that it was too expensive, and that they are happy with their current forms of transportation. 9% of the

population surveyed indicated they could not ride a bike at all, and that was a major obstacle preventing them from joining. The full results of this question, in which respondents could choose multiple answers, can be seen in Figure 6, below.

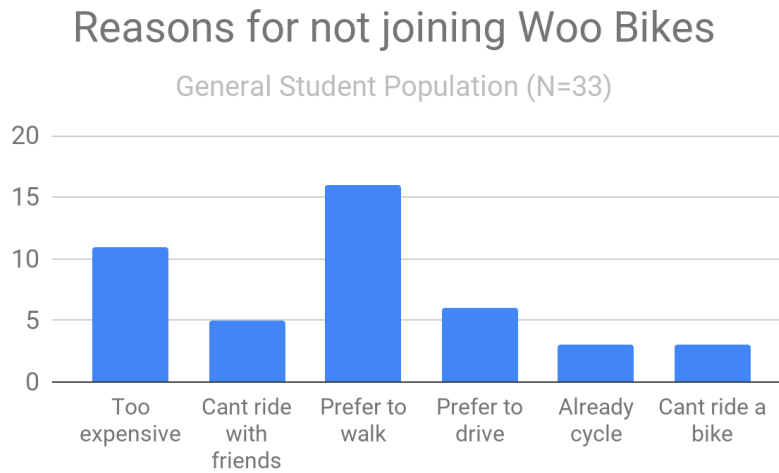


Figure 6: Reasons for Not Joining Woo Bikes

A majority of the students surveyed did live on campus or within Worcester, and as a result they would be strong candidates for the program, and 58% of them said they had access to safe bike storage at their place of residence.

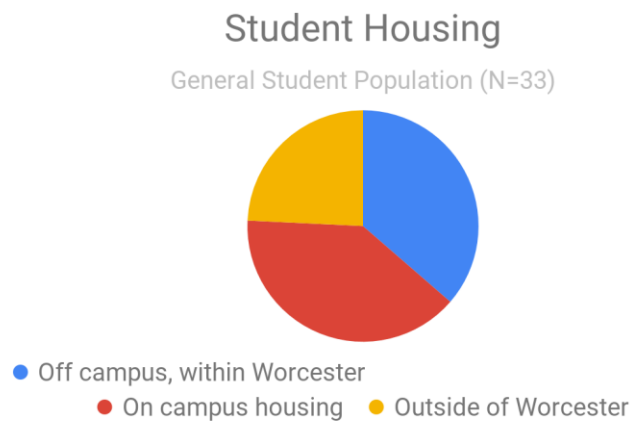


Figure 7: Student Housing Distribution

When asked about the major obstacles to cycling, 54% of students stated that inclement weather was a major reason why they would not ride a bike. These surveys were administered in

November with an average temperature of 5°C, so is highly likely that the cold weather affected this result.

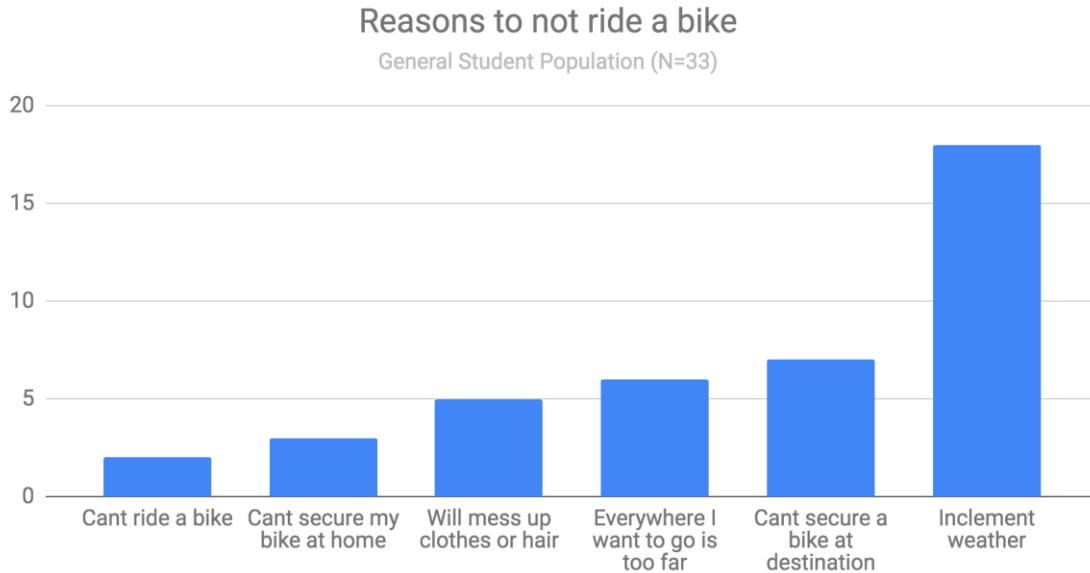


Figure 8: General Student Reasons Not to Cycle

Fortis Living Employees

To gauge interest in the bike share program, the team distributed a survey to all of the employees of Fortis living. This survey can be found under “Potential Users: Fortis Living” in “Appendix B: Surveys.” There was a wide range of ages, and approximately even distribution of genders in the population. The survey received 35 responses. 57% of people lived within five miles of their workplace, and, of those people 55% said they would be interested in cycling to work if a bike was provided by their employer. The lengths of employees’ daily commute can be seen in Figure 9 below.

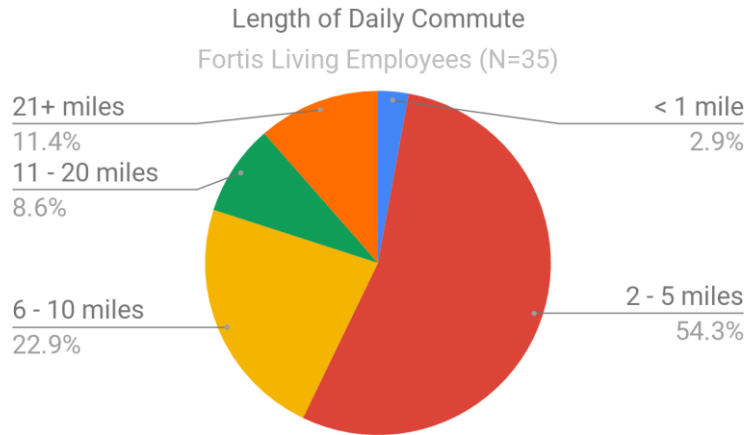


Figure 9: Fortis Living Length of Daily Commute

71% of the employees surveyed indicated that they go out to lunch at least 1-2 times per week, and of that population, 47% said they were either interested, or very interested in potentially checking out an e-bike for lunch. Employees were not interested in using e-bikes to travel to meetings. Of the 27 respondents who travel for meetings, 70% of their meetings were more than 6 miles away and, as a result, only 37% of the employees were likely to checkout a bike for a meeting. The data from this survey was sent to Mr. Piotrowski, so that he could present it to the Fortis Living leadership and guide the program in the future.

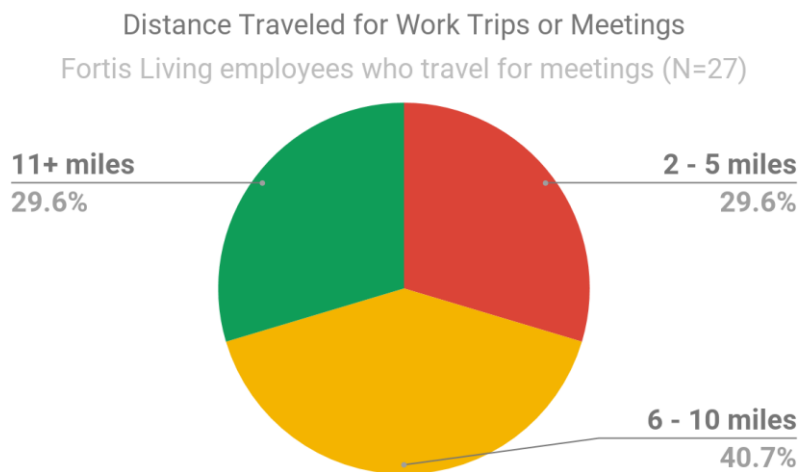


Figure 10: Fortis Living Distance Traveled to Work Trips

West Mercia Police department

To gauge initial interest in a free e-bike share program with the West Mercia Police, a survey was sent out to all the employees. The full text of the survey can be found under “Potential Users: West Mercia Police” in Appendix B: Surveys. Respondents were asked if they would be interested in using an e-bike to commute. This survey received 27 responses, with a distributed age range between 24 and 54. There was an even distribution of males and females. 62% of the employees surveyed lived less than 5 miles of their workplace, and of that, 70% said they would be interested in checking out an e-bike for commuting.

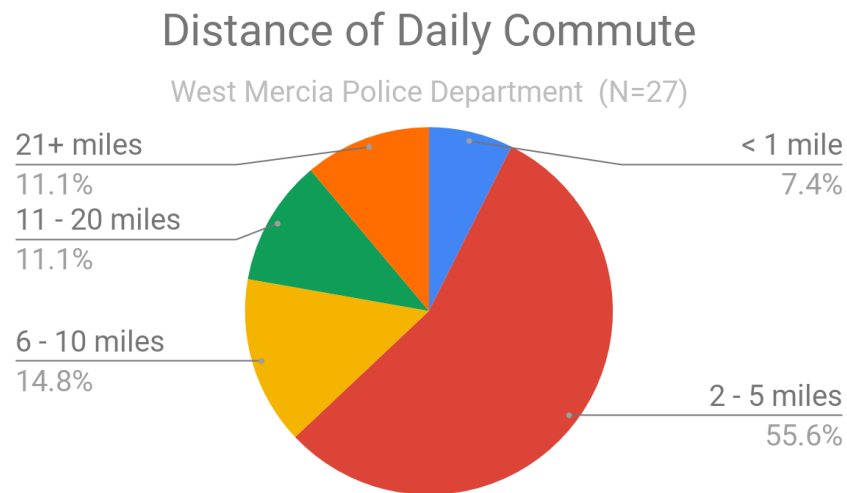


Figure 11: Police Length of Daily Commute

At the end of the survey, there was a field to enter an email address if the respondent was interested in hearing more about the program, and 14 emails were listed. This data has been given to Katy Boom and Naomi Goldman so that they can follow up with the police about deploying bikes next year.

Chapter 5: Findings and Analysis

Introduction

This section discusses the data and information presented in Chapter 4: Results. The research team will present trends observed in the results, and document the conclusions that were drawn from this data. This section briefly summarizes the data collected and explores the meaning of the data that the team has collected relating to each of the objectives of this project.

Objective 1: Market E-Bikes to Local Agencies in Worcester

The team continued ongoing work of rolling out and marketing e-bike share to several agencies within Worcester. “Have a go” trial sessions with Fortis Living and the Worcester City Council did not get many people on bikes but explored their interest in bike share. Other meetings with the Mayor of Worcester and the West Mercia Police Department revealed concerns about implementing bike share into their workflow.

The research team hosted trial sessions with Fortis Living and the Worcester City Council. These sessions revealed trends that either motivate or dissuade people from using bikes or bike share. When hosting a “have a go” session with the Worcester City Council, the Mayor of Worcester noted that he expects his use of an e-bike around the city will motivate other people to do the same. The Mayor is a large public figure within Worcester, and he was approached by several individuals asking for photos as the team demonstrated the e-bike to him. As the mayor continues to make use of the e-bike around the city of Worcester, the team expects that his public image will influence others to make use of more sustainable travel. The long-term effects of the

Mayor's efforts are yet to become evident, as it will take time for others to notice his practices and adopt those practices for themselves. However, if the Mayor continues to openly advocate for the Woo Bikes program, a positive outcome is expected.

The Worcester City council currently has three of the Woo Bikes e-bikes deployed to the Guildhall for use by the employees there. When the team first met with council officials to host a "have a go" session, the employees there were not aware that the Woo Bikes were already deployed to their employer. This situation is similar to the situation on-campus with Woo Bikes; 57% of people on campus simply do not know the program exists. Another barrier to usage of Woo Bikes at the City Council is their process of completing a risk assessment. Following the distribution of the Woo Bikes to the Guildhall, their health and safety office began an internal process of evaluating the risks of City Council employees riding Woo Bikes. This assessment is still ongoing. The team recommends that promotional materials, similar to the ones developed for Fortis Living, be developed and distributed to the Guildhall employees.

As the team worked with Fortis Living, they suggested promotional materials be developed as a part of the marketing campaign. These would be an effective way to raise employee awareness of the bike share, and get them deployed to their workplace and the health benefits of cycling. When the team distributed the pamphlets, found in "Appendix C: Promotional Material:" under "Fortis Living Tri-fold," people were able to quickly get information about the benefits of biking and the program in general, even if they did not have the time to talk with the team or try the bikes themselves.

The trial session at Fortis Living's Malvern facility revealed one of the major barriers to cycling: inclement weather. The team hosted this trial session on a cold and rainy day, and as a result, very few people were interested in riding the bikes citing that they would be wet for the

rest of the day and that riding a bike in the rain is too dangerous, due to the increased risk of slipping or losing control of the bike. This is backed up further by the team’s survey in which 55% of respondents noted that inclement weather was a reason they choose not to ride a bike.

The survey of Fortis Living employees revealed how a bike share would best fit into their company culture. Although 85% of employees surveyed indicated that they never cycle to work, 37% of employees answered that they are likely or very likely to cycle to work if an e-bike were provided to them by their employer. This aligns well with the fact that of the Fortis Living employees surveyed, 57% live within five miles of their workplace, an easily bikeable distance. Figure 12 below confirms the team’s conclusion that as a person’s distance from their workplace increases, their willingness to cycle decreases with a moderately strong trend.

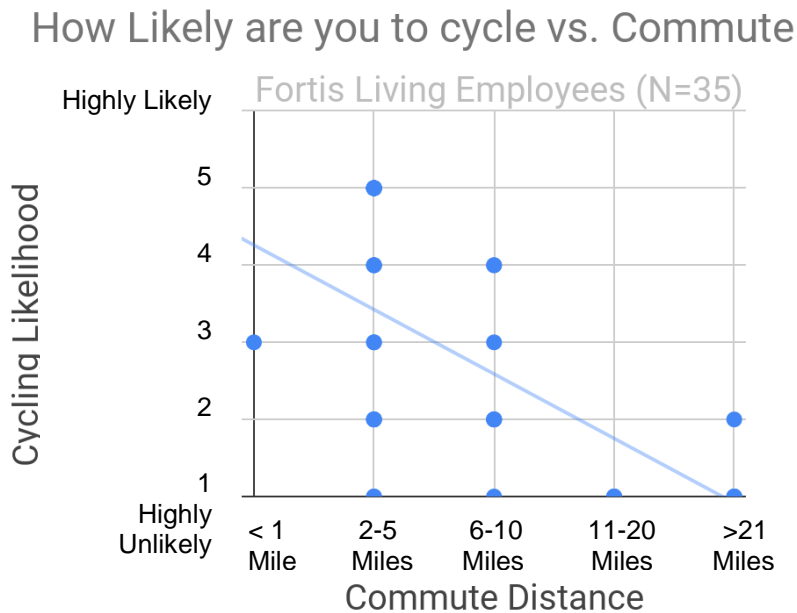


Figure 12: Likelihood to Cycle vs. Commute Distance

The survey of Fortis Living employees asked them to state their likelihood of using an e-bike to travel to off-site meetings and how far these meetings are from their workplace. The responses to the question of likelihood were mostly negative, with only 37% of people

identifying as likely or highly likely to use an e-bike to travel to meetings. Figure 13 shows that regardless of the distance these meetings are from the Fortis Living campuses, employees are not interested in traveling by bike.

Meeting Distance and Likelihood of cycling

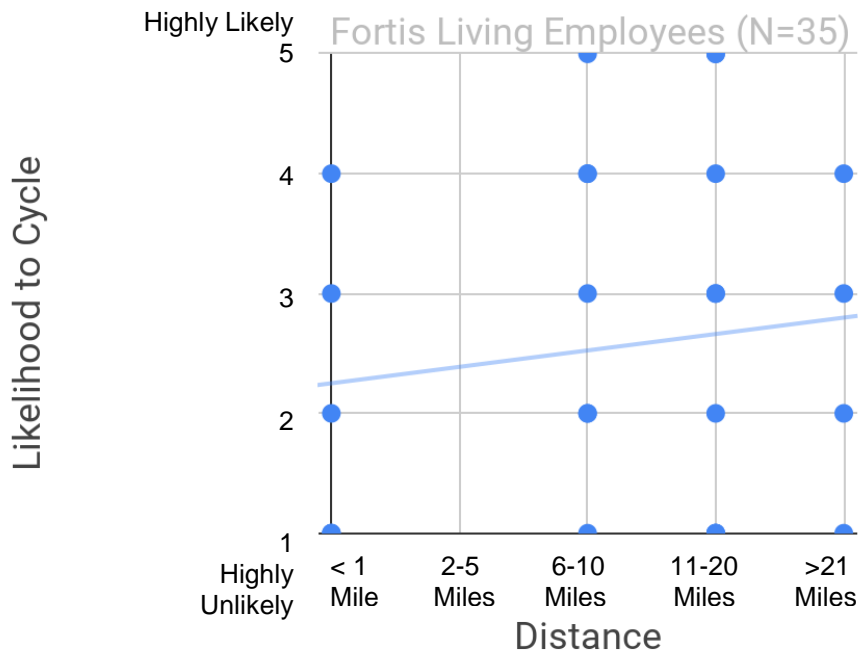


Figure 13: Meeting Distance vs. Likelihood of Cycling

From this information, the team concluded that using bikes for commuting to and from the Fortis Living workplaces is the implementation system which would be the most used by Fortis Living's employees.

Working with the West Mercia Police department highlighted other barriers to the implementation of a bike share scheme. In a meeting with the police which discussed potential implementation of e-bike share for use within the department, they were concerned with setting up and managing the administrative side of bike share, specifically managing a checkout system which tracks who has what bike and for how long. This system would also require either a new staff member to operate the checkout or new training of an existing staff member. Another

concern expressed by the police department was the durability of the e-bikes. The team concluded that e-bikes would not be a good fit for officers on patrol due to the bikes potentially having to be abandoned during an on-foot pursuit or other altercation. When such a situation arises, an officer must have no distractions to keep them from effectively pursuing; if the officers feel the need to stop and remove the battery, or attempt to park the bike safely, precious seconds can be lost. Additionally, the West Mercia Police indicated to the team that their officers prefer the visibility and approachability that comes with on-foot patrols, and cites this as a reason why they do not use their existing fleet of police mountain bikes. However, this did not mean that an e-bike share was not a good fit for the police department. Taking the concerns of the West Mercia Police department into consideration, the team determined that a system where communal bikes are available to all employees was not the best fit. Instead, a system where bikes would be issued directly to individuals who were interested in having one for commuting was determined to be the best option. This greatly reduces the complexity of the system. Of those surveyed within the department, 62% indicated that they were likely or very likely to commute to work with an e-bike if it were provided to them by their employer. This is backed up by the survey of the police department, in which the same proportion of individuals noted they live within 2-5 miles of their workplace, an easy distance to cycle.

Objective 2: Examine Specific Characteristics and Motivations of E-Bike Users

The team identified that the major motivation of Woo Bikes users is for commuting between lectures on the different University of Worcester campuses. Members of the program are not motivated or interested in making use of the e-bikes offered to them due to their unfamiliarity with the bikes, as well as the relative difficulty of checking them out when

compared to the traditional pedal bikes. Inclement weather is a major barrier to using the bikes, and users seek out other modes of transportation when biking isn't an option. Finally, users expressed concerns over the security of the bikes, and the cost vs. value of the Woo Bikes program.

During the interviews with current Woo Bikes users, the team found that the bikes were used almost exclusively for traveling between housing and lectures. Users were not interested in using the bikes for recreation or for running errands. One interviewee mentioned the lack of basket storage made cycling to the shop more difficult when compared to walking. In other cases, users indicated that while they live far enough from the campus to make riding a bike worth the additional effort, they lived close enough to stores that it is more convenient for them to walk. Another user only joined the program in their second year at the University of Worcester, during their first year, they lived on the St. John's campus close to their lectures, but then moved further from campus. The primary indication from Woo Bikes users was that they were using the bikes for medium distance journeys across town. These journeys are usually to lectures, but the users also use the bikes for traveling to other events or to visit friends. Users are not using bikes when they have things to carry with them, such as shopping bags or large project materials, such as presentation posters.

Woo Bikes users primarily make use of the pedal bikes, rather than the e-bikes. Of the users interviewed, none answered that they ever use the e-bikes. This was primarily due to the convenience of using a standard bike when compared to the e-bikes. The standard bikes have a rental period of 7 days compared to the 24-hour rental period of the e-bikes. Due to the longer rental period, members prefer the conventional bikes, as they do not have to renew their rental daily. This claim made by the interviewees is supported by the team's university student survey,

in which, only 67% responded that they are on a university campus every day. Thus students would either have to travel to campus with the sole purpose of renewing their bike rental or go without a bike. Additionally, all of the interviewees indicated that they use Woo Bikes, not as a simple check in/check out system where they only have the bike while traveling, instead, they keep up a constant rental, essentially having a personal bike at all times. The 24-hour rental period for the e-bikes does not fit the lifestyle of university students. Another factor contributing to the use of pedal bikes over e-bikes is the unfamiliarity students have with e-bikes and the perceived danger of using one. One user mentioned that while they were interested in eventually trying the e-bikes, they were more concerned with becoming more comfortable riding a conventional bike. In general, the users were content with the performance of the standard bikes and did not see the appeal of the e-bikes.

Of the users interviewed, none claimed that they cycle for recreation with their friends or peers. This contradicts a trend seen in the general student body survey, which revealed that 16% of respondents were not interested in joining the bike share, as they would be cycling alone. While this aligns with the team's prediction that the visibility of cyclists will influence others to cycle, specifically in the case of the Mayor, the team's interviews revealed that most people are not interested in riding together. Woo Bikes users are not members of the program for recreational or exercise riding, rather they are using the bikes as a commuting tool to get from point A to B; in most cases these journeys being from their homes to lectures on the City or St. John's Campuses. Due to the high initial cost of the program, most students were unable to justify this cost for recreation or exercise use only. 63% of students surveyed who listed "£45 is too expensive" as one of their reasons for not joining, also said that their primary reason to cycle is for "Riding for recreation/exercise." This can be seen in Figure 14.

Views on Program Cost For Recreation
Students who believe the program is too expensive (N=11)

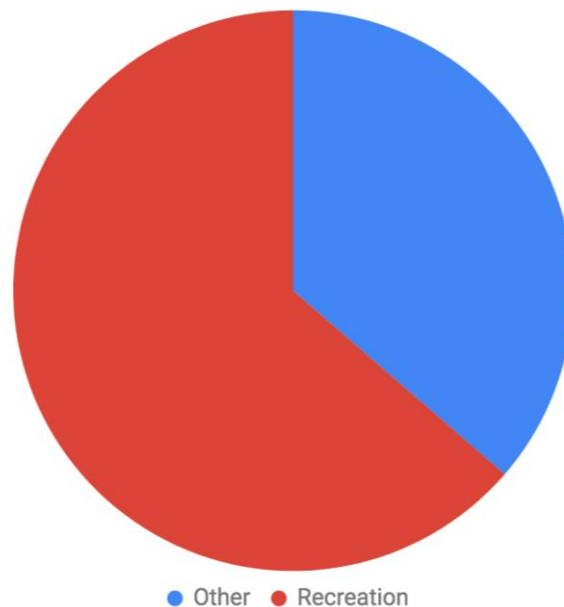


Figure 14: Primary Use for Students Who Believe Program is Too Expensive

Another trend identified in the interviews is that all of the students that participated traveled to the University of Worcester from abroad. This group of students has been shown to be more likely to join the bike share program when compared to students coming from within the UK. The major reason being the impracticality of bringing their bike or car with them such a long distance. Following this conclusion, it is also noted that none of these interviewees had cars of their own, showing that members are not using the bike share scheme as an alternative to driving. Instead, users are using bikes because they do not have the means to drive. In the team's survey of the general student body, 67% indicated that they own a car, and 91% of those respondents indicated that they were not interested in joining the bike share program. This indicates that students are using the bike share only because they have no access to a car, not because they believe it is more convenient or easier than driving.

Objective 3: Identify Barriers to Cycling

The team was able to utilize bikes as a means of transportation around the city. By riding bikes around Worcester, the team observed how bike friendly the city is. The city has numerous bike paths around the city, some of these are part of a national cycle network and some are put in place by the city. Using the cycle routes, it is possible to get between most major locations in the city, in a safe and quick manner. One of the most common paths traveled for students is between St John's Campus and City Campus. Between these destinations is a well-used cycling and walking path, including Sabrina Bridge. The journey takes about 19 minutes to walk and only 7 minutes to bike. It saves students a significant amount of time to bike. However, there are numerous destinations that are not accessible to cyclists. For example, there is a cycling ban in place in the City Center between the hours of 10:30am and 4:30pm making it difficult to cycle into the central city. Even if students would like to cycle close to the city and walk from there, limited space availability to lock up bikes in a safe and legal manner is another obstacle to riding around Worcester. There are only limited designated bike racks available, and students did not want to risk their bikes by locking them to a lamppost or fence, citing fears that they may be confiscated for not being parked in a designated area, or stolen due to questionable security of these structures.

Interviewing current users of the program allowed the team to see what factored into their decision of whether or not they would ride a bike. When asked if weather was a factor in their decision, three of the four people interviewed said it was a significant factor in their decision. Due to winter weather during the school year, students will not be willing to ride bikes, leaving them to seek alternate means of travel. Furthermore, the lack of commitment to cycling

and the habit of walking/driving can be difficult one to break. The same routine every day can become familiar, and factoring in weather dependence can deter users away from cycling.

Although users did not have frequent mechanical issues with the bikes, if an issue did arise, the bike shop being open only two days a week for two hours a day means that users may go several days without being able to service a bike. One interviewee was prevented from joining the program for two weeks by their inability to finish the signup process without the help of the bike shop. Another interviewee stated that they had problems fixing the seat and did not know who to talk to. Small inconveniences like these cause people to not want to ride, any barriers that users encounter make them less likely to use the program. Fears of mechanical issues with the bikes is a major factor preventing new users from joining the program. If students are not aware of the bike shop's hours or that all maintenance is covered by the university, they may be hesitant to join the bike share.

From the team's interviews, it was apparent that a majority of the students who currently use the bike share program are foreign exchange students from other countries and as a result, are frequently on campus for a semester instead of a full year. The way the current program works the user pays their fee and is enrolled for a full year. This makes the financial barrier hard to overcome for such a short period. 34% of students surveyed stated that they felt the £45 was too expensive and that it was preventing them from joining.

The team also identified some social barriers that are stopping people from riding bikes. When people travel for recreation or even to a lecture, a lot of the time it is with other people. Traveling can be a social event; by taking a bike, people are missing this. If someone has friends who would prefer to walk it is more likely that they will walk with them. By extension, if an

individual has friends who ride bikes, either a Woo Bike or their personal bike, they will be motivated to cycle with them.

The student population survey indicated that 52% of students did not know that the university had a bike share that was available to students. The program is only significantly promoted during freshers week at the beginning of the year, when students are overwhelmed adjusting to university life. Due to a lack of continued promotion during the year, the program is not well-known among the students. This is a significant problem because if people don't know that joining the bike share is an option they won't be looking to join the program and fewer people will travel by bike. A lack of knowledge is one of the biggest barriers to participation in the program that the team identified.

Objective 4: Explore People's Attitude Towards Cycling

The primary method the team used to explore people's attitudes towards cycling was by surveying employees of agencies and from surveying the general student population of the University of Worcester.

Students

91% of the students at the University of Worcester currently do not use cycling as a primary means of transportation. 90% of people who are not part of the Woo Bikes program do not have access to a bike on campus. Of the students surveyed who were aware of the Woo Bikes program, 50% listed the cost of the program as a reason they are not a member. This survey, combined with interviews of current users, showed that current users would prefer a different pricing model and that £45 cost is too high for most people to justify. Although this cost is lower

than the cost of owning a car and parking on campus, many students have already paid this cost and see Woo Bikes not as an alternative to their car, but an additional fee. When asked what prevents students from joining Woo Bikes, 15% of students cited their lack of friends that are members as a as a reason not to join. 68% of people said that they were already happy with their current means of transportation. Marketing to this group of students, by emphasizing how much time and effort could be saved, could be a strong way to increase the ridership of the program. Current promotional materials, found in “Appendix C: Promotional Materials” under “Student Promotional Poster” do not highlight these factors.

For people who have access to a bike and choose to occasionally cycle, 56% of students indicated that weather was a deciding factor. At the time that this project took place it was late fall going into winter. The weather was starting to get cold and rain was common, and could have skewed the data. The weather was brought up frequently, when discussing why people were not interested in “having a go” on the bikes, even if they were interested in the program. 30% of students surveyed indicated they could not secure their bike either at their destination or at home. Problems like this require changes to infrastructure that is out of the control of the riders and would require the backing of the town and property owners to change.

Fortis Living

57% of the employees Fortis Living surveyed indicated they had a commute distance of less than 5 miles to work. This translates to roughly a 20-30 minute bike ride to work. Of the people who fit into that category 55% said they would be willing to cycle to work if an e-bike was provided by their employer. Depending on their route to work it is possible that biking would be faster than driving, due to traffic and other factors. It would also offer people an active

way to start their day and align with Fortis Living's goal of creating a happy and healthy workplace. Another instance of employee travel is for lunch and meetings. 71% of employees indicated that they travel for lunch at least once a week, and of them 47% said that they would be interested in using an e-bike to travel for lunch. The length of time many people have for lunch restricts how far they can travel for lunch. An e-bike would increase the distance they can travel, or allow more time to sit and rest. Being physically active in the middle of the day has also been shown to dramatically increase productivity in the second half of the day. Fortis Living employees frequently have meetings around the city. 70% of these meetings were more than 6 miles away and, as a result, only 37% of the employees were likely to checkout a bike for a meeting. In conclusion, most of the employees who live within a reasonable distance would consider using it to commute and a significant number (54%) of employees would be willing to use them during the day.

West Mercia Police department

62% of employees at the West Mercia Police department live within 5 miles of their work. 70% of the employees who live within 5 miles, said they would be willing to try a e-bike for commuting. Inspector Troth recommended issuing the bikes to specific users within the department, to reduce the bureaucratic issues, and speed up the process.

Inspector Troth also advised that e-bikes would not be well suited for normal patrols. The department already owns a fleet of bikes that are underutilized. He was concerned about officers not being able to leave the bike for fear of damage or theft, which could be detrimental to an investigation. The e-bikes are significantly more expensive than the department's current bikes and, it would be more likely that smaller components, such as the battery, could be easily stolen

or broken. The West Mercia Police already have a fleet of mountain bikes, intended for use by officers on patrol. These bikes are not currently in use by the department. The team's contact in the department stated that officers prefer the visibility and approachability that comes with on-foot patrols as the main reason these bikes are not used. The weather also plays a major role in the officer's decision to not utilize their existing bikes, and the Woo Bikes do not change this. Instead, the team and the West Mercia Police believe that the best usage for Woo Bikes within the department was, like Fortis Living, to commute, discussed further in Objective 1 of this chapter.

Chapter 6: Conclusions

This chapter summarizes the analysis of the data collected from surveys, interviews, and participant observation methods. The team collected over 100 survey responses from three different sources. The groups surveyed were: Employees of Fortis Living; the West Mercia Police Department; Worcester City Council; current students of the University of Worcester. The team also conducted four interviews with current students to gain insights into how the program could be improved. Finally, the team actively participated in cycling around Worcester and recorded field notes in the process.

Across all groups surveyed and interviewed the most prevalent use case for cycling and e-bikes was commuting. In the student's case, this refers to commuting from their homes to lectures on campus. In the case of Fortis Living, West Mercia Police, and Worcester City Council, this means traveling from home to their workplace. Employees of Fortis Living and the West Mercia Police indicated that they would likely not be interested in using e-bikes for travel to work meetings or site visits, but would potentially be interested in using the bikes for commuting. The members and staff of the Worcester City Council were interested in using e-bikes for traveling to work meetings and site visits.

From the beginning of the project, the primary goal has been to determine the barriers discouraging both students and employees from riding e-bikes. After surveying three agencies and University of Worcester students, major barriers included: weather conditions, road conditions, and bike security and responsibility. The weather became a major factor as the winter closed in. The road conditions, and intersections were a concern the team noticed after riding throughout the city. One example is the intersection of bridge street and croft road. The cost of a

membership to the Woo Bikes program was consistently brought up by students who were surveyed and interviewed. Most believed changes to the billing plan could increase membership. Lastly, the absence of bike racks around living accommodations, and around the city, were major concerns for the interviewees.

Of the 36 users of the current Woo Bikes program, four were interviewed and surveys were sent to the rest of the student population. From these interviews, the team found that a large portion of the population were international students. These students do not have access to bring a car or a bike to campus, and for this reason are interested in a bike share. In addition, many international students use bikes on a regular basis in their home countries, so they are used to this means of transportation. The team also learned that all the interviewees use the bike share as a long-term rental instead of a typical bike share program.

Another primarily set of potential users of the bike share program would be to target those who currently commute by car. For students who currently drive to campus, making the change to cycling would reduce carbon emissions while saving money on parking. However, of current students surveyed who had a car, 45% indicated that they preferred to drive. Most of the current users of the program interviewed primarily use it for commuting to and from lectures. While getting these students to replace their car with a bike may not be possible, using directed marketing to get them to join the program for other reasons, such as recreation or exercise, is a more effective strategy. Alternatively, promoting the program to these students before they pay the cost of a parking permit allows them to see the cost savings of biking.

Working with Fortis Living and hosting “have a go” sessions at their facilities allowed the team to best understand how e-bike share fits into their company culture. The team determined that the primary use of e-bikes by Fortis Living employees would be commuting to

and from the workplace. A secondary use of the bikes would be taking day trips to lunch destinations. Fortis Living employees were not interested in riding bikes to travel to work trips or meetings. Although only 14% of Fortis Living employees surveyed consider themselves avid cyclists, over one-third indicated they would be interested in commuting on an e-bike. Fortis Living is in the process of moving to a new facility, and upon the opening of their new facility in February 2019, they will be receiving six Woo Bikes e-bikes. The opening of the new facility and the moving of the employees from Malvern Link will break the existing commute habits, and allow them to form their new commute habits with e-bikes in mind. Additionally, the delay between the trial sessions and the deployment of Woo Bikes will allow Fortis Living to adequately advertise and build interest for the program in preparation for its eventual launch with the opening of the new Worcester facility.

Chapter 7: Recommendations

Recommendations for the Woo Bikes Program

In this chapter, the research team will make recommendations for the future of the project, and how Woo Bikes can be improved. One recommendation is the addition of a basket to the e-bikes. They would make the e-bikes more useful for shopping and carrying things, such as books, class materials or groceries. Implementing a promotional scheme to current students, and especially international students, that highlights the reliability of the bike share program and the enormous cost savings when compared to driving. Finally, the team recommends increasing the rental period, and simplifying the signup process. By implementing some, if not all, of these changes, ridership can be increased, and e-bike usage within the city will become a regular sight.

One of the primary recommendations is the addition of a basket to some, if not all the e-bikes that are part of the Woo Bikes on-campus bike share program. In all the interviews with current users, interviewees said they did not use the program for shopping, or any activity where items needed to be carried outside of a backpack. The team's participant observation indicated that riding to local grocery stores from the St. Johns Campus, ASDA and Aldi for example, is very feasible with the electric assist but it is difficult to bring items back. Currently, the conventional bikes have a flat rack on the back. This is useful when carrying some items, but becomes difficult to use with soft bags, such as those received from the grocery store. The students interviewed all primarily rode conventional bikes, and did not mention these racks when discussing the difficulties of shopping with the bikes. Adding a basket to the front handlebars of the e-bikes would make this considerably easier. Using the e-bikes for shopping would be a

strong use case, as it lends itself well to the shorter rental periods. Another alternative for the conventional bikes would be a basket that attaches to this flat rack and allows the user to carry shopping bags. This addition would allow users of the program to shop with the bikes, and by extension, increase ridership.

A key result the team noticed in their survey of the general student population at the University of Worcester is that nearly one half of the student population were not aware of the Woo Bikes program. Currently, the major promotion and demonstration of the Woo Bikes program are done in-person during the new student welcoming programs, known as Freshers Week. Although the program is promoted then, the students are likely overwhelmed with the adjustment to campus life and are too busy to remember and sign themselves up for Woo Bikes. The team recommends promoting the program specifically towards students living on the City Campus or at off-campus locations, as they have the longest and most frequent trips across town. The surveys and interviews indicate that the most popular use of bike share would be these 2-5 mile commutes. As students work out how long their commute to campus is, a reminder that the program exists and is much easier than walking (especially with the e-bikes) is a great motivator to get them to join the program. Students respond well to email promotions, so developing a campaign, possibly linked to the other emails sent out by the students union, could greatly enhance sign-ups. Distribution of pamphlet at the students union, such as the one that can be seen in “Appendix C: Promotional Materials” under “Student Promotional Poster” could be a strong way to recruit new students. These pamphlets could be given to the reception staff at the students union to be distributed when students ask about bikes.

Another element to highlight in advertising to students is the fact that bikes are maintained by the University of Worcester bike shop, Spokes, in partnership with the Emily

Jordan Foundation. This will alleviate student's worries that they may have to pay for repairs or perform repairs themselves should something happen to the bikes. Additionally, the Gtech e-bikes are extremely low maintenance, with no chain or gears, as well as a tool less system for adjusting seat height. Promotional emphasis on the fact that e-bikes have required no maintenance other than battery charging since their introduction to the program should alleviate concerns students have about reliability.

International students, as shown in the interviews, are strong candidates for the Woo Bikes program. Due to the fact that these students do not have an easy means to bring a bike or car with them to campus, they are prime candidates for joining Woo Bikes. Creating and distributing targeted advertising materials for this demographic will help to capture more of the people who could benefit most from the program. The pamphlet in "Appendix C: Promotional Materials" under "Student Promotional Poster" could be modified to target this group more closely.

From research, the team discovered that most of the users of the bike share program use it as a long-term loan rather than a traditional bike share. The interviewees have a bike perpetually checked out only returning it when they are not going to be on campus for extended periods of time. This is different from a conventional bike share where the user checks out a bike, bikes from point A to point B and returns the bike, only having the bike in their possession when they are using it. All of the interviewees cited the fact that you can only check out an e-bike for 24 hours as a major reason why they do not currently use the e-bikes. For these reasons, the team felt that a longer rental period for both conventional and e-bikes would benefit the users on campus and make it an easier and more enjoyable experience for the users. There are some barriers with this; the batteries on the e-bikes will last a maximum of 30 miles and need to be

recharged by the front desk staff. However, in the team's experience, most users would take a couple of days to drain the battery with normal use. If the battery was drained faster the user would simply have to return to the front desk sooner. By extending the rental period to 48 hours for e-bikes and two weeks for the conventional bikes, users would get to keep the bikes for longer, and this would offer an incentive for students to sign up. This would also reduce the workload of the reception staff while allowing the program administrators to still have a good idea of where the bikes are at any time.

Simplifying the signup process could be a strong way to get users to complete the signup process. Currently, users must meet with the bike shop to receive a helmet, lights, and a quick safety briefing. The on-campus bike shop is only open for limited hours, two days a week. These limited hours can result in delays of at least a week, to join the program. Also, if users are in lectures when they are open, they will be unable to join the program. Due to the lack of demand for the bike shop, as well as the cost of extending opening hours, it would be infeasible for it to be open longer. The team's recommendation is to train the reception staff at the City Campus, and the St Johns Campus, to handle the distribution of the lights and helmets. This would allow potential users to easily sign up for the program any day of the week without increasing the operating costs of the program.

After receiving feedback from University of Worcester students via interviews and surveys, the issue of pricing a Woo Bikes membership became apparent. The feedback leads the team to believe that £45 per year was not the optimal way to sell the membership. Rather, more frequent, small payments over a shorter period of time will result in a higher membership count. In addition to offering the membership for £45 per year, a monthly membership for £10 or a semesterly membership for £25 could motivate more students to join. This reduces the perceived

bar to entry, while not actually reducing the income to the program. The £10 per month plan would result in £60 a year, and semesterly payments would result in £50 a year. Currently, students only willing to try the program must pay the full £45 per year, preventing them from trying the program at all. The original £45 per year ensures complete commitment by the student to the program. The £25 per semester allows the student to join the program with less commitment, in exchange for a higher yearly price. This new billing plan also allows students to join mid-year more easily, as well as allowing temporary students to join for a short amount of time. £10 per month allows the students to try the program without a large initial financial investment. The goal of this restructured billing plan is to increase membership at the start of the year and keep users active throughout the year.

A major issue to cyclists is not being able to cycle in the city center, because of the ban on bikes between 10:30 am and 4:30 pm (Barnett, 2018). One possible solution to this issue would be the implementation of marked bike paths along these closed roads with crossings for pedestrians similar to the zebra crossings used on regular roads. This would both allow bikes to move through easily when it is crowded with pedestrians, while simultaneously protecting the pedestrians. The team spoke to Mark Radford, who works for the Worcester city council and works closely with the mayor, and he agreed that this would be a workable solution that would likely satisfy all parties involved. Mr. Radford did say it would take years to implement, due to the necessary planning, zoning, and other bureaucratic processes that regulate infrastructure changes within the city. This could possibly be worked on by another bike focused IQP team.

After conducting interviews and a survey of the West Mercia Police department, the team determined that the department, like Fortis Living, would best make use of e-bikes for commuting. E-bikes were found not to be suitable for police officers patrolling, due to fears that

the bikes themselves would be stolen if officers had to abandon them during an on-foot pursuit, or, if not the bikes, but the easily removable batteries. When officers pursue miscreants, it is important that their entire focus is on their own safety, and protecting the safety of others, not worrying about a bike or battery. The survey administered to the department gathered a sample of interest, and the team recommends that 6 bikes be issued to the department. The team expects that this amount of bikes will allow the 9 interested individuals within the West Mercia Police to all have time trying the bikes.

Following the team's "have a go" session for the City Council at Worcester Guildhall, the team recommends that additional Woo Bikes be deployed to them. Currently, the City Council has three e-bikes, with one used solely by The Mayor. There was a large number of interested people at the City Council, about 10 people, and the research team determined that 2 bikes are not enough to fulfill this demand. The team also recommends that the City Council move some of the e-bikes to the Worcester Customer Service Center or Hub, located at the Hive. Many of the departments of the City Council are based out of this location, and this location is away from the city center, avoiding the daytime cycling ban. Finally, promotional materials should be developed, similar to the ones used for Fortis Living, will allow more individuals within the City Council to make use of Woo Bikes.

Recommendations for Further Research

At the conclusion of this project, the team have developed several areas where a future team, or the directors of the Woo Bikes project, can investigate further. First, the team was not able to get in contact with the National Health Service, one of the original target agencies set forth by the program director, Katy Boom. The Worcestershire Health and Care NHS trust is,

like Fortis Living and the City Council, a major employer in Worcester whose employees make frequent site visits or cross town journeys, a perfect candidate for Woo Bikes. In the future, the team suggests working with all agencies and involved parties during pre-project preparation. This will allow the teams to ‘hit the ground running’ with in-person meetings ready once the team arrives on-site. This recommendation extends beyond the NHS, as one of the major difficulties faced in this project was the delay in setting up initial contact and meetings.

After the opening of Fortis Living’s new facility and the rollout of the Woo Bikes program to their employees, an opportunity for interesting research arises. A future IQP team could, rather than working with several Worcester agencies and the on-campus bike share, focus on Woo Bikes within Fortis Living. Reducing the scope of the project to a in-depth look at how one group of people are using the bike share will allow a complete and thorough understanding of one case of bike share to be developed. A team working with an agency post-deployment of Woo Bikes would be able to understand the strengths and failures of the program as it relates to that specific agency, and relate it to past data and research on the student population, or other existing bike share programs. This research could be performed with the City Council as well, but currently, Fortis Living has more employees interested in bike share, as well as a larger amount of Woo Bikes being deployed to them.

Following the deployment of Woo Bikes to Fortis Living and the West Mercia Police, their usage trends must be investigated. A survey was developed by the team, found in “Appendix B: Surveys” under “Bike Users: Post Deployment.” This survey can be used by Woo Bikes administrators, or a future IQP team to gather data on how the employees are making use of Woo Bikes at their employer.

Another aspect of bike share a future team could investigate is how people's opinions and attitudes towards cycling change with changing weather. This project and its research were conducted in the late-fall; with weather getting colder and wetter. One of the major barriers to cycling identified by this research the weather, people interviewed and surveyed noted that if it is too cold or too wet, they will refuse to ride a bike. If similar research were conducted during the spring or summer months, it is possible that the major and most apparent barrier seen in the fall, the weather, may be moved to the back of people's minds. Instead, research in a more fair weather time may uncover more barriers to cycling, as individuals will not be concerned as much with the weather.

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Appendix A: Interviews:

Interview with Current Woo Bikes Users:

You are being invited to participate in an interview regarding your participation in the University of Worcester bike share program. This interview is being conducted as part of a research project sponsored by Worcester Polytechnic Institute and the University of Worcester. The goal of this research is to determine the weaknesses of the current Woo Bikes program and how it can be improved. The results of this research will be published online by Worcester Polytechnic Institute. We are interested in gaining insight into what current user's opinions of the program are, and what a current user's issues with the program are. We estimate that this interview will take approximately 25-30 minutes to complete. This information will be used to gain a better understanding of the potential issues with the program, and your responses may be quoted, although all interview data will be anonymized. This interview is voluntary and at any time you may choose to not participate, stop the interview or skip any of the questions.

1. What motivated you to begin using the program?
 - a. How long have you been using the program?
 - b. How did you find out about the program?
2. How often do you check out a bike?
3. Could you describe the process for checking out a bike?
4. What do you like about the current checkout process?
 - a. What do you dislike?
5. Do you usually rent an e-bike or a conventional bike?
 - a. why do you choose one over the other?
 - b. How far do you typically ride on the electric bikes?
 - c. How far do you typically ride on the conventional bikes?
6. Where do you usually take the bikes?
 - a. (Home? Work? Shopping?)
7. Does the weather affect your desire to rent a bike?
8. How do you get to your destination if you don't ride a bike?
9. What would you say is your greatest challenge when using the program?
10. Do you currently own a car?
 - a. When do you choose a bike over a car?

Interview with Agency Administrator(s)

You are being invited to participate in an interview regarding your agency's participation in a bike sharing program. This interview is being conducted as part of a research project sponsored by Worcester Polytechnic Institute and the University of Worcester. The goal of this research is to determine how an e-bike sharing program could be best implemented for your agency. The results of this research will be published online by Worcester Polytechnic Institute. We estimate that this interview will take approximately 20-25 minutes to complete. This information will be used to gain a better understanding of the potential issues with the program, and your responses may be quoted, although all interview data will be anonymized. This interview is voluntary and at any time you may choose to not participate, stop the interview or skip any of the questions.

If you have any questions regarding this interview, please feel free to ask us before the interview. The student researchers, Thomas Gibbia, Mark Lightbody, Brandon Terry, and, David Vollum, can be contacted via email at gr-UKB18-Bikes@wpi.edu.

1. How do you think an e-bike program would be most effective?
 - a. Commuting?
 - b. Work-related trips?
 - c. Checkout for lunch?
2. Do your employees make frequent car trips during the day?
 - a. How far are they typically?
 - b. Could these trips be adapted to bikes?
3. Do you currently have a system that the bikes could be implemented into?
 - a. Is there a place where the bikes could be charged?
 - b. Is there a place the bikes could be stored or locked up?
4. What do you see as potential problems to the program?
 - a. What can we do to minimize these issues?

Appendix B: Surveys:

Potential Users: Fortis Living

This is an invitation to participate in a survey regarding your agency's participation in a bike sharing program. This survey is being conducted as part of a research project sponsored by Worcester Polytechnic Institute and the University of Worcester. The goal of this research is to determine how an e-bike sharing program could be best implemented into your agency. The results of this research will be published online by Worcester Polytechnic Institute. This information will help us make informed recommendations. We estimate that this survey will take approximately 5-10 minutes to complete. This information will be used to gain a better understanding of the potential issues with the program, and your responses will be anonymous. This survey is voluntary and you may choose to not participate. If you have any questions regarding this survey, please feel free to contact us. The student researchers, Thomas Gibbia, Mark Lightbody, Brandon Terry, and, David Vollum, can be contacted via email at gr-UKB18-Bikes@wpi.edu.

1. Do you consider yourself an avid cyclist?
 - a. 1 (I never cycle)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Cycling is my passion)
2. How many days a week, on average, do you commute to work on a bike?
 - a. I do not cycle to work
 - b. 1 - 2 days Per Week
 - c. 3 - 4 days Per Week
 - d. 5 - 7 days Per Week
3. How far is your daily commute?
 - a. < 1 Mile
 - b. 2 - 5 Miles
 - c. 6 - 10 Miles
 - d. 11 - 20 Miles
 - e. 21 + Miles
4. How likely are you to commute with an E-bike, weather permitting?

- a. 1 (Never)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Very Likely)
5. How often do you typically travel for lunch?
- a. I do not leave for lunch
 - b. 1 - 2 days Per Week
 - c. 3 - 4 days Per Week
 - d. 5 - 7 days Per Week
6. How far do you typically travel for lunch?
- a. I do not leave for lunch
 - b. < 1 Mile
 - c. 2 - 5 Miles
 - d. 6 - 10 Miles
 - e. 11+ Miles
7. How likely would you be to check out an E-bike for lunch?
- a. 1 (Never)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Highly Likely)
8. How often do you typically travel for work trips or meetings during the day?
- a. I do not leave for work trips or meetings
 - b. 1 - 2 days Per Week
 - c. 3 - 4 days Per Week
 - d. 5 - 7 days Per Week
9. How far do you typically travel for meetings or work trips?
- a. I do not leave for work trips or meetings
 - b. < 1 Mile
 - c. 2 - 5 Miles
 - d. 5 - 10 Miles
 - e. 10+ Miles
10. How likely would you be to check out an E-bike for a work trip or meeting?
- a. 1 (Never)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Highly Likely)

11. To what gender do you identify?
 - a. Male
 - b. Female
 - c. Other
 - d. Prefer not to answer
12. What is your age?
 - a. 18-24 years old
 - b. 25-34 years old
 - c. 35-44 years old
 - d. 45-54 years old
 - e. 55-64 years old
 - f. 65-74 years old
 - g. 75 years or older
 - h. Prefer not to answer
13. Questions or feedback? Let us know below.
 - a. <Open Response>

Potential Users: City Hall Bike Share Interest

This is an invitation to participate in a survey regarding your agency's participation in a bike sharing program. This survey is being conducted as part of a research project sponsored by Worcester Polytechnic Institute and the University of Worcester. The goal of this research is to determine how an e-bike sharing program could be best implemented into your agency. The results of this research will be published online by Worcester Polytechnic Institute. This information will help us make informed recommendations. We estimate that this survey will take approximately 5-10 minutes to complete. This information will be used to gain a better understanding of the potential issues with the program, and your responses will be anonymous. This survey is voluntary and you may choose to not participate. If you have any questions regarding this survey, please feel free to contact us. The student researchers, Thomas Gibbia, Mark Lightbody, Brandon Terry, and, David Vollum, can be contacted via email at gr-UKB18-Bikes@wpi.edu.

1. Do you consider yourself an avid cyclist?
 - a. 1 (I never cycle)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Cycling is my passion)
2. How many days a week, on average, do you commute to work on a bike?
 - a. I do not cycle to work
 - b. 1 - 2 days Per Week
 - c. 3 - 4 days Per Week
 - d. 5 - 7 days Per Week
3. How far is your daily commute?
 - a. < 1 Mile
 - b. 2 - 5 Miles
 - c. 6 - 10 Miles
 - d. 11 - 20 Miles
 - e. 21 + Miles
4. How likely are you to commute with an E-bike, weather permitting?
 - a. 1 (Never)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Very Likely)

5. How often do you typically travel for lunch?
 - a. I do not leave for lunch
 - b. 1 - 2 days Per Week
 - c. 3 - 4 days Per Week
 - d. 5 - 7 days Per Week
6. How far do you typically travel for lunch?
 - a. I do not leave for lunch
 - b. < 1 Mile
 - c. 2 - 5 Miles
 - d. 6 - 10 Miles
 - e. 11+ Miles
7. How likely would you be to check out an E-bike for lunch?
 - a. 1 (Never)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Highly Likely)
8. How often do you typically travel for work trips or meetings during the day?
 - a. I do not leave for work trips or meetings
 - b. 1 - 2 days Per Week
 - c. 3 - 4 days Per Week
 - d. 5 - 7 days Per Week
9. How far do you typically travel for meetings or work trips?
 - a. I do not leave for work trips or meetings
 - b. < 1 Mile
 - c. 2 - 5 Miles
 - d. 5 - 10 Miles
 - e. 10+ Miles
10. How likely would you be to check out an E-bike for a work trip or meeting?
 - a. 1 (Never)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Highly Likely)
11. Which of the following prevents you from riding a bike? (Check all that apply)
 - a. I do not know how to ride a bike
 - b. I do not own a bike
 - c. I am unsure if I will be able to lock my bike at my destination
 - d. I do not want to mess up my clothes or hair

- e. Riding a bike is too tiring
 - f. Everywhere I want to go is too far
 - g. Inclement weather (rain, snow, too cold, etc.)
 - h. Riding a bike is unsafe
 - i. Other (Please Specify)
12. To what gender do you identify?
- a. Male
 - b. Female
 - c. Other
 - d. Prefer not to answer
13. What is your age?
- a. 18-24 years old
 - b. 25-34 years old
 - c. 35-44 years old
 - d. 45-54 years old
 - e. 55-64 years old
 - f. 65-74 years old
 - g. 75 years or older
 - h. Prefer not to answer
14. Questions or feedback? Let us know below.
- a. <Open Response>

Potential Users: West Mercia Police

This is an invitation to participate in a survey regarding your agency's participation in a bike sharing program. This survey is being conducted as part of a research project sponsored by Worcester Polytechnic Institute and the University of Worcester. The goal of this research is to determine how an e-bike sharing program could be best implemented into your agency. The results of this research will be published online by Worcester Polytechnic Institute. This information will help us make informed recommendations. We estimate that this survey will take approximately 5-10 minutes to complete. This information will be used to gain a better understanding of the potential issues with the program, and your responses will be anonymous. This survey is voluntary and you may choose to not participate. If you have any questions regarding this survey, please feel free to contact us. The student researchers, Thomas Gibbia, Mark Lightbody, Brandon Terry, and, David Vollum, can be contacted via email at gr-UKB18-Bikes@wpi.edu.

1. Do you consider yourself an avid cyclist?
 - a. 1 (I never cycle)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Cycling is my passion)
2. How many days a week, on average, do you commute to work on a bike?
 - a. I do not cycle to work
 - b. 1-2 days per week
 - c. 3-4 days per week
 - d. 5-7 days per week
3. How far is your daily commute?
 - a. Less than 1 mile
 - b. 2-5 miles
 - c. 6-10 miles
 - d. 11-20 miles
 - e. 21 + miles
4. How likely are you to commute with an e-bike if it was provided by your employer?
 - a. 1 (Never)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Highly Likely)

5. Which of the following prevents you from riding a bike? (Check all that apply)
 - a. I do not know how to ride a bike
 - b. I do not own a bike
 - c. I am unsure if I will be able to lock my bike at my destination
 - d. I do not want to mess up my clothes or hair
 - e. Riding a bike is too tiring
 - f. Everywhere I want to go is too far
 - g. Inclement weather (rain, snow, too cold, etc)
 - h. Riding a bike is unsafe
 - i. Other (Please Specify)
6. To what gender do you identify?
 - a. Male
 - b. Female
 - c. Other
 - d. Prefer not to answer
7. What is your age?
 - a. 18-24 years old
 - b. 25-34 years old
 - c. 35-44 years old
 - d. 45-54 years old
 - e. 55-64 years old
 - f. 65-74 years old
 - g. 75 years or older
 - h. Prefer not to answer
8. If you are interested in using an e-bike for commuting, please put your email below
 - a. <Open Response>
9. Questions or feedback? Let us know.
 - a. <Open Response>

“Have a go:” Open Day

This is an invitation to participate in a survey regarding your participation in a bike sharing program. This survey is being conducted as part of a research project sponsored by Worcester Polytechnic Institute and the University of Worcester and the goal of this research is to determine how an e-bike sharing program could be best implemented. The results of this research will be published online by Worcester Polytechnic Institute. This information will help us make informed recommendations. We estimate that this survey will take approximately 5-10 minutes to complete. This information will be used to gain a better understanding of the potential issues with the program, and your responses will be anonymous. This survey is voluntary and you may choose to not participate. If you have any questions regarding this survey, please feel free to contact us. The student researchers, Thomas Gibbia, Mark Lightbody, Brandon Terry, and, David Vollum, can be contacted via email at gr-UKB18-Bikes@wpi.edu.

- 1) Do you consider yourself an avid cyclist?
 - a) 1. No
 - b) 2.
 - c) 3.
 - d) 4.
 - e) 5. Yes
- 2) How likely are you to bring a bike to university?
 - a) 1. Not at all Likely
 - b) 2.
 - c) 3.
 - d) 4.
 - e) 5. Very Likely
- 3) How likely are you to bring a car to university?
 - a) 1. Not at all Likely
 - b) 2.
 - c) 3.
 - d) 4.
 - e) 5. Very Likely
- 4) The Woo Bikes program offers 7-day pedal bike rentals and 24 hour e-bike rentals to its members. How likely are you to join the Woo Bike share program for £45 a year?
 - a) 1. Not at all likely
 - b) 2.
 - c) 3.
 - d) 4.
 - e) 5. Very Likely

- 5) How important is the availability of electric bikes to you in a bike share?
- a) 1. Not at all important
 - b) 2.
 - c) 3.
 - d) 4.
 - e) 5. Very important
- 6) Are you currently a student at the University of Worcester?
- a) Yes
 - b) No

Bike Users: Post Deployment

This is an invitation to participate in a survey regarding your participation in a bike sharing program. This survey is being conducted as part of a research project sponsored by Worcester Polytechnic Institute and the University of Worcester and the goal of this research is to determine how an e-bike sharing program could be best implemented. The results of this research will be published online by Worcester Polytechnic Institute. This information will help us make informed recommendations. We estimate that this survey will take approximately 5-10 minutes to complete. This information will be used to gain a better understanding of the potential issues with the program, and your responses will be anonymous. This survey is voluntary and you may choose to not participate. If you have any questions regarding this survey, please feel free to contact us. The student researchers, Thomas Gibbia, Mark Lightbody, Brandon Terry, and, David Vollum, can be contacted via email at gr-UKB18-Bikes@wpi.edu.

- 1) How many times did you check out a bike?
 - a) Open response
- 2) How long would you typically keep a bike checked out for?
 - a) Less than 1 hour
 - b) 1-5 hours
 - c) 6-10 hours
 - d) 11-15 hours
 - e) 16-20 hours
 - f) 20-24 hours
 - g) 24+ hours
- 3) How far was your typical bike trip?
 - a) Less than ½ mile
 - b) ½ to 1 mile
 - c) 1 to 2 miles
 - d) 2 to 4 miles
 - e) 5+ mile
- 4) How often were no bikes available when you wanted to check one out?
 - a) 1. Never
 - b) 2.
 - c) 3.
 - d) 4.
 - e) 5. Every time
- 5) What did you use the bikes for (check all that apply)
 - a) Commuting

- b) Business Travel
 - c) Lunch/Social Outings
 - d) Other:_____
- 6) To what gender do you identify?
- a) Male
 - b) Female
 - c) Other
 - d) Prefer not to answer
- 7) What is your age?
- a) 18-24 years old
 - b) 25-34 years old
 - c) 35-44 years old
 - d) 45-54 years old
 - e) 55-64 years old
 - f) 65-74 years old
 - g) 75 years or older
 - h) Prefer not to answer

General Interest Survey

This is an invitation to participate in a survey regarding your participation in a bike sharing program. This survey is being conducted as part of a research project sponsored by Worcester Polytechnic Institute and the University of Worcester and the goal of this research in to determine how an e-bike sharing program could be best implemented. The results of this research will be published online by Worcester Polytechnic Institute. This information will help us make informed recommendations. We estimate that this survey will take approximately 5-10 minutes to complete. This information will be used to gain a better understanding of the potential issues with the program, and your responses will be anonymous. This survey is voluntary and you may choose to not participate. If you have any questions regarding this survey, please feel free to contact us. The student researchers, Thomas Gibbia, Mark Lightbody, Brandon Terry, and, David Vollum, can be contacted via email at gr-UKB18-Bikes@wpi.edu.

1. Are you aware of the university bike share, Woo Bikes?
 - a. Yes but I am not a member
 - b. Yes and I am a member
 - c. No
2. I consider myself an avid cyclist?
 - a. 1 (Strongly Disagree)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Strongly Agree)
3. Which of the following most closely describes your living situation?
 - a. I live on the University of Worcester St. John's Campus
 - b. I live on the University of Worcester City Campus
 - c. I live outside university housing but within Worcester
 - d. I live outside Worcester
4. How many days a week do you travel to a university campus?
 - a. I am never on campus
 - b. 1-2 days per week
 - c. 3-4 days per week
 - d. 5-7 days per week
5. There are secure places to lock a bike at my living place.
 - a. Agree
 - b. Disagree
 - c. I don't know

6. Which of the following do you, or would you consider using a bike for? (Check all that apply)
 - a. Traveling to lectures
 - b. Visiting friends
 - c. Riding for recreation/exercise
 - d. Other (Please Specify)
7. Which of the following prevents you from riding a bike? (Check all that apply)
 - a. I do not know how to ride a bike
 - b. I do not own a bike
 - c. I am unsure if I will be able to lock my bike at my destination
 - d. I do not want to mess up my clothes or hair
 - e. Riding a bike is too tiring
 - f. Everywhere I want to go is too far
 - g. Inclement weather (rain, snow, too cold, etc)
 - h. Riding a bike is unsafe
 - i. Other (Please Specify)
8. How likely are you to join the on-campus bike share program?
 - a. 1 (Not at all)
 - b. 2
 - c. 3
 - d. 4
 - e. 5 (Highly Likely)
9. If you were not interested in joining, please specify why. (Check all that apply)
 - a. £45 is too expensive
 - b. I wouldn't be able to ride with my friends because they are not members
 - c. I do not need it, I prefer to walk
 - d. I do not need it, I prefer to drive
 - e. I do not need it, I already cycle
 - f. Other (Please Specify)
10. Do you own a bicycle?
 - a. Yes
 - b. No
 - 10a. Did you bring your bicycle to campus?(Only administered if responded "Yes" to 10)
 - Yes
 - No
11. Do you own a car?
 - a. Yes
 - b. No
 - 11a. Did you bring your car to campus?

Yes

No

12. To what gender do you identify?

- a. Male
- b. Female
- c. Other
- d. Prefer not to say

Appendix C: Promotional Material:

Fortis Living Tri Fold

<h3>E-Bike Facts</h3> <p>30 miles on a single charge</p> <p>15 miles per hour electric assist</p> <p>0 £ for Fortis Living employees</p>	 <p>Interested? Take our survey?</p>  <p>Contact Us: gr-ukb18-bikes@wpi.edu</p>	<h3>E-Bike Share</h3> <p>A Collaboration between the University of Worcester and Fortis Living</p> <p>Commute to work </p> <p>Grab some lunch </p> <p>Head to a meeting </p> <p>Fortis  </p>
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Go By Bike!



3% Lower
Blood Pressure

Saves the
Planet

Makes You
Stronger

46% Lower Risk
Of Heart Disease



5X More Efficient
than Walking

IT'S FUN!

Reduces
Traffic

Increases
Self Esteem

Easier To Park

Student Promotional Poster



The poster features a teal header with the 'wo' logo (where the 'o' is a bicycle wheel) and the text 'user info'. Below this are five teal callout boxes with icons and text. A QR code is located in the top right corner with the text 'SCAN TO REGISTER'.

wo user info

 Pay the annual £45 membership via the online bike share system
<https://ext-webapp-01.worc.ac.uk/bikeloan/>

 SCAN TO REGISTER

To start your membership, collect your **FREE** helmet and lights from the Bike Shop
(see reverse for details)

 Collect the key from any 24/7 hub at **City** or **St. John's** reception

 Hire **pedal bikes** up to 7 days or **e-bikes** up to 24hr at no extra cost

 Return the bike to any of our hubs and hand in **the key** (and the battery if issued one)

ALWAYS START IN ECO MODE IF FIRST TIME RIDING AN E-BIKE

wobc where to find us

University of Worcester

St John's Campus
Henwick Grove
St John's
Worcester
WR2 6AJ
01905 855000

City Campus
Castle Street
Worcester
WR1 3AS
01905 542444

Severn Campus
Hylton Road
Worcester
WR2 5JN
01905 544444

Bike Shop opening times
Tuesday, Wednesday
12:00 - 14:00
To M5 Junction 7

To M5 via ring road

Appendix D: Derby

Derby Bike Share

No Subscription Required

3p
per minute
minimum charge applies

Pay As You Go Cycling

- Easy for both regular and infrequent riders
- Minimum charge of £1 per rental, which includes 35 minutes ride time
- After 35 minutes, the 3p per minute charge will apply
- Maximum daily charge of £12
- Ability to pre-load credit onto your account

TIPS

- Check your bike before you ride, including the battery level on the App/bike
- When inserting or removing the U-lock, hold the saddle with one hand to steady the bike
- Lock your bike with the parking dock on the right. If locks better!
- Follow the Highway Code
- Treat pedestrians and other road users with respect and consideration

CONTACT

If you have any questions about eBikes Derby and how it works, check out the FAQ section on ebikesderby.com. For any other enquiries, please contact customer service:

Email: support@ebikesderby.com
Phone: 01332 492095

Connect with us on social media:

[@ebikesderby](https://twitter.com/ebikesderby) [f](https://www.facebook.com/ebikesderby) [i](https://www.instagram.com/ebikesderby) [y](https://www.youtube.com/ebikesderby)

As the network expands, this map may become out of date – please always refer to the interactive maps on the App or Website for live info on the eBikes and their locations

The flyer features a map of Derby with numerous black circular icons containing a lightning bolt, representing the locations of eBikes. The map shows a dense urban area with streets and green spaces.

HOW IT WORKS

JOIN



Register to ride through the eBikes Derby website www.ebikesderby.com or the Social Bicycles Mobile App for iOS or Android.

UNLOCK



Press the green tick to wake up the bike. Upon registration, you will receive your 6-digit account number and 4-digit pin. Enter these into the keypad on the back of the bike to release the U-lock.

RIDE



Place the U-lock in the holster before cycling.

To make a quick stop during your rental, press the 'HOLD' button and lock the bike to a rack.

LOCK



To end your ride, lock the bike to any eBikes Derby dock or overflow bike parking area. These can be found on our interactive map on www.ebikesderby.com or the Social Bicycles app. Check the screen to confirm your rental has ended.

VISIT EBIKESDERBY.COM TO FIND OUT MORE



How many bikes can I rent?

We actually allow you to take 2 bikes. But please note that the second bike taken will be charged at the rate of £1 per trip plus the normal rate of 3p per minute from the moment of rental, and the costs added to your account. You are responsible for any use or misuse to all bikes rented under your account.

Do I need to take the U-lock with me?

Yes definitely! Remember to always put the U-lock in its holster on the left side of the bike as soon as you unlock it. Otherwise you will not be able to lock the bike at your destination.

What if the destination hub is full?

If the hub is full, you may lock the bike to nearby public bike parking. Do not lock the bike to any other structures (posts, lamp posts, fences etc) unless absolutely necessary as this may cause an obstruction or inconvenience for other pavement users. You may also be charged an out of hub fee for doing so.

What happens if I run out of power?

You can check the estimated power left in the bikes through the app. If your eBike does run out of power during your ride it can still be ridden as a normal pedal bike without any problem.



ebikes derby


No Ordinary Bikeshare



@ebikesderby f @ ebikesderby

Appendix E: Legal Forms

Woo Bikes Indemnity form



Indemnity form-Open/Visit days

This form specifies that the test rider will take full responsibility when s/he test rides the Woo e-Bike (the e-Bike) and gives details of the privacy notice and how the University will use, store and delete this personal information.

Test Rider's Print Name:.....

I, the below signed Test Rider, understand and agree that the e-Bike has been temporarily provided to me by University of Worcester. I agree to obey all traffic and other laws and to return the vehicle without damage to the University of Worcester. I agree to hold University of Worcester harmless from any and all damages, losses, or injury to persons or property while I have the right to use the e-Bike. I agree to indemnify and keep indemnified University of Worcester against all losses, claims, demands, actions, proceedings, damages, costs, expenses or other liability in any way arising from my use of the e-Bike.

I acknowledge and agree that other than death or personal injury caused by University of Worcester's negligence or any liability which it would be unlawful for University of Worcester to exclude or restrict, University of Worcester is not liable for:

- (a) any injury to me;
- (b) any losses, claims, demands, actions, proceedings, damages, costs or expenses or other liability incurred by me;
- (c) any loss or damage suffered by me;

I agree that I will not take the e-Bike onto the public highway and only to ride it where advised by University of Worcester.

Privacy Notice for a data collection form

We are requesting this information from you so that we can let you take an e bike Woo Bike to test ride. We may also use the information for assessing if people are interested in bike share and electric bikes because the University runs a bike share scheme. In aggregative format personal data may be provided to other Woo Bike partners, Worcestershire Local Enterprise Partnership, Worcestershire County Council, Worcester City Council. The processing of this data is necessary to evaluate if people enjoy riding e bikes and are interested in using them as part of a bike share scheme. Please note that the University of Worcester is the Data Controller and more information about your rights are detailed on <https://www.worcester.ac.uk/informationassurance/privacy-notice.html>


This form will be placed in an envelope marked confidential whilst at this event, then locked securely in the sustainability department at the University of Worcester at the end of today's event for a maximum of 2 working days. After that, it will be confidentially disposed of.

I consent to my personal information being processed in accordance with the purpose identified on this data collection form.

I hereby acknowledge that I fully understand this agreement and confirm I am confident and capable to complete a test ride.

Test Rider's Signature:..... Date:.....

Bike number:..... Woo Bike Promoter:.....
University of Worcester Henwick Grove Worcester WR2 6AJ
www.worcester.ac.uk



Appendix F: Emails

Email to current users

Good Afternoon «Firstname»,

We are a group of American students doing research into how we can expand the bike share program to local businesses and agencies right here in Worcester. We would like to talk to you in order to gather feedback on the current program on campus so we can improve the program to make it better in the future. It should only take about 30 minutes of your time, and we were hoping to conduct them between before Tuesday Nov 20th. If you would be willing to sit down with us and talk about this topic, please respond with a date and time you are available. We will do our best to accommodate any time that you are free.

We appreciate your time and hope that you will be willing to chat with us.

Thank you,

The Woo Bikes IQP Team
Brandon, David, Mark, Tom
gr-ukb18-bikes@wpi.edu