Cycle Pack:

Final Report

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Abstract

The plethora of positive social, and environmental benefits that result from cycling inspired me to research how the University of Washington could increase bicycle ridership on and to campus. Preliminary research uncovered a gap in services provided to students who live within biking distance of campus, but do not have access to a bicycle. My research also revealed that a bicycle library, which facilitates long term bicycle rentals, would fill this service gap. Pursuing this finding, my project morphed into developing a plan to establish a bicycle library at the UW. I began this process by grounding myself in literature, conducting case studies on bicycle libraries, and unpacking the success and failures of bike-share schemes. Next, I reached out to the UW community in order to conduct interviews, expand my research, and establish campus partnerships. After compiling my research, I developed a bicycle library program, conducted a cost analysis and applied for a $25,000 grant through the Campus Sustainability Fund. As a result of funding from the CSF, and coordination between; UWild, EcoReps, UW Transportation Services, and UW Sustainability, “Cycle Pack” bicycle rentals will be available to student starting in the Fall of 2017. While the program I have developed provides a detailed plan for implementation and operation, Cycle Pack’s success will depend on its ability to adapt over time and the collaboration between the program’s supporting organizations and departments.

Introduction

University of Washington students have access to several cycling services on campus; UWild provides low cost bicycles for day and weekend use as well as bicycle programs and classes; [1] Pronto bike-share is intended to offer users bikes for 30-45min trips between two bicycle hubs;[2] and the Bike Shop provides low cost bicycle repair, parts and free maintenance classes. [3] These types of programs offer valuable services but fail to provide feasible solutions for students who do not have access to a bicycle but could feasibly commute to campus by bike. This gap in service is detrimental to the University's commitment to encouraging sustainability on campus and to the students who would benefit from being able to bike to campus if the option was made more accessible to them.

Through my preliminary research and literature review I found that a large barrier to biking is simply having access to a bicycle. For my senior project I targeted UW students who don not have access to a bicycle, but could reasonably commute to campus by bike. Through researching the context of the University of Washington, examining the University's commitment to sustainability, and the sustainability of cycling, I piece together an argument for why the UW needs to invest in additional programs in order to promote cycling on and to campus. Once the need for a new program is flushed out, I proceeded to examine the decision to cycle in order to create a tool set which I can use to analyze both the type of program the university could best benefit from, and the optimal features included in that program. After my toolset is assembled I look into the history, advantages and disadvantages of the most prominent form of bike program, bike share. Next I argue for the advantages of a bicycle library program with respect to bike share and in the context of the UW. With the argument for a bicycle library in place, I then proceed to compile and review case studies and available literature on bicycle libraries In order to lay out an array of potential features that a University of Washington Bicycle Library could adopt.

With the majority of my research completed I moved in the next step in the project; forming campus partnerships, and developing a program for a university of washington bicycle library. Through several discussions, the first partnership I made was with the assistant director of UWild, Matt Jensen. Matt agreed to UWild handling the storage & maintenance of a 20 bicycle fleet. He also agreed to take on the administrative duties of the program such as facilitating rental transactions, and reviewing applications to the program.

In addition to UWild, I also created partnerships with EcoReps, UW Sustainability, and UW Transportation services. The roles of these organizations is flushed out in the Operations Manual for the program. The Operations manual I developed is meant to be a living document that can be updated as more information is compiled and programmatic changes need to take place. This document has been compiled from the research developed in my literature review, conversations with bicycle specialists on the UW campus, suggestions from the Campus Sustainability Application Review Committee, and discussions with the organizations partnering with Cycle Pack.

[1] UWild, 1.
[2] Pronto, 1.
[3] ASUW Bike Shop, 1.

As the program started to piece itself together I shifted my focus to identifying funding sources. From the beginning of this project I had intended to apply for a grant through the Campus Sustainability Fund (CSF), and through my analysis of the case studies I compiled, a large portion of university bicycle libraries used the same method to jump start their programs. In order to apply for a grant from the CSF there are several steps; first submission of a letter of intent explaining the purpose of the proposed project as well as how the project aligns with the CSF goals/requirements. Feedback is given when the LOI is approved or denied. Next the full project proposal must be completed. As part of the full proposal a cost analysis must be compiled in order to demonstrate how the money distributed will be spent. Along with the final proposal, project approval forms must also be submitted. PAFs are a formal agreement with the partnering organizations in order to prove that they support the project. The final step in the CSF application process is to present to the CSF application review board and then await project approval or denial.

On June 2nd, 2017, I was alerted that my application to the CSF had been excepted. I had applied for a grant for a little more than $25,000 in order to obtain a fleet of 20 bicycles equipped with lights, fenders, and ULocks. The grant will also cover the maintenance and marketing of the program for the next 5 years. With the approved funding, I plan to start the summer advertising campaign for the new program as well as opening the application for Fall 2017 rentals. Over the course of this Summer there will be a lot of work to do in ordering the new bicycle fleet, associated components, as well as branding the bicycles, formalizing the orientation process, and ensuring all the liability documents are in order for bicycle checkouts to take place.

Literature Review

University of Washington Context

The University of Washington is committed to sustainability. According to the Sustainability Tracking, Assessment and Rating System, in the Fall of 2015 the University of Washington "received a gold rating, with a score of 77.47 percent." [4] The UW's score is the best among Pac-12 universities which have submitted a STARS report, and the third-highest of the 252 currently rated schools." [5] The UW received a 6.07/7[6] in transportation sustainability. The entity running the system,The Association of Advancement of Sustainability in Higher Education, states, "From its award-winning U-PASS program, to a more sustainable fleet, and to bicycle and pedestrian programs and facilities, this office truly enables the University to operate in a more sustainable way." [7] The University of Washington is clearly dedicated to transportation sustainability measures, but as the campus continues to grow, more needs to be done to encourage active transportation for students and staff commuting from surrounding neighborhoods.

According to the University of Washington Transportation Report of 2014, Figure 36: "Mode Share of All Trips Taken to Campus in a Seven-Day Week—All Respondents" show that the majority of student, 41.5%, use transit, followed by 39.6% that walk, 7.3 that drive alone, 5.8% that bike, and 4.4% that either carpool or vanpool.[8] This data demonstrates a preference for bussing and driving. Nearly 50% of student commuters choosing an active transportation mode isn't bad in the context of America. In 2009 the percent of bicycle commute trips made on average by the US was 0.5%. [9] Putting this in perspective, the country with the highest bike modal share in 2009 was the Netherlands. 26% [10] of their trips were made by bike whereas the United States had only 1%[11] of trips made by bike. The University of Washington 2014 transportation report stated 6.8% [12] of trips were made by bike. This amount is substantially higher than the average for the US but pales in comparison to the average for the Netherlands.

Automobiles have a significant effect on the student experience and education provided by a university. Rodney Tolley, a professor for over 30 years and honorary research fellow at Staffordshire University in the UK, is a consultant and leader in the research of active and sustainable transportation, argues that automobiles present a ,"[disturbance] to teaching, loss of natural environment by parking provision, and health effects on staff and students." [13] It is crucial to the well being and education of students and staff that the number of automobiles on campus are reduced, Tolley suggests that universities should, "encourage modal switching to

[4] AASHE, 1.
[5] Eklund, 1.
[6] AASHE, 1.
[7] AASHE, 1.
[8] Transportation Survey Report, 68.
[9] Pucher, 10.
[10] Pucher, 10.
[11] Pucher, 10.
[12] Transportation Survey Report, 68.
[13] Tolley, 213.

environment-friendlier forms of transport, particularly public transport, walking and cycling." [14] John Pucher, a professor in the Bloustein School of Planning and Public Policy at Rutgers University, and Ralph Buehler, an assistant professor of Urban Affairs and Planning at Virginia Tech's Alexandria Center, have found that "[a] coordinated package of infrastructure provisions, promotional programs, transportation and land-use policies is the trademark of every city that has succeeded at significantly raising cycling levels and improving safety" [15] If the University of Washington wants to continue being a leader in sustainability they need to focus on developing a comprehensive active transportation strategy that focuses on more than just infrastructure.

The University of Washington has more than an ethical obligation to be sustainable. There is also a financial incentive in generating a comprehensive transportation policy. "Without a balanced functioning transportation system, many universities find that they are spending more resources each year on transportation-related facilities and services." [16] There are many positive indicators that increasing cycling funding will be well received by commuters. The New Jersey Bicycle and Pedestrian Research Center has found that, "[while] the largest increases in the number of cyclists have typically occurred in cities, NJDOT and the TMA's understand that universities and college towns are also becoming hubs of cycling culture, where it will continue to be important for local officials to provide adequate facilities for cyclists." [17]

In the next sections we will be unpacking why cycling is appealing to college students but a couple of key components are that, "[bicycles] have low access costs, moderate travel speeds and provide flexibility in departure time compared with transit modes." [18] There are also some aspects of cycling that indirectly improve the student experience including, "Improved cognitive functioning and educational attainment among young people who are physically active." [19] These features are mutually beneficial to the students and the University who have a shared goal of education. In the following sections we will look deeper into the sustainability of cycling, the choice to cycle, and why a bicycle library would be a beneficial addition to the University of Washington's transportation strategy.

Cycling Sustainability

Barbara C. Richardson, a research scientist for the UM Transportation Research Institute, defines a sustainable transportation system as, "one in which fuel consumption, vehicle emissions, safety, congestion, and social and economic access are of such levels that they can be sustained into the indefinite future without compromising the ability of future generations of people throughout the world to meet their own transportation needs." [20] In order to analyze the sustainability of cycling we can use this definition to look at the environmental (consumption and emission), safety, efficiency (congestion), social, and economic components of cycling.

[14] Tolley, 214.
[15] Pucher, John, City Cycling, 351.
[16] Daggett & Gutowski, 45.
[17] NJ BPRC, 1.
[18] Akar & Clifton, 165.
[19] Garrard, Rissel & Bauman, 37.
[20] Richardson, 27.

Environment (Consumption and Emission)

John Parkin, a professor of Transportation Engineering at London South Bank University, states, "Few could argue coherently that cycling is not one of the more sustainable modes of transportation currently available to humankind: It produces little green house gas relative to motorized transport, emits virtually no air pollution and is nearly noiseless." [21] John highlights the environmental advantages of cycling in terms of its minimal CO2 emissions, air and noise pollution. Barbara C. Richardson, a research scientist for the UM Transportation Research Institute, elaborates on the need to reduce greenhouse gas emissions arguing, "The environmental consequences of climate change, which include sea-level rise, degraded air quality, and extreme weather events, affect human health both directly and indirectly." [22] Tolley adds that there are several more variables bicycle transportation can aleve, including, "water pollution, land take, community severance, wildlife disturbance, noise and vibration, resource use and waste disposal." [23] Transportation is an environmentally taxing result of urban life but it can be mitigated through the the use of bicycles. On a university campus, the environmental advantages of bicycles have cascading effects on the health of the students/faculty/staff, quality of education, and beauty/experience of campus life. These effects will be elaborated on in the *Social* section.

Safety

Cycling is often passed up because of fears associated with sharing the road with vehicles. Jan Garrard, a professor in the School of Health and Social Development at Deakin University, and Adrian Bauman & Chris Rissel, professors in the School of Public Health at the University of Sydney, write about this barrier, "The flip side of the enjoyment of cycling is the psychological distress associated with the actual and perceived risks of cycling in traffic." [24] The risk presented is a barrier to cycling but as, Susan A. Shaheen, a professor in Civil and Environmental Engineering at UC Berkeley and co-director of the Transportation Sustainability Research Center, Stacey Guzman, a research associate, and Hua Zhang, a supporting author, claim, "having more cyclists on the road improves motorist behavior because drivers become more aware of cyclists and are less likely to collide with them." [25] This statement demonstrates that the safety of cycling increases as more cyclists take to the street. Through nothing else but encouraging cycling, the safety of cycling increases, and the door is opened to cyclists who previously felt the road was unsafe. In the university context, increasing the road safety on campus is crucial to not only preserving the lives/well being of students/faculty/staff, but it can also contribute to the experience of being on campus. By encouraging cycling, a campus can calm the roads traveling through and around campus contributing to a less stressful and more pleasant campus experience.

[21] Parkin, John. *Cycling and Sustainability*, 4.
[22] Pucher, John, City Cycling, 45.
[23] Tolley, 213.
[24]Garrard, Rissel & Bauman, 39.
[25] Shaheen, Guzman & Zhang, 184.

Efficiency

A common critique of bicycles is that they slow down the flow of traffic. There is some truth to this as the speed of a cyclists is much less than that of a vehicle, but there are some strong aspect of cycling and methods of supplying infrastructure for bicycles which turn this argument on its head. In a transportation network which forces drivers and cyclists to share a lane, the flow of traffic will ultimately be slowed. However, there is an inherent advantage to road use efficiency that bikes have over other road users, their size, "Cycling has the potential to reduce roadway congestion because bikes take up a small fraction of the space needed for the use and parking of cars." [26] Not only do bikes allow roads to be more densely utilized but at the end of trip, bicycles have dense storage capabilities that dramatically reduce the amount of land needed provide parking. So while bikes are unable to travel at the speeds that automobiles can, they are vastly more efficient in their use of the road. Supplying protected bike lanes cater to both automobiles and cyclists as they provide a space for cyclists on the road, and reduce the number of car users in the network. Even without supplying this additional layer of infrastructure, there is still a huge advantage to having cyclists over additional vehicle users. In urban areas we already face large congestion problems because the capacity of our network cannot handle the number of vehicles users.

I would argue that the congestion caused by cyclists in comparison to automobiles has little to a net negative effect on the congestion of our urban transportation networks. For decades we've operated on the concept of expanding our roads to decrease delays, but transportation planners can predict within a 20 year timespan when the congestion will become as bad and typically worse than before the infrastructure change. Therefore, instead of fixating on vehicles to solve congestion problems, we need to reexamine what other modes are available and how we as a society can surpass our obsession with the idea that the single occupancy vehicle is convenient. Building bike lanes and tweaking public transportation systems is a natural evolution for our current system. One major roadblock to this speed of this transition comes from social behaviour. While not ideal, encouraging new ridership on existing infrastructure is crucial to building support for eventual infrastructure changes.

In the university context, traffic created from automobiles and busses commuting to campus can generate major delays. Due to the fact that students, faculty and staff typically live within reasonable biking distance of campus (around 4 miles) this can contribute to problems for public transportation systems as busses can become clogged up by large amounts of users in this dense area of use. Increasing levels of cycling ridership can alleviate the stress on public transportation and the resulting congestion that occurs in the network around the university. The users that choose to cycle will also be benefited by the fact that most campuses have ample, free bicycle parking on campus. As i've already explained bicycle parking has huge advantages over the price of, and time needed to find, vehicle parking. As cycling increases, the University will also benefit from being able to develop and reclaim the valuable land set aside for vehicle parking.

Social

[26] Pucher, John, City Cycling, 1.

There are huge social benefits to bicycle commuting due to the low economic barrier to bicycle ownership, improved mental and physical health from using a bicycle, and the community formed through the social nature of cycling. The cost point of cycling "contributes to social inclusion because it provides an affordable and convenient form of personal mobility that is accessible to people who do not own or have access to a motor vehicle." [27] Besides walking, the bicycle is arguably the most equitable mode of transportation. Unfortunately, due to social customs and infrastructure improvements being concentrated in densely populated urban areas, cycling growth has mainly occurred in middle to upper class areas. This has generated some race based problems for the cycling culture in America as well as put into question the equitable nature of cycling.

Another positive social feature of cycling is the health benefits associated with active transportation. Both mental and physical benefits have been linked to increased exercise and correspondingly cycling. For example, Pucher states that, "decreased physical activity from reductions in the use of non-motorised means of transportation as a result of increased car use due to urban sprawl corresponds with a greater incidence of cardiovascular ill health." [28] In addition to increasing one's cardiovascular health, active transportation can help decrease obesity, especially among children who have increasing been confined inside and subject to planned activities as the fear of urban life has made parents wary of allowing their children to navigate their neighborhoods by themselves. There has also been a lot of research on the psychological benefit of regular exercise. Commuting by bicycle is an easy way to provide consistent exercise, "Utilitarian cycling provides a practical means for inactive people to be active for thirty minutes per day." [29] This consistent exercise, "improves depressive symptoms in people with depression," [30] and "long-term regular physical activity, including walking, [is] associated with significantly better cognitive function, less cognitive decline, improved motor function, improved memory, and a decreased risk of Alzheimer's disease."

In addition to health and equity benefits, communities that adopt forms of active transportation as their primary form of mobility, will eventually morph their urban neighborhoods into human scale environments. In human scale environments, amenities are accessible without the need for automobile, social interactions are more common, and citizens have a deeper connection to place. "Human-scale urban environments that support cycling and walking and discourage car use can improve social interactions and increase community attachment, livability, and amenity." [31] The social aspects stemming from cycling are extremely beneficial to the urban environment, happiness of communities, and a crucial incentive in fostering an increase in bicycle ridership.

Economic

[27] Garrard, Rissel & Bauman, 41.
[28] Parkin, John. Cycling and Sustainability. 6.
[29] Garrard, Rissel & Bauman, 32.
[30] Garrard, Rissel & Bauman, 37.
[31] Garrard, Rissel & Bauman, 40.

Bicycle infrastructure is extremely affordable, resilient, and condensed when compared to infrastructure necessary for automobiles. For example, "Portland, Oregon—one of North America's most bicycle friendly cities—recently announced that their city's entire bike infrastructure cost less than one mile of freeway. Specifically, the estimate was for a total cost of US $52m, or about the cost of a single freeway interchange in Calgary."[32] The Bike Calgary nonprofit also found when looking at City expenses, that transit commuters individually cost the city $2500, car commuters $800, and bicycle commuters $400. [33] In order to make automobiles affordable, our country provides huge subsidies, "Cars enjoy huge direct subsidies in the form of road construction public parking spaces, as well as indirect subsidies to the oil industry that provides their fuel. These subsidies far exceed the tax revenue generated by car use." [34] Gulsah Akar, an Associate Professor at the Knowlton School of Architecture, and Professor of Civil and Kelly J. Clifton, a Professor of Environmental Engineering at Portland State University argue, "as long as car use remains cheap and transportation policy remains dominated by motorized modes, bicycles will continue to be used primarily for recreation and not for daily urban travel in the United States." [35] In the university context, providing the infrastructure necessary to accommodate single occupancy vehicles is extremely expensive, "The costs of providing parking facilities include the salaries and associated overheads for car park attendants; the administration costs; the asset value of land used for car parking; the taxes paid on the car parks and the maintenance and repair costs for them; and fees and other payments to clamping companies." [36] After reviewing the costs associated with the automobile and economic benefits of bicycles, it is clear that it would be financially, and environmentally irresponsible, for a university or a city, to ignore the benefits of encouraging an active transportation mode like cycling.

The Choice to Cycle

Robert J. Schneider, an Associate Professor in the Department of Urban Planning at the University of Wisconsin-Milwaukee explains, "Awareness and availability, determines which modes are viewed as possible choices for routine travel. The next three elements, [basic safety and security; convenience and cost; and enjoyment], assess situational tradeoffs between modes in the choice set [The final part, habit] reinforces previous choices and closes the decision process loop." [37] Through this model set up by Schneider, we will analyze how these variables influence the decision to cycle on a college campus.

Awareness + Availability

[32] "Bike Calgary," 1.
[33] "Bike Calgary," 1.
[34] Folbre, 1.
[35] Akar & Clifton, 165.
[36] Tolley, 214.
[37] Schneider, 129.

The first rung in the decision loop established by Schneider is awareness of and availability to the activity. In this case, awareness of bicycle uses and access to bicycles. Having access to a bicycle is a crucial first step to using and adopting a bicycle into the university culture, "In order to commute to class by bicycle, students must first own or have access to a bicycle." [38] In a cyclical nature, there will be no demand to obtain a bicycle if people aren't aware of the recreational or commuting uses of a bike. One method for increasing awareness around cycling is simply to have more bicycles on the road, "A stronger bicycle presence can contribute to an overall acceptance of bicycle use for trips that are not solely recreational but also more practical." [39] In addition to simply having more bicycles on the road, universities have several tools available to them in order to increase awareness, "to encourage biking on college campuses is to nurture and promote a culture of cycling. This can be accomplished through the formation of bicycle organizations and clubs and the holding of bicycle-related events." [40] One of the benefits of focusing on increasing cycling in a university setting is that universities function much like highly homogeneous small cities. This is beneficial because,"tighter social networks often present in smaller cities [increase the] chance of [cyclers] influencing others to bicycle as well." [41] Awareness and access are the cornerstones for an individual to determine whether cycling is a possibility for them. While awareness and access are necessary components to consider in the choice to cycle, these next sections will look into the other psychological factors that affect the desire to cycle after this initial requirement is fulfilled.

Safety + Security

A huge concern when considering biking is the safety of sharing the streets with automobiles, "An individual's perception of safety can be an enormous obstacle preventing them from bicycling. Many novice or casual cyclists would prefer not to ride with traffic, especially on busy roads, because of such safety concerns." [42] As I've already brought up in the safety section, much of the concern surrounding using the roads decrease as more cyclists take to the streets, but in order to get bikers on the streets in the first place, "It is essential for colleges to provide educational programs and resources to students not only to promote cycling in a university setting, but also to ensure that students are riding safely." [43] Through educational and advocacy programs, the perceived safety of cycling can begin to align more accurately with the actual safety of the streets and encourage higher bicycle ridership.

Convenience + Cost

John Parkin's argues that in order to effectively encourage new cyclists, "Cycle promoters need to focus on the bicycle as a highly efficient means of transport, and not reduce it to a second-best remedy for obesity or climate issues." [44] While the environmental and health benefits

[38] NJ BPRC, 1.
[39] Shaheen, Guzman & Zhang, 184.
[40] NJ BPRC, 1.
[41] Pucher John, City Cycling, 259.
[42] NJ BPRC, 1.
[43] NJ BPRC, 1.
[44] Parkin, John. Cycling and Sustainability, 267.

of cycling are positive, these elements are not the primary concerns for the typical user who is much more interested in the easiest, most efficient way to get to their destination. When people make transportation choices they tend to focus on the most convenient mode that, "requires less time, effort, and money," as well as modes, "that involve less cognitive effort to use [and allow] adequate personal space and personal control over travel movements." [45] In terms of convenience and cost, driving is expensive, vulnerable to delays caused by traffic, and during the trip the driver must navigate stressful situations such as finding parking at the end of the trip, sitting in stop and go traffic, and anticipating the movement of others on the road as well as pedestrians crossing the street. In light of its negative aspects, driving does give the user control over their travel movements, personal space, and offers the user freedom to depart on their trip whenever they want. Using the bus has some advantages over driving. Users who bus pay drastically less than drivers and do not have to consider end of journey parking. However, John Daggett AICP a planner working for the Fort Collins, Colorado Transportation Planning Department, and Richard Gutkowski P.E Ph.D, a professor in the Department of Civil Engineering at Colorado State University, worked together on the University Transportation Survey Research, point out that, "One of the primary complaints often heard about transit and often used as an excuse not to ride transit is convenience. Simply put, it is less convenient to use transit because it does not come close." [46] In addition to location of bus stops, bus users are restricted to fixed routes, time schedules, and depending on the capacity of the bus, they might have to give up their personal space. Bussing is also an extremely slow mode of transportation as it is subject both to the number of stops it must make, as well as the typical congestion of the roadway that all road users are subject to. In some situations bus speed is increased by providing bus only lanes, but this factor doesn't ensure that the mode will be any faster, or even as fast as driving.

In contrast to driving and busing, cycling; is extremely inexpensive; gives users control over their movement; in many situations, allows users to bypass vehicle traffic; and requires much less energy than is perceived. There are several elements that make cycling inconvenient, weather, distance and topographical features. Daggett & Gutowski state that, "weather often forces walkers and bicyclists onto transit buses." [47] Unfortunately even dedicated cyclists with rain gear and fenders are swayed onto buses in poor conditions. However, providing cyclists amenities at the end of their trip can encourage cyclists to push through the bad conditions, "The availability of lockers that allow individuals to store extra clothes and change if needed and showers provide cyclists with what may be a necessary amenity after a long ride on a hot day." [48] The strategy of providing showers and lockers to cyclists allows users to refresh and encourages cyclists to persevere through mud and rain, as well as the sweat produced navigating the distance or topographical features of their routes.

In the university context, students and faculty typically live in close proximity to campus, "In many universities, nearly all of the students and many, if not most, staff live within reasonable cycling distances, accepted as 8 km or 30 minutes." [49] Due to the close proximity to campus, as well as the bike's economic appeal, cycling is a very popular activity on college campuses,

[45] Schneider, 131.
[46] Daggett & Gutowski, 46.
[47] Daggett & Gutowski, 46.
[48] NJ BPRC,1.
[49] Tolley, 215.

"[Cycling] is often more visibly used in locations with college campuses, where these advantages appeal to younger and more cost-conscious students, who tend to live near campus." [50] As i've demonstrated, cycling has many advantages over other modes. The low cost and high convenience of cycling in the university context are two beneficial aspects when it comes to encouraging cycling at the UW.

Enjoyment

Enjoyment is a key factor in a user's choice to start or continue an activity, "psychological factors such as relaxation, stress reduction, fun, enjoyment, and social interaction are among the key self-reported motivations for commencing and continuing cycling." [51] This component in the decision to cycle deals with the personal experience of cycling and can be influenced by the positive and negative features stemming from social, environmental, and physical variables. "People seek to travel to activities using a mode that provides them with personal physical, mental, or emotional benefits; helps them achieve social status; or makes them feel good about benefitting society or the environment." [52] As discussed in the above sections we see there are some major advantages to cycling over other modes and these advantages contribute to the overall enjoyment of the activity. From mental health benefits caused by physical activity and social interaction to the freedom allotted through control over travel movements, there there are plethora of positive psychological advantages lending to the enjoyment of cycling. The enjoyment of cycling is a crucial tool that can be used to market and advertise cycling in college settings where students can use bicycles to find community and alleviate stress induced by an academic setting.

Habit

Habit is the final element that influences a user's choice to cycle. This element is fickle as it is both a variable preventing the adoption of the bicycle and the element that produces committed cycling ridership. One reason this variable is so influential is because, "[as] people develop routine choices, they may not consider as much information about other possible modes." [53] Habit has the power to blind users from considering other modal choices despite the advantages they might deliver them. Car users for example may choose to continue commuting through an hour of traffic each day rather than take the light rail which would cut their travel time in half, "[There] are substantial numbers of people who do not optimize their travel behaviour, even where information is reasonably readily available. The seductive nature of car commuting encourages many to continue car commuting despite objectively changed circumstances of congestion and parking difficulty." [54] However this feature is also at play with committed bike users who persevere through the rain and cold in order to maintain their routine and perceived physiological advantages of the activity. Habit may be one of the most influential variables to encouraging higher bicycle ridership,

[50] Akar & Clifton, 165.
[51] Garrard, Rissel & Bauman, 38.
[52] Schneider, 132.
[53] Schneider,132.
[54] Tolley, 217.

"as people start cycling, their attitudes toward cycling become more positive and their perceptions of various personal and external barriers change. This finding suggests that although the majority of people have never considered cycling, there is a group of people who could be persuaded to cycle and would like cycling and continue to cycle." [55] Cycling may not be the best mode for every user, but as highlighted in the positive physical, mental, and environmental advantages of cycling on and to college campuses, there are many untapped users who simply haven't been able to break free of their habits and expose themselves to this alternate transportation mode.

In context of the university, it has been found that habits can be broken during significant life changes, "Mode choice habits may be interrupted and reconstructed when people experience significant life changes, such as having children or retiring from work." [56] David Hembrow a leading British cycling advocate states that, "If we don't 'get them when they're young', i.e. at the age when the affordability and freedom offer a unique combination then we must instead try to convince older people to take up cycling when they've already formed a habit of travelling by other means and when they can more easily afford other means." [57] David is arguing that young users are the most influential users to influence to cycle because of the advantages specifically applicable to them and their lack of fully formed habitual activity. I would argue that an individual's transition to college produces a renaissance of the type of user David describes.

When transitioning to college students are, independent of their parents for the first time, economically disadvantaged and living in a new location. Due to these features college is an extremely influential period of an individual's life and a perfect opportunity to encourage healthy habits like bicycle ridership. The University of Washington, as an educational institution with a desire to encourage sustainable behaviours has a gigantic opportunity to not only increase ridership on campus, but to form habitual cycling behaviour that will persist post graduation. Encouraging cycling before graduation has a long term effect on a user. Post graduation a student who was exposed to cycling will think critically about their commute to work and consider the ability to cycle as a huge perk when making housing choices.

Bike Share and Bicycle Libraries

In the previous sections we have looked into the University of Washington's context, why cycling aligns with the university's dedication to sustainability, and the variables that influence a user decision to cycle. In this next section we are going to examine why a bicycle library program could be a beneficial addition to the university's already extensive bicycle infrastructure and cycling programs. Specifically I am going to be looking at the advantages and disadvantages of a bicycle library over the dominant bike sharing programs that have become popular on many college campuses and in many cities across America.

History of Bike share

[55] Akar & Clifton, 166.
[56] Schneider, 132.
[57] Hembrow, 1.

Bike share emerged out of a desire to increase bicycle ridership by providing public use bicycles at little to no cost. The first bike share program "began on July 28, 1965, in Amsterdam with the Witte Fietsen, or White Bikes." [58] Since the implementation of this program bike sharing has morphed as incremental decisions were made to improve the implementation of bikeshare. Amsterdam's Witte Fietsen is considered an example of a first generation bike sharing program in which, "the bicycle is the main program component. Other distinguishing characteristics of first generation bikesharing include that bicycles usually painted one bright color, unlocked, and placed haphazardly throughout an area for free use." [59] This first generation bike sharing concept is similar to a bike library in the freedom of users to use the bicycles to commute anywhere they wanted to, but unlike a bicycle library, users are not responsible for the care of the bicycles or able to rely on a bike being available to them when they desire to use one. Because of these features, and the risk of theft and vandalism, first generation bicycle libraries have been largely unsuccessful. In order to prevent these problems, future generations of bike share systems have grown increasingly monetized and utilize designated bicycle parking hubs in order to help fund the programs, ensure return the of bikes, and decrease vandalism.

In the second generation of bike share, the main components were, "(1) distinguishable bicycles (usually by color and special design); (2) designated docking stations in which bikes can be locked, borrowed, and returned; and (3) small deposits to unlock the bikes." [60] This system attempted played with the zero cost nature of the previous generation by requiring a deposit that would be refunded when the bicycle was returned to the docking station. However this was also susceptible to theft and did not guarantee availability of bikes as there was no rental time limit and bikes could become concentrated at bicycle hubs in high use areas, "These systems do not issue a time limit for bicycle use, which means that bikes are often used for long time periods or not returned at all." [61] The second generation deposit based payment model has been adopted in some bicycle library programs in order to ensure return of bicycles. This payment model is something I'm considering including in the UW bicycle library program in order to keep costs down for the users and provide a safety net for the program in case of damage or theft of bicycles.

The third generation of bike share solves the problems of second generation bike share largely by using debit/credit cards to check out bicycles. This use of debit/credit cards holds users accountable for their rental and discourage them from using bikes for long periods of time through fees related to rental duration, "The main components of] third-generation bikesharing programs are (1) distinguishable bicycles (color, special design, and/or advertisement); (2) docking stations (e.g., flex or fixed station); (3) kiosk or user interface technology for checking bikes in or out; and (4) advanced technology (e.g., mobile phone, magnetic strip cards, smartcards)." [62] Along with the benefits associated with being able to charge and identify users, the second generation bike share makes strides in marketing, integration with 21st century technologies, and flexibility in hub locations. In the UW bicycle library system, the marketing component is particularly intriguing as a source of additional funding.

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[58] DeMaio, 42.
[59] Shaheen, Guzman & Zhang, 186.
[60] Shaheen, Guzman & Zhang, 187.
[61] Shaheen, Guzman & Zhang, 187.
[62] Shaheen, Guzman & Zhang, 189.

In the fourth, and most recent generation, the main components, "are the bicycle, docking station, kiosk/user interface, bicycle distribution system, and linked public transit smartcard." [63] This generation is an expansion of third generation with two main differences. First, bicycles are shuffled between docking stations in order to ensure an even distribution across the network, and second, a city's public transportation card is integrated into the bike share scheme to make it easier to use the system. Pronto bikes share is an example of a hybrid third and fourth generation system. Pronto utilizes all the features of the third generation in addition to a distribution system that keeps the network balanced.[64]

Third and fourth generation bike share systems have become extremely popular, "Today, more than 600 cities around the globe have their own bike-share systems, and more programs are starting every year." [65] The growth of bike share provides expanding case studies that help us understand how to make the program successful,"Although other cities' examples can serve as useful guides, there is no single model of bike-share." [66] As bike share spreads and is adopted into new cities with unique climates, geographies and people, the diverse contexts of these cities generate innovative new applications of bikeshare, " Each city has made bike-share its own, adapting it to the local context, including the city's density, topography, weather, infrastructure, and culture." [67] Ultimately the success and failures of every nuanced bikeshare will help inform the next generation of bikeshare and continued innovation.

Purpose of Bike Share

Bike sharing serves an important service by supplementing other modes of transportation, "Bike-share fills that critical gap between the station or stop and the final destination for the passenger." [68] By providing a link from one mode, to a bikeshare system, the transportation network grows and in particular bike share can make public transportation system more accessible while simultaneously encouraging bicycle use, "Bikesharing offers a transportation alternative to increase bicycle use by integrating cycling into the transportation system and making it more convenient and attractive to users." [69] Looking specifically at bicycle use, "Bike-share offers an easy way into cycling for people who may have been prevented from cycling by a lack of access to a bike or bike parking." [70] While bike sharing programs provide bikes and typically, guaranteed parking spots, bikeshare systems put limitations on the users as their purpose is to provide short term usage of bicycles for daily commutes, "This flexible short-term usage scheme targets daily mobility and allows users to access public bicycles at unattended bike stations." [71] As a result bikeshare does a good job of getting someone from point A to point B within a predetermined network on bicycle hubs.

[63] Shaheen, Guzman & Zhang, 204.
[64] Pronto, 1.
[65] Cohen, Simons, Martignoni, Olsen, & Holben, 10.
[66] Cohen, Simons, Martignoni, Olsen, & Holben, 10.
[67] Cohen, Simons, Martignoni, Olsen, & Holben, 10.
[68] Cohen, Simons, Martignoni, Olsen, & Holben, 14.
[69] Shaheen, Guzman & Zhang, 183.
[70] Cohen, Simons, Martignoni, Olsen, & Holben, 16.
[71] Shaheen, Guzman & Zhang, 183.

Difficulties of Bike Share

Bike sharing benefits users, "[by] addressing the various aspects of bicycle ownership, bikesharing programs encourage cycling by providing hassle- and maintenance- free bicycle access." [72] These features are beneficial in encouraging bicycle ridership, however, there are several compromises in the nature of bikeshare systems that limit the ability of bike share systems to reach user who would consider using them. The most restraining feature of bike sharing systems is their dependence on the bicycle hub model. Because bike share systems rely on station hubs, "consistent coverage through uniform station density, or at least a minimum station density everywhere, is critical to creating a system that users can truly rely on to go anywhere in the city." [73] The limiting nature of the bicycle hub means bike share systems must not only be dense but vast in order to make a bicycle commute convenient and accessible to users. This has been a consistent problem with the implementation of bike share systems as, "[many] bike-share systems concentrate stations in high-demand 'destination' areas, while neglecting station coverage in lower-demand, residential areas. However, a significant portion of trips in most cities occur in low-density areas of a city." [74] Through neglecting low demand residential areas bike share faces huge barriers in reaching users in arguably more bikeable areas. In the american context where high density urban centers are surrounding by large expanses of single family housing, a link between these two worlds becomes crucial. Without a hub in both areas, bike share systems exclude a large portion of users who commute to the urban centers for work and pleasure, and retreat back to their single family housing at the end of the day.

Another huge problem with bike share systems is that there is a very small, if existent, profit margin, "bike-share systems are not large profit centers, the business model more closely resembles that of public transport than the models used for toll roads and parking management, which can often be unsuccessful when applied to bicycle sharing because of the difficulty of obtaining a return on investment." [75] The primary reason bike share systems are financially unstable stems from the requirement of a vast, dense, network of bicycle hubs required to reach potential users. This feature of bike share demonstrates why American cities have been slower to adopt bikeshare than European countries where medium-high density development patterns make bike share networks much more efficient and easy to implement.

In the context of the University of Washington, bikeshare on campus makes a lot of sense, "Unlike other areas in modern communities, universities are surrounded by densely populated residential area in which a large proportion of students, and even faculty and staff, reside." [76] As a university, the UW, has dense network of users living within biking distance of a central destination. This means that the problems faced in typical American cities do not apply in the University context. Unfortunately, because the UW reside in Seattle we are subject to a helmet law which greatly increases the cost of a bike share program. Due to the helmet law, a bike sharing system must either require users to use their own personal helmets, or provide every user with a helmet. Both scenarios create issues. Requiring users bring their own helmets destroys the

[72] Shaheen, Guzman & Zhang, 184.
[73] Cohen, Simons, Martignoni, Olsen, & Holben, 55.
[74] Cohen, Simons, Martignoni, Olsen, & Holben, 55.
[75] Cohen, Simons, Martignoni, Olsen, & Holben, 88.
[76] Daggett & Gutowski, 42.

principle of accessibility that bike sharing is built off of, and is not easily enforceable meaning students may ignore the helmet requirement and put themselves in physical and legal danger. This liability may also fall back on the program if not enough had been done to ensure users wear their helmets. Providing helmets to users also comes at a huge material and distribution cost, "If each bicycle needs a helmet, there must be a system to distribute the helmets, as well as to prevent loss or theft [...] Users may be reluctant to use a helmet worn by someone else [...] Users will not necessarily use a helmet, and if the do, they may not return it, since there's no way of attaching it securely." [77] Due to Seattle's bicycle helmet laws, implementation of a bike share system becomes excessively expensive and complex.

Bicycle Libraries

Compared to the expansive literature concerning bike share systems, the information available concerning bicycle libraries is very thin. I have struggled in my research to find peer reviewed literature on bicycle libraries. In order to traverse the gap in literature, I will attempt to unpack what a bicycle library is by comparing and contrasting several publicly and university sponsored bicycle library programs including; Cykelbibliotket in Malmö, Sweden, The Iowa City Bike Library, Arcata Library Bike, The University of California, Santa Cruz Bike Library, University of Kentucky's Wildcat Wheels & Blue Big Cycles, University of California, Los Angeles' Bruin Bikes, University of Wyoming Pokes' Spokes Bike Library, The University of Oregon Bike Rental Program, and Oregon State University's Beaver Bikes.

After reviewing these programs I have found that bicycle libraries, similar to bike share systems are aimed at encouraging bicycle ridership. Unlike bike share systems, bicycle libraries typically do not attempt to make the use of the bicycle more convenient by taking care of all the repair and maintenance work. I say typically because the bike share in Malmo, Cykelbibliotket is modeled around a luxury model of short term bicycle rental. The services provided by Cykelbibliotket are aimed at providing the user a high quality cycling experience for a relatively short period of time, two weeks[78]. The time frame prevents the need for users to perform maintenance in this time and makes repairs very unlikely. While the time period for this bicycle library is much shorter than the majority of programs I looked into, Cykelbibliotket has the same end goal, encouraging users to purchase a bicycle for individual use after experiencing the benefits of bicycle ownership. The distinction of encouraging bicycle ownership is primarily what separates bicycle libraries from bike share systems.

Bicycle libraries are essentially long term bicycle rental programs. Bill Burton, a pioneer in bicycle libraries, and the creator of Arcata's Library Bike program states in his book, *Anybody's LibraryBike Book,* "A bike library is a place where people can borrow bikes like borrowing a library book. They can borrow the bike for a significant amount of time and can get an operable bike with air in the tires that is ready to go immediately." [79] Low access costs, and long rental period means that bicycle libraries are typically not built upon a profit margin, but instead, on a mission to expand bicycle ridership. This explains why, with the exception of the swedish bicycle library, there

[77] Cohen, Simons, Martignoni, Olsen, & Holben, 79.
[78] Berséus, 1.
[79] Burton, 1.

are not for-profit business models established around bicycle libraries, and why bicycle libraries are typically implemented by universities and non-profits. The lack of capitalist involvement in these programs would also lend to why literature surrounding bicycle libraries is hard to come by. In the next sections we will focus specifically on university bicycle libraries and how features from other university programs advance the central purpose of bicycle libraries (i.e. encouraging individual bicycle use).

University Bicycle Library Features

Length of Rental

From the Universities I researched, bicycle library rental periods range from semester/quarterly rentals up to one year. University of Kentucky's, Big Blue Cycles, was the only program that required year long rentals and this condition stemmed from the program's requirement on users to vow not to bring an automobile to campus.[80] While Big Blue Cycles required users to rent a bike for an entire year, many of the other programs I looked at did not restrict the ability of a user to renew their rental after the loan period expired. The exception to this being University of Oregon's 4 quarterly rental limit[81] and University of Santa Cruz' application process which gives priority to new users thus discouraging repeat users. [82]

When I talked to the University of Washington bicycle transportation specialist and past administrator of UO Bike Program, Ted Sweeney [83], he voiced concern that at some point you have to ask yourself, "is a bicycle library encouraging ridership or discouraging users from purchasing a bicycle." This critique helped guide my research of bicycle library programs. Addressing this concern, I found that the flexibility of bicycle libraries allows for solutions to this central problem. From what I have found there is an easy way to prevent users from abusing a bicycle library's purpose; set the rental period long enough to give the user an experience of bicycle ownership, and set limits on the number of times a user can use the system. A bicycle library is meant to give users an experience, and due to simple supply and demand, repeat users can prevent new users from having the same experience. While discouraging repeat users goes against the concept of public good, I would argue that equal opportunity is a necessary component of public goods. For this reason I think a program like the University of Santa Cruz does an effective job at making sure that new users are prioritized and the length of their rental period is conducive to encouraging repeat users to purchase a bike due to the risk they run in not getting a bike after their first rental period expires.

Cost of Rental

[80] Blue Big Cycles, 2.
[81] UO Bike Program, 1.
[82] UCSC Bike Library, 1.
[83] Ted Sweeney (January 2017).

The range of campus rental fees spanned from free to UCLA's Bruin Bikes rental fee of $65/quarter.[84] Two of the non-university programs, The Arcata Bike Library, and the Iowa City Bike Library used a security deposit based rental agreement. [85] [86] The security deposit model much like some second generation bikeshare systems is meant to supply incentive for users to return the bike upon termination of their rental agreement. The Iowa City Bike Library, and The Arcata Bike Library use this system less to encourage users to return bikes and more as a way to offset costs of the program. The Iowa City Bike Library refers to their program as a "borrow-or-buy system." [87] The borrow-or buy system only really makes sense when using refurbished bikes as new bicycles would either require large security deposits or large outside sources of funding for the program. Due to the volunteer support needed to sustain these styles of programs, they don't make a lot of sense for universities with varying degrees of support from the student body each year. The security deposit model is intriguing, however for programs that source their bicycles new, the risk associated with repairs, lost equipment, and stolen bikes pose significant loss for the program which might create a need for discouragingly high security deposits.

Theft, Loss, and Repairs

The cost of rental is meant to offset the program costs of bicycle libraries including bicycle maintenance, but what happens in the case of significant repairs, loss of equipment or stolen bicycles? In the bicycle libraries I looked at, the majority of universities also offered DIY bicycle repair shops which functioned as places students could come and learn how to perform regular maintenance and repairs of their bicycles with little to no labor costs. These repair shops often included discounted parts for users and some would even offer free repair in the event of regular use breakdowns. These services provided by the bicycle libraries reduce the cost of bicycle ownership and focus on a key educational component of bicycle ownership.

While many university and nonprofit bicycle libraries offer discounted repairs, not all of them do, and in the event that users return a bike that needs repair there is a fee charged to the user for the cost of the repairs. In order to ensure that payment is made in the event of repairs, or loss of equipment/bicycle, university bicycle libraries either require students to submit a credit card in the application process, or make it clear that the cost will fall into a student's university account much like an overdue university library book. In the case that a student fails to pay this fee in the university account model, it could restrict students from registering for classes.

Application for Bicycle

In most bicycle library programs, users can apply to get a bicycle either through a first-come- first-serve model or through a lottery. In the case that more students apply for a bike than the current supply of bicycles, the lottery comes in handy in order to distribute bicycles in a relatively unbiased way. However some universities have put stipulations on the lottery model. For

[84] UCLA Recreation, 1.
[85] Arcata Library Bikes, 1.
[86] Iowa City Bike Library, 1.
[87] Iowa City Bike Library, 1.

example The University of Kentucky's Big Blue Bikes put a stipulation that students with parking permits the previous year would get priority in the lottery as their application demonstrates a commitment to leave their car at home in exchange for use of a bicycle. [88] The first-come-first-serve and no stipulation lottery model fails to address the fact that some students could benefit more from the bicycle library than others, and in the Kentucky university's case, a university's mission in implementing a bicycle library could benefit from certain student over others.

The final model of bicycle library application I found primarily employed by UCSC Bike Library. In this model the application for a bike includes a written component describing how a bicycle would benefit a student's life. [89] In the UCSC Bicycle Library, "Recipients are selected based on their application due during the first week of each quarter. Applications include a 500-700 word explanation of why they need a bicycle, and each essay is assessed based on a guiding rubric." [90] As mentioned above the UCSC model also give preference to new users which prevents repeat users from preventing new users access to the program. This model of written application is an effective way of engaging users in the educational message of a bicycle library and a method of filtering out students who might not get as much out of the program.

Another tool that university bicycle libraries have used to both screen users and keep them safe are post application bicycle safety orientations classes, like the one offered through UK's Big Blue Bicycle program, [91] and pre-registration bicycle safety tests, like the one offered through OSU's Beaver Bike program. [92] Offering a safety test/orientation can contribute to a user's perception of safety on their bicycle, and increase the actual safety of the cyclist on the road. In response, the increase in perceived and actual safety can contribute to higher levels of cycling amongst both users of the bicycle library and cyclists in the network as a whole.

Sponsoring of the Program

The university bicycle libraries I looked into typically formed as a student, or student government project. Almost all the programs I looked at stemmed from a campus sustainability fund grant in order to start the bicycle library. Other sources of funding included parking & transportation offices, healthcare offices, administrative offices, and in some cases donations of bicycles or money from the community. One of the funding sources I found particularly suitable for a bicycle library came out of UK's Big Blue Cycles program. Big Blue Cycles partnered with the UK HealthCare, level I Trauma Center and they provided the program one hundred helmets.[93] After initial funding of bicycle libraries it is common for the programs to shift ownership from student hands over to either transportation services, or a university affiliated outdoor program. This is largely because bicycle libraries are not self sufficient and require constant outside funding sources. It is also difficult to maintain student support of a program due to fluctuating support from one year to the next and so institutional support guarantees the program will continue to run.

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[88] Blue Big Bicycles, 2.
[89] UCSC Bike Library, 1.
[90] UCSC Bike Library, 1.
[91] Blue Big Bicycles, 11.
[92] Beaver Bike Rentals, 1.
[93] Blue Big Bicycles, 7.

Another source of funding is through advertisements. While most bicycle libraries only use stickers to mark the bicycles with the logo of their program, there is an opportunity to allow companies and school programs to advertise their program/brand on the bicycles in exchange for funding. This style of advertisement based funding is very prominent in bike share systems where the center triangle of a bicycle frame often includes a board that sponsors can pay to advertise on. Advertisements can be more than just a source of funding though. By providing advertisements the bikes become more recognizable and the program appears more legitimate. These elements both deter theft and encourage ridership through increased awareness of the program.

Accessories Included with Bicycle

Locks and helmets were the only accessories supplied universally with the bicycles at the university bicycle libraries. The majority of these locks were ULocks which provide a higher degree of security than cable locks. While a Ulock was typically supplied, a couple universities advised students to also invest in a cable lock to use in combination with the Ulock. When I talked to Matt Jensen [94], assistant director of UWild adventures and former employee at the Idaho State Bicycle Library, he told me that one of the typical problems with bicycle locks was administrative key management and cost associated with students losing keys. He advised I look and see if there are any locks that would supply security without the need to manage keys. After research into bicycle locks I found two alternative products on the market, the first being combination ULocks and the second being Electronic ULocks which open through proximity to a bluetooth fob or cellphone. Some of the electronic fobs I looked into even had buttons to input a combination in case one's cellphone died.

As for the helmet, there was no one brand or style that stood out. Most Universities require helmet use, but helmet use is not mandatory at the University of Oregon and so the UO Bike Program supplies a helmet as an option to its users. [95] I think the idea of offering options when it comes to helmets might help encourage more users to use a bicycle library. While I don't necessarily agree with the idea that helmet laws keep cyclists safe, it is the law in Seattle to wear a helmet and so I envision two possible alternatives to the typical rental helmet, either buy a new helmet from the bicycle library, or bring your own helmet. One deterrent to bike share programs is having to use a helmet that someone else has worn, so supplying alternatives to this might encourage use of the library, and possibly a small source of funding for the program.

The next most popular accessories were fenders and bike lights. Fenders are extremely important for the user to be able to use a bicycle in rainy/wet conditions. In a similar manner, without bicycle lights, users are not able to legally, or safely ride their bicycle past dusk. It is understandable that not every university supply these amenities. For example a university in a geographic location that doesn't get a lot of rainfall might be able to justify not including fenders. Bike lights on the other hand can be expensive, high maintenance and from my experience, the first thing to get stolen off your bike. The main culprit in bicycle light theft is that most bike lights are not permanently fixed to a bike and so students must remember to take the lights with them

[94] Jensen (January 2017).
[95] UO Bike Program, 1.

after parking their bike. In order to justify supplying bike lights with each bicycle, programs must consider the cost of replacement, and lifespan of rechargeable batteries, and pedal powered lights.

There were several other accessories I found applied sporadically across the university bicycle library programs. These accessories included, racks, baskets, and bells. Racks and baskets could be useful for storing supplies and backpacks during a commute trip. Without having to worry about holding items or having extra weight on one's back, a bicycle commute becomes more convenient and enjoyable. Bells are helpful safety tools that help alert other bikers and pedestrians of a bikes presence. However, much like the horn of a car, bells can be used to help alert users of their surroundings, or contribute to road rage when used ineffectively.

Sourcing Bicycle

As I researched bicycle libraries, I found that there was one factor that contributed to vastly different programs. This feature was how the bicycles for the program were sourced. I'll call the first model a refurbished bicycle model, bicycles are sourced from either donations, or abandoned bicycle programs. In this model of bicycle library the emphasis on the program is to distribute bikes at the lowest cost possible and mainly targets users on mid to lower income brackets. Refurbished bicycle programs rely on volunteers and community support in order to thrive. Often refurbished bicycle programs operate like the Iowa City Bike Library program, a "borrow-or-buy system." [96] These types of programs are highly susceptible to users not returning bicycles and so the borrow or buy model system attempts to offset the cost of users who don't return the bikes by charging the cost of the bike upfront as a security deposit. The Iowa City Bike Library also charges a small sustainability fee in order to keep their program running. [97]

In two separate discussions with Matt Jensen [98] and Ted Sweeney [99] both agreed that there are costs associated in refurbished bicycle models that make them very expensive. The first problem they highlighted was that having lots of different bikes means needing parts for lots of different bikes. The second was that not all parts can be easily found and so some bicycles have to retire because one part cannot be found. The third was the amount of labor that goes into sourcing the parts, and repairing the bikes. This is why high levels of volunteering is necessary in order to keep these programs running. The final recommendation Matt and Ted both made was to attempt to partner with a bike company and buy a fleet of one style of bike at a wholesale price. This model of bicycle library I will refer to as the single supplier model.

One of the big advantages of a single supplier model is that an inventory of parts can be purchased all at once, reducing shipping costs, labor involved in searching for parts, and can potentially lead to getting the parts at wholesale prices. Another advantage of the single supplier model is that you can order bikes with accessories like fenders, bells, chain guards, and even built in lights. Having a uniform fleet also gives a bicycle library brand recognition and makes tracking down stolen bikes much easier. Finally, having a single supplier makes it easy to expand the fleet as demand for bicycles grown.

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[96] Iowa City Bike Library, 1.
[97] Iowa City Bike Library, 1.
[98] Jensen, (January).
[99] Sweeney, (January).

Storage

The final element of a bicycle library that needs to be considered is where the library will be housed and where repairs/maintenance will take place. It is also important to remember that between rental periods, the bicycles need to be able to be stored in one location, so the size of a bicycle fleet will be limited by the storage capabilities of whatever building the bicycle library is using or has access to. In the university programs that I looked at, pretty much every university had a garage or workshop space set aside for the bicycle program. Most of the time these facilities were supplied by either transportation services or the university's outdoor program. Thankfully there are many innovative bicycle storage racks that can be used to significantly reduce the floor space need for bicycle storage.

Methodology

Qualitative Literature Review

The literature I have looked into primarily consists of articles and research compiled in transportation journals, reports produced for city programs, and books written by transportation specialists. I chose to use a qualitative approach to my research because I wanted to dive into the theory behind why a bike library makes sense on the UW campus, and why increasing bicycle ridership is important. The advantage of this method was that I was able to compare and combine the work of other scholars into one paper. The disadvantage of this method is that my work can reflect my own personal bias as well as restate the biases found in the theoretical framework of transportation planning and behavioral studies.

The structure of my literature review starts with an inquiry into the context of the University of Washington. In this first section I unpack how the university could immediately benefit from increasing bicycle ridership and how the University's commitment to sustainability demonstrates a vested interest in increasing bicycle ridership. Next I take an indepth look at the sustainability of cycling and how a university could benefit from the results of increased bicycle ridership. After addressing the advantages of cycling and the university incentive to increase cycling rates, I transitioned into an overview of the psychological and tangible variables that influence a user's decision to cycle. These variables provide a toolset to consider as I moved forward into the next section, examining the prominent bicycle program, bike share, and the less common program, the bicycle library. Ultimately the progression of my research allowed me to draw some conclusions about why a bicycle library program would make more sense in the context of the University of Washington. In the final portion of my literature review I utilized case studies I had assembled from a variety of bicycle library programs and compiled the features of these programs into sections. This final section was crucial in deciding on features to include in the bicycle library program I eventually assembled.

Semi-Structured Interviews

In the process of doing my research I contacted Ted Sweeney, the active transportation specialist on campus, and former administrator at the University of Oregon Bike Program, as well as Matt Jensen, the assistant director of UWild, UW's outdoors program, and former volunteer at the Idaho State University bike program. The purpose of doing these interviews was to develop relationships with UW administrators, collect information on the advantages and challenges of implementing a bicycle library on the UW campus, and to identify programs/departments interested in adopting the bicycle program.

I used a semi-structured interview technique to conduct my interviews. This techniques is defined by William C. Adams as an intermediary style between close-ended and open-ended

questions. Semi-structured interviews are, "[conducted] conversationally with one respondent at a time, [employs] a blend of closed- and open-ended questions, [and is] often accompanied by follow-up why or how questions." [100] The advantage of using this style of interview was that I was able to draft up an array of questions, but leave the interview open-ended enough in order to ask follow up questions and cater the interviews to the areas of study that the interviewee knew most about. The downside of this style of interview was that it was difficult keep an accurate record of the conversations that deviated from the originally drafted questions.

Despite the uncertainty of each semi-structured interview, I gained a lot of information about details of bicycle library programs that I had not considered. For example Ted Sweeney posed the question, do bicycle libraries encourage bicycle ridership or discourage users from purchasing bicycles? This question became an occupying force in my research of bicycle libraries and helped give me a healthy level of criticism of the programs I reviewed. The other main result of my interviews was that Matt Jensen, after learning about my desire to implement a bicycle library on campus verbally agreed to host and take care of the administrative features involved in running a bicycle library program.

Case Studies

The primary reason I used case studies was due to a lack of literature written about bicycle libraries. Through my literary research, it became apparent that I would need to look at existing programs to pick apart the features and the types of programs that have been successful. The unique program features I identified in each case study contributed to an expanding package of variables to consider when developing the University of Washington Bicycle Library Program.

The case studies I analyzed were; Cykelbibliotket in Malmö, Sweden, The Iowa City Bike Library, Arcata Library Bike, The University of California, Santa Cruz Bike Library, University of Kentucky's Wildcat Wheels & Blue Big Cycles, University of California, Los Angeles' Bruin Bikes, University of Wyoming Pokes' Spokes Bike Library, The University of Oregon Bike Rental Program, and Oregon State University's Beaver Bikes. The relatively small sample of bicycle libraries with websites ultimately dictated the programs I chose to analyze. However I did make sure to use a combination of both university and non-university affiliated bicycle library programs.

The metrics upon which I evaluated these case studies were on; Location, who can rent, length of rental, rental renewal, application process, type of bicycle, bicycle accessories, funding and program sponsors, repairs, and damage/loss. I used an excel spreadsheet to compile the data and compare the case studies. The metrics I developed were derived from common features shared between the case studies I looked at and features I found important to understanding the different contexts of the bicycle library programs.

Program Design & Development

[100] Adams, 493

In the process of creating the Cycle Pack program, I used the outline of core features identified through my literature review, consulted with bicycle specialists on campus, discussed responsibilities and roles with each member of the sponsoring organization, and reflected on the variables that shape the decision to cycle. Through this process, a program for Cycle Pack gradually began to assemble. In order to record all the aspects of the program for future students and the sponsoring organizations to use, I compiled all the aspects of the program into an operations manual. An operations manual is a document that describes the processes involved in a company or program. I chose to use an operations manual because I thought it would be the best style of document to pass on after I complete the initial implementation of teh program. With this document, Matt Jensen, the assistant director of UWild, or Sean Schmidt, the sustainability specialist at UW sustainability, will be able to pick up this document and not only understand what the program is, but the components that will keep it running, and their positions within it. In assembling the operations manual I used the operations manual that EcoReps had assembled several years ago as a template for the sections I would need to include, and ultimately expanded upon this structure as new sections became necessary to fully describe the program. For the purposes of this report I have included the operations manual I have assembled, but I fully expect and anticipate that over the years this document will fluctuate and change as more information is known about running the program, and as roles begin to shift.

Campus Partnerships

As the coordinator for EcoReps, one of my main functions is to collaborate and strike partnerships with green registered student organizations (RSOs), students, faculty, and staff at the University of Washington. Through the experience of linking groups together around sustainability projects on the University of Washington campus, I discovered the advantages of working collectively rather than unilaterally. When I set out to design a program for Cycle Pack, I realized that many of the elements in the program could be split between different organizations, and that bringing in a governing body over the program from multiple departments would ensure a diversity of opinions and potential resources that can be applied to the program in the future. In developing the Cycle PAck program I struck a partnership between UWild, UW Transportation Services, UW Sustainability, EcoReps, and the Campus Sustainability Fund. In order to strike these partnerships I first identified potential partners through interviews with bicycle specialists on campus. Next, I scheduled meetings with representatives from each organization I had identified, and discussed what I was trying to accomplish with the Cycle Pack program and how their organizations might want to participate. Finally, in part to satisfy Campus Sustainability Fund requirements, and in part to solidify agreements with these campus partners, I had my point of contact with each organization sign a project approval form (PAF). The initial agreements I struck with all of the partners of the program place much of the the actual weight of the program on UWild, but I am confident that in placing these organizations in a governing positions over the program their

investment in the success of the program will manifest in greater participation and gradual adoption of larger roles with the program.

Cost Analysis

I used a cost analysis to compile and summarize all associated expenditures and revenue streams for the cycle pack program. My analysis took into consideration four main financial components of my program; the initial funding needed to obtain the initial bicycle fleet and associated components, the maintenance and running costs, marketing expenses, and finally the potential for expansion given the revenue generated from the sustainability rental fee, the expenses from marketing & maintenence, and the grant money initially supplies by the Campus sustainability fund.

The cost analysis served several functions in the construction of the cycle pack program; First, the cost analysis required that I determine the exact materials the program would require. This included the selection of the bicycle, the bicycle accessories, as well as replacement parts that would be necessary to repair the bicycles over time. Second, the cost analysis required me to examine the component breakdown over time. Calculating the component breakdown with the cost of replacement parts allowed me to determine the quarterly repair costs for each bicycle. Third, given an understanding of the associated program expenditures, as well as the ideal fleet size, I was able to determine the size of the grant I would need to fund the program for a 5 year lifespan. Finally, using the expenditures, and revenue from the sustainability fee, I was able to estimate the potential for expansion, and generate a plan for expansion over the lifetime of the program.

Grant Application

In order to provide funding for the first five years of the cycle pack program, I applied for a grant through the Campus Sustainability Fund. In order to apply for a grant through the Campus Sustainability Fund (CSF), I needed to both complete a full cost analysis and argue that the nature of the Cycle Pack program aligned with values and requirements of the CSF. Obtaining a grant through the CSF consists of three steps. First I had to submit a letter of intent (LOI). The LOI asks for an overview of what the grant money would be used for and how the project being funded aligns with the CSF goal. Within a couple of weeks, the LOI is reviewed by the CSF application review committee and is either approved or denied. If approved the applicant is alerted of concerns and suggestions for the project. The next step is to submit a full project proposal with project approval forms (PAFs) from all the participating organizations involved with the project. These PAFs are used to create formal agreements with the associated organizations in order to demonstrate to the CSF that they are committed to the project. The final step in the application process is to give a formal presentation to the CSF application review committee and answer any

additional questions about the project that weren't clear in the proposal or that didn't fit into the questions asked of the applicant in the full project proposal. The detailed nature of the CSF application requirements ultimately helped expand the elements that I included in the program I created and this is reflected in the additional elements included in the operations manual.

Operations Manual

Mission

Cycle Pack is a bicycle library program that encourages bicycle ridership by providing long term bicycle rentals to UW students. Unlike bike share, which provide short term bicycle rentals between two hubs, and regular bike rentals, which facilitate daily or weekend use, a long term rental gives users an experience of bicycle ownership. The experience of ownership teaches users about the various ways a bicycle can fit into one's everyday life as well as the responsibility that stems from maintaining and preventing bicycle theft. It is our view that providing an experience of bicycle ownership is the best way to demonstrate the value of a bicycle to a user and foster a desire to purchase a bicycle after completing the program. It is our goal to do more than just increase bicycle ridership on and to campus. We hope that providing this service will encourage sustainable cycling habits that persist into the rest of a user's life.

Vision

To become a heavily utilized and sought after program on campus. Keeping the supply smaller than the demand in order to ensure intentional applicants are admitted to the program. Using survey responses as indicators for success and shortcomings, the program will be adapted to fit students needs. As the program gains popularity so will the involvement from the existing program collaborators and new funding routes will be identified in order to improve and sustain the program. Advertisement space on the bicycle and Cycle Pack promotional materials will be used to mutually benefit the contributing companies/departments.

Values

Sustainability, Collaboration, Intentionality, Flexibility, and Innovation

Target Audience

University of Washington Students who would consider cycling if they had access to one, and could benefit from using a bicycle to commute to campus. We have determined that students who live beyond reasonable walking distance from campus (reasonable walking distance < 0.75 miles) and within a reasonable cycling distance from campus (reasonable cycling distance < 4.0 miles) are those who could benefit most from our program.

Roles

UWild Adventures

- Provides storage for the Cycle Pack fleet
- Maintains, and repairs bicycles between rental periods
- Facilitates rental transactions and bicycle orientation
- Reviews applications and determines successful applicants
- Advertisement of Cycle Pack on their digital platforms
- Representatives attend the quarterly Cycle Pack meeting

EcoReps

- Generates informational and advertising materials for Cycle Pack
    - Cycle Pack Outreach and Marketing Coordinator
- Curation of Cycle Pack survey and application metrics
- Markets Cycle Pack through tabling events and postering
- Advertisement of Cycle Pack on their digital platforms
- Representatives attend the quarterly Cycle Pack meeting

UW Sustainability

- Facilitates quarterly Cycle Pack meeting between; UWild, CSF, UW Transportation and EcoReps
- Advertisement of Cycle Pack on their digital platforms
- Representatives attend the quarterly Cycle Pack meeting

Campus Sustainability Fund

- Advertisement of Cycle Pack on their digital platforms
- Representatives attend the quarterly Cycle Pack meeting

UW Transportation Services

- Representatives attends the quarterly Cycle Pack meeting

Cycle Pack Meetings

Every quarter, a Cycle Pack meeting is held to discus;

- Survey responses from the previous quarter
    - Survey responses should ideally be used to justify potential changes to this document
- Application metrics

    - The Application metrics will uncover who is taking advantage of the program, and what strategies have been effective. This information will also reveal if there is a need to purchase bicycles of a certain size
- An advertising strategy for the upcoming quarter
- Potential issues/problems with the program
- Goals for the upcoming quarter
- In the Fall of 2020, and Winter of 2021 after the program has been running for three years, the conversation will also include how to expand the program
- In the Spring of 2021 a plan for implementation of an expansion strategy will be determined
- Starting in the Fall of 2021 the implementation strategy will be discussed and amended if necessary

These meetings are facilitated by Sustainability Specialist Sean Schmidt, in the third week of every quarter. This meeting will consist of; UW Sustainability representative(s), UWild representative(s), CSF representative(s), EcoReps representative(s) including the Cycle Pack Marketing and Outreach Coordinator, and UW Transportation Services Representative(s). Highlighted members of this meeting include UWild's Assistant Director, Matt Jensen, and UW Transportation Services' Active Transportation Specialist, Ted Sweeney.

Cycle Pack Meeting Facilitation Plan

Regular Meetings

- Open the floor to Matt Jensen to discuss failures and success of the program in the previous quarter (5-10 min)
- Discuss solutions to potential problems (5-15 min)
- Vote upon a solutions to the problems (5 min)
- Review survey and application metrics assembled by the Cycle Pack Outreach and Marketing Coordinator (5-10 min)
- Discuss the metrics and consult with the Cycle Pack Marketing and Outreach Coordinator on a marketing strategy for the upcoming quarter (10 - 15min)
- Vote upon marketing strategy for the upcoming quarter (5 min)
- Open the floor to any amendments to the original Cycle Pack program plan (5-10 min)
- Vote upon any amendments (5 min)

Include in Fall quarter meeting, 2020, and Winter quarter meeting, 2021

- Discuss strategy for expansion of the program (5-10 min)

Include in Spring quarter meeting, 2021

- Discuss a strategy for expansion (5-15 min)
- Vote on strategy (5 min)

Include starting Fall of 2021

- Discuss implementation of expansion strategy and decide on amendments to the strategy (5-15 min)
- Vote on amendments (5min)

*Votes will be decided by majority rule with the exception of a veto from the Assistant Director of UWild, Matt Jensen. Matt can chose to stand aside on vote he doesn't agree with but has the power to veto the vote if he believes it is in the best interest of the program.

Marketing & Outreach

Each quarter, EcoReps will generate graphics and advertising materials for Cycle Pack. EcoReps have the option to either allocate this task to one of their quarterly service learners or offer the role to an interested volunteer with the organization. The position will be referred to as the, "Cycle Pack Marketing and Outreach Coordinator." The duties of this position will include; attending the quarterly Cycle Pack meeting, postering for the opening and closing of the Cycle Pack application, generating posts for Cycle Pack partnering organizations to post to their digital platforms, managing the Cycle Pack facebook page, maintaining and reviewing metrics from applications and survey data, and developing innovative marketing strategies.

During the third week of each quarter, the Cycle Pack quarterly meeting will be held. At this meeting the Cycle Pack Marketing and Outreach Coordinator will suggest marketing strategies and be debriefed about what marketing strategies have worked in the past. By the end of the meeting there should be an agreed upon strategy for how to move forward with the marketing strategy for the upcoming quarter.

In addition to any innovative marketing strategies that are developed at the quarterly meeting, there should be at least two regular posts per quarter; The first post should go out in the third week of the quarter corresponding with the opening of the Cycle Pack application, and the second post should go out a week before the application closes. The application will formally close as the at 11:59pm on the Friday before finals week.

Suggested Innovative Marketing & Outreach Ideas

- Interviews with users who are renting or have rented a bicycle
- Video of the rental and return process
- Video of cafe cycling tips around campus
- Promotional video of Cycle Pack users commuting to campus/ going on group rides ect.
- Creating a partnership with the UW Bike Shop / UW Cycling RSOs

Cycle Pack Marketing & Outreach Job Description

Title: Cycle Pack Outreach & Marketing Coordinator

Context:

Cycle pack is a quarterly bicycle rental program operating out of UWild adventures. UW students are able to rent bicycles from this program for a $50 sustainability fee which is used to repair the bicycle fleet, sustain the organization, and over time, grow the program. The program emerged out of a desire to create a sustainable increase bicycle ridership on the university of washington campus and after a student graduates from the university. Ecoreps as a supporting body of the program works to advertise and market the program. Through the UWild, ecoreps is allotted a $100 quarterly budget in order to launch innovative advertising campaigns and to print materials. Ecoreps is also a part of the quarterly Cycle Pack meeting which governs over the program.

Work Description:

As the Cycle Pack Outreach & Marketing Coordinator, it will be your responsibility to;

- Develop advertising materials, & campaign strategies
- Coordinate with UWild's assistant director, Matt Jensen as well as the the Cycle Pack sponsors (CSF, UW Sustainability, UW Transportation Services, & the current EcoRep Coordinator)
- Attend the quarterly Cycle Pack meeting
- Manage the Cycle Pack facebook page
    - Create posts concerning the opening and closing of application periods
    - Potentially generating other material like cyclist spotlights to highlight people who are using the program

In addition to these responsibilities, there is a lot of room for innovation within this position, some features that would be beneficial would be to

- Identify and create partnerships with new potential sponsors for the program
    - This relationship could be a monetary sponsorship or an administrative one where new members are brought into the quarterly meeting
- Attend monthly Green Husky Coalition meetings
- Class visits
- Creation of a game we could use at tabling events (like the cornhole game we made for EcoReps)

Impact:

As the Cycle Pack Outreach & Marketing Coordinator you will be actively working to promote sustainable biking behaviours and learning a plethora of marketable skills in the process. From getting first hand experience coordinating with multiple organizations, to developing and testing marketing strategies, you will be supporting sustainability while bolstering your resume.

User Liability

There are several risks, physical and financial, associated with the use of a Cycle Pack Bicycle. These risks and penalties are;

- In the event of loss/theft/damage to the bicycle, users will be required to pay a fee for replacement of the bike and its accessories, or in the case of damages; the cost of repair/replacement.
    - Even if a bike is securely locked, there is still an inherent risk in the location the bike is being locked. Being vigilant of where a bike is locked and the duration of its stay is part of bike ownership.
    - Regular maintenance and repair of old components is paid for by the program. If a component breaks, the cost will fall on the user if the damage is intentional or a result of negligence. In order to aid in this determination, each component is checked between rental periods, the miles on the component are logged, and pictures are taken of the bike before the bicycle is handed over to the renter.
- If a user loses the key to their bicycle lock, Cycle Pack will unlock the bicycle replace the lock with a new one, and charge the user for the cost of a new bicycle lock
    - This prevents the threat of users claiming to have lost keys and then using the key in the future on cycle pack locks in an attempt to steal a bicycle.
    - The costs of requesting new keys or the potential labor cost of having to physically break a lock because a user loses the spare key given to them are additional incentives for this strategy.
- If accessories on a bike are lost/stolen or significantly damaged the user is responsible for paying for the replacement of the accessory.
    - This does not include dead batteries
- If a user is hurt in any way, hurts someone else, or causes any damage while using one of the program bicycles, the physical liability is on the user. This includes if the user allows someone else to use their bicycle.
    - The bikes are checked before they are distributed to ensure that all the components are fully functional and safe.
    - The bike is not meant to be used by anyone but the renter

Application (Link)

The application for Cycle Pack opens in the third week of every quarter. The official opening of the application should correspond with the marketing strategy determined in the Cycle Pack meeting that takes place during the same week. The application will remain open until 11:59pm on the Friday before finals week.

The application consists of several multiple choice/short answer questions and two 150-300 word essays:

- First Name
    - Collected in order to inform users their application has been received/accepted/rejected
- Last Name
    - Collected in order to inform users their application has been received/accepted/rejected
- Email
    - Collected in order to inform users their application has been received/accepted/rejected
- Will you be a student at the University of Washington next quarter? (A valid UW ID will need to be provided upon checkout a bike in order to receive a bicycle)
    - This program is only offered to UW students who will be enrolled in classes during the duration of their rental.
- What address will you be living at next quarter?
    - Preference is given to student who live beyond walking distance from campus (greater than .75 miles) and within bike distance of campus (less than 4 miles).
- Height
    - Using height, bike size can be determined. Cycle Pack has 3 bicycle sizes, Small (46 cm), Medium (53 cm), and Large (58cm). Applicants must be provided a bicycle within the recommended bicycle size for a user. If the supply of bikes of a certain size are outweighed by the demand for them, then those applicants will need to be compared.

Height (Inches)[101]	Dew Bike Sizes (cm)
4'10" - 5'1	**46**/48
5'0" - 5'3"	**46**/48/49
5'2" - 5'7"	48/49/52/**53**/54
5'6" - 5'11"	52/**53**/54/55/56

[101] "Dew Plus." KONA BIKES. Accessed April 17, 2017. http://www.konaworld.com/dew_plus.cfm.

5'10" - 6'3"	54/55/56/57/**58**/59/61
6'2" - 6'5"	57/**58**/59/61

- How did you hear about Cycle Pack?
    - This information will be used in order to target our advertising efforts.
- Why do you want to rent a bicycle through Cycle Pack? (150-300 words)
    - This question will help in determining why an applicant wants to use the program.
- What trips do you plan on making by bike? (150-300 words)
    - This question will help in determining how an applicant will use their bicycle.

Application Review

The Applications will be reviewed by the Assistant Director of UWild, Matt Jensen. Applicants who have been accepted into Cycle Pack will receive an acceptance email with the rental agreement document, liability waiver, and any promotional material generated for the program. For example bike safety/maintenance literature, or an invitation to join the Cycle Pack Facebook group. Accepted applicants will also be prompted to sign up for for a checkout/orientation time slot.

In reviewing the applications, Matt will make his decision based on;

- If the applicant will be enrolled in classes at the UW
    - Yes - Pass
    - No - Fail
- Has the student used the program before (names will be cross referenced with students who have already used the program). It is our goal to have new applicants and not to create dependent users
    - Yes - unpreferred
    - No - prefered
- Address of student
    - Closer than .75 miles from the Husky Union Building - unpreferred
    - Between .75 miles and 4 miles from the Husky Union Building - preferred
    - Farther than 4 miles from the Husky Union Building - unpreferred
- Height
    - There are only 6 small (46 cm), 8 medium (52 cm), and 6 large (58 cm) bicycles in the initial Cycle Pack fleet. Users applying to the program are split into three application pools based upon their height and corresponding bike size.
- Essay questions
    - These questions help determine who the applicants are and their motives for using the program

- Grammar will not be weighted in an application decision

Checkout/Orientation

Upon checkout, a user must bring a Husky ID and a credit/debit card which will be entered into the system in case of damages/loss/stolen equipment. During this transaction users will be charged a $50 sustainability fee and required to either purchase a helmet through UWild for $25 or present their own personal helmet. By Seattle law, it is illegal to ride in the city without a helmet so it is crucial to ensure students have the proper safety equipment before being able to checkout a bicycle. If a student refuses to purchase a helmet or bring their own, they will not be able to leave with a bicycle.

Before a user is allowed to ride away on their bike, they must attend a short orientation facilitated by UWild. During the orientation, students will be informed about cycling safety, user responsibility, bike maintenance, and the cool programs offered to cyclists at the University of Washington. After completion of the checkout and orientation process, students will be able to ride away on their bicycles.

Check In

Students must return their bike to the UWild facility on or before the Friday of Finals week. An email will go out to all program users informing them of the turn in procedures, and chunks of time that UWild will be available to check in the bikes. The check in procedure consists of; having a UWild representative look over the bicycle to assess if there are any significant damages, recording general wear and tear on the bike, photographing the bicycle, collection of the bike lock/key, checking to see if the students received the survey email, and reminding them to fill it out when they get an opportunity.

Survey (Link)

After a user completes the Cycle Pack program, they are sent a survey about their experience. The purpose of this survey is to see if the program is effective and to pinpoint areas that can be improved in the future. The questions in this survey include;

- Were you able to use your bike to commute to class?
- On average, how many trips did you make by bike per week? (A trip is from one destination to another, so to school and back would be 2 trips)
- After completing the program, are you more likely to own a bike in the future?
- What did you enjoy about your experience with Cycle Pack?

- What could we do to improve your experience using Cycle Pack?

The responses to these questions will be collected and shared at the quarterly meeting facilitated by UW Sustainability. The answers to these question will be used to help shape the program as it changes over time. These questions will also need to be shaped over time in order to examine more specific problems and to make sure the survey is relevant.

CSF Letter of Intent

For my senior project in Community Environment and Planning I have been researching how to increase cycling on and to the University of Washington campus. Through my preliminary research I looked into programs and services that the University and the City of Seattle currently offer the UW student. I discovered a gap in services provided to students who would consider commuting to campus by bike but lack access to one. There are (or were) two programs that offer student who do not own a bicycle access to one; Pronto Bicycle Share, and UWIld's equipment rental.

Uwild offers students single day and weekend rentals at extremely low cost to students. Unfortunately UWild's rental period makes the possibility of using their bicycles for commuting purposes impossible. Pronto is(was) aimed at providing hub to hub commuting services for short periods of time. This service targets users who live in close proximity to bicycle hubs and multimodal users who typically use bike share services to compliment another transportation mode. Unfortunately, due to the size and density of Pronto's network of bicycle hubs, a majority of UW students are unable to use their services beyond cycling on campus.

Through my research I found that a bicycle library would be an appropriate solution to both provide users a bicycle for commuting purposes and to encourage users to invest in a bicycle at the end of the rental period. A bicycle library is an inexpensive or in some cases free, long term rental program. At other Universities, like the University of California, Santa Cruz Bike Lending Library, and University of Kentucky's Wildcat Wheels, the bicycle rental period is typically over the duration of either a quarter or a semester. The purpose of this style of program is that it gives users an experience of bicycle ownership. The benefit of this experience is that users are given an ample time to explore how a bicycle can be used on a daily basis and how the bike can fit into their everyday life.

After discovering a program that could effectively target the user group I was concerned with, and impact future cycling use both at the University and through the rest of a user's life, I redefined my project. My Senior Project is now to research, design, and implement and plan to bring a bicycle library to the University of Washington. At this point in my project, I am near the end of my research phase, in the midst of refining program features, and I have established a partnership with UWild in order to add the Bicycle Library to their current services. The final process I need to undergo is to achieve funding for the program through a CSF grant.

My point of contact with UWIld is the assistant director of the program, Matt Jensen. Through our conversations he has offered to house a fleet of bicycles (current capacity is 20 bicycles) and provide the administrative services of; maintaining the fleet, and facilitating the rental transactions. In addition to UWIld's commitment to the program, I'm also attempting to work with EcoReps in order to, foster a consistent student presence in the program. Through an interview with Ted Sweeney, the active transportation specialist on campus I was advised that the biggest roadblock to a successful bicycle library program is student engagement. I hope that In partnering

with EcoReps I can harbor a student body committed to the promotion of this sustainable project and can work to create a greater awareness of the program on campus. The final player I hope to incorporate into the program is the Office of Sustainability. I believe the office can provide additional administrative and financial support so that Uwild can focus primarily on logistical duties.

At this point in the project I am still working towards a refined cost analysis. In addition to the bicycle I still need to decide on the benefits of including certain accessories like bike racks, fenders, and locks. This week I am meeting with Ted and Matt to make final decisions concerning which accessories to include and what bike specifications are necessary. Next I plan to outreach to local bike manufactures/stores with the bicycle specifications we decide on and then partner with the bidder that gives us the best deal for our dollar. I've been advised by both Matt, and Ted, that for this program we should use bicycle from a single vendor. This ensures that the fleet will be recognizable, parts will be uniform (this allows us to buy in bulk, and ensures parts will be accessible when we need them), and it establishes a relationship with a seller which in turn reduces costs in the long run. In addition to purchasing the bikes and materials, I hope to also set up a fund for Uwild to use to purchase replacement parts and accessories for regular maintenance of the fleet and in the event of stolen bicycles.

I believe this project aligns with every element of the CSF's goals. First, the environmental impact of cycling is a large component I addressed In my research. Cycling reduces the amount of cars on the road, doesn't require environmentally intensive infrastructure, and contributes to higher density development, all of which reduces noise, air, and water pollution. Second, this project emphasizes a desire to foster student involvement through partnership with EcoReps and potentially other student run organizations like SAGE and the UW Bike Shop. Third, ultimately behavioral change is at the center of this program and an area I focused on heavily in my research. Giving users the experience of bicycle ownership is the best route to encouraging new users to cycle. EcoReps will also play a prominent role in advertising and educating students about the new service. Finally, through my research and outreach to organizations and departments I have created a sustainable partnership with Uwild and demonstrated my ability to obtain the technical knowledge to make educated decisions concerning this program.

Full CSF Proposal & Cost Analysis

Executive Summary

Problem

University of Washington students have access to several cycling services on campus; UWild provides low cost bicycles for day and weekend use as well as bicycle programs and classes; [102] Pronto bike-share is intended to offer users bikes for 30-45min trips between two bicycle hubs;[103] and the Bike Shop provides a low cost bicycle repair, parts and free maintenance classes. [104] These programs provide valuable services but fail to provide feasible cycling options for students who do not have access to a bike but could easily commute to campus by bike. This gap in service is detrimental to the University's commitment to encouraging sustainability on campus and to students who would consider biking to campus if the option was made more accessible to them.

Solution

In order to provide students access to a bicycle they could use for commuting purposes I have created a plan to implement a new program called Cycle Pack. Cycle Pack is a bicycle library program that encourages bicycle ridership by providing long term bicycle rentals to UW students. Unlike bike share, which provide short term bicycle rentals between two hubs, and regular bike rentals, which facilitate daily or weekend use, a long term rental gives users an experience of bicycle ownership and the ability to commute by bicycle. The experience of ownership teaches users about the various ways a bicycle can fit into one's everyday life as well as the responsibility that stems from maintaining and preventing bicycle theft. It is our view that providing an experience of bicycle ownership is the best way to demonstrate the value of a bicycle to a user and foster a desire to purchase a bicycle after completing the program. It is our goal to do more than just increase bicycle ridership on and to campus. We hope that providing this service will encourage sustainable cycling habits that persist into the rest of a user's life.

Initially this program will start with a fleet of 20 bicycles. These bikes will be rented out to UW students for the duration of a quarter for a $50 sustainability fee. UWild will house the bicycle fleet, handle the maintenance and facilitate the rental transaction; EcoReps will be responsible for generation of advertisement materials; and UW Sustainability will assist in the promotion of the program, as well as facilitating a quarterly meeting between all the associated organizations partnered with the program. The quarterly meetings will be used to discuss marketing strategies,

[102] UWild, 1.
[103] Pronto, 1.
[104] ASUW Bike Shop, 1.

reflect on survey/application results, set goals, and plan for expansion of the program. The members of this meeting will be; UWild's assistant director Matt Jensen; UW Sustainability's sustainability specialist, Sean Schmidt; The CSF Coordinator; The EcoReps Coordinator, the EcoRep's Cycle Pack Outreach and Marketing Coordinator; and finally, UW Transportation Services' active transportation specialist, Ted Sweeney.

Funding Requirements

For the first three years the program is running, data will be collected from applications, end of use surveys, marketing expenses, and component repair frequency. After three years there should be ample data on program costs and a plan will be drafted to expand the bicycle fleet. During the 5th year of service, the expansion plan will be implemented. After 5 years the initial grant money will be used up, and the program will rely on the revenue generated from the sustainability fee to continue its expansion efforts and keep up regular maintenance on their current bicycle fleet.

Organization

The implementation of this program, and the administrative functions will primarily be carried out by Matt Jensen of UWild. UWilds motto is "Live curiously. Experience nature. Be Wild." It is UWild's mission to engage students in outdoor activities through; educational classes, access to rental equipment, facilitated trips, and the fostering of adventurous clubs. Cycle Pack would expand the options of UWild's current rental options. The organizations currently possesses a bicycle fleet which Matt oversees and maintains. Cycle Pack would expand the existing fleet managed by Matt and provide a new quarter long rental option. This option would supplement the existing daily and weekend rentals currently offered through the program.

Another promising feature of working with Matt is that he has a pre established relationship with the UW Bike Shop. He currently enlists bike mechanics from the Bike Shop to help maintain the current UWild bicycle fleet. While the initial plan for this program could not find a way to incorporate the Bike Shop, Matt's relationship with the shop may lead to deeper collaboration between the two organizations in the future.

Cost Analysis

Total Expenses

In total this grant application is requesting **$25,055.29** from the campus sustainability fund. This value is made up of three component, an initial budget for all the supplies needed to start the program, a maintenance budget in order to repair, replace, and service bicycle components over a 5 year timeframe, and a marketing budget which will be used to help advertise the program to the UW community. Not considered in this breakdown is the revenue generated from the $50

sustainability. The revenue section will expand upon why it is not included, but essentially, the revenue generated by the program will be used to expand and maintain the program after the money from the CSF grant dries up.

Total Expenses	3 year w/Tax	5 year w/Tax
Initial Budget	$15,052.94	$15,052.94
Maintenance Budget	$5,101.41	$8,502.34
Marketing Budget	900	1500
Total	$21,054.35	$25,055.29

Startup Budget

Startup Budget	Total	Total W/Tax
Cost	$13,746.98	$15,052.94

This is the initial budget that will be necessary to purchase the bike fleet, equip the bikes with necessary components, and label the bikes with; The Cycle Pack Logo/bike number, sponsor logos, and a bike registration strip which will deter theft and help track down and of the bicycles if they are every stolen. I also put lube and degreaser on the list as these are maintenance products that will be needed to jumpstart the program. Another Item I included is a bike computer which will be helpful in keeping track of the milage of each bike, as well as an indicator for how frequently components will need to be changed in the future. Finally I added a key box in the initial budget because UWild will need to store keys from the ULocks and so key management will be crucial to this process.

Startup Budget	Description	Cost	Qty	Total	Total W/Tax	Link
Bike	Dew Plus	$463.00	20	$9,260.00	$10,139.70	Link
Fenders	Planet Bike Hardcore	38	20	$760.00	$832.20	Link
Lock	Kryptonite Kryptolok Series 2 STD U-Lock with Bracket: 4x9in	$40.95	20	$819.00	$896.81	Link
Lights	Blaze Set	$70.00	20	$1,400.00	$1,533.00	Link
Helmets	Ted	$25.00	20	$500.00	$547.50	
Key Box	Barska 64 Position Key Lock Box with Key Lock, Black	$66.00	1	$66.00	$72.27	Link
Bike Registration	Bike 529 (UW Police Use This)	$10.00	20	$200.00	$219.00	Link
Stickers	Cycle Pack Logo + Sponsor Logos	$52.00	1	$52.00	$56.94	Link
Bike Computer/ Odometer	Planet Bike Protege Computer Black	$23.75	20	$475.00	$520.13	Link
Lube	Boeshield T-9 Lube, 1 Gallon ORM-D	$114.99	1	$114.99	$125.91	Link
Degreaser	Finish Line Citrus Biosolvent, 128oz (1 Gallon) ORM-D	$99.99	1	$99.99	$109.49	Link

Maintenance Budget

The maintenance budget for cycle pack will be crucial to ensuring that our bicycles are both safe and available to students to use. There are many components on a bicycle which eventually wear down. While students will be responsible for any intentional, or negligent damages to the bicycles, as well as lost/stolen equipment/components, regular maintenance/replacements will be at the expense of Cycle Pack.

Maintenance Budget	3 Year	3 Year W/Tax	5 Year	5 Year W/Tax
Per Bike	$232.94	$255.07	$388.23	$425.12
For 20 Bike Fleet	$4,658.82	$5,101.41	$7,764.70	$8,502.34

Approximating repair frequency was done by researching bike blogs and looking at part manuals in order to determine a life span for each component. In using bike blog data, I tried to weigh several opinions against each other in order to find a reasonable average between responses. Through my initial research I found that there is no way to formally claim a component will last a certain milage because milage only paints half the picture. Components are subject to the materials used, the weight of the rider, the weather conditions, the use of the bicycle and many other conditions. While I have attempted to my best ability to determine a lifespan for the above components, there is a large degree of variance in how long the components will actually last.

There were several components that I was unable to find any replacement frequency data on. Due to the fact no data could be found on replacement frequency I made the assumption that these components last a long time. Therefore I assumed these parts would last 10 years. Another element I considered when estimating repair frequency was how different components affect each other. For example, if a chain isn't repaired frequently enough, then the chain will start to deform the cassette.

In order to translate milage to years, I had to calculate how many miles a student would ride a bike in a quarter. In the process I found it necessary to make several assumptions. First, because this program is intended to provide students a commute option to campus, I am assuming students will ride their bike from their homes to class and back. The second assumption is that they will commute monday through friday, or 5 out of 7 days. The final assumption is that students will live within our desired range of .75 to 4 miles from campus. The average of this range being 2.375 miles. Next I calculated the number of weekdays in the service period of a renter which added up to 55. Putting all this data together, I found that 55 days/quarter X 2 trips/day X 2.375 miles/trip = 261.25 miles/quarter. Finally, because there are three quarters Cycle Pack is running per year, I can assume that a bike will be used 783.75miles/year. To be safe in my calculation I rounded this number up to 1000 miles/year when converting Approximate Repair Frequency to Estimated Life Span in Quarters. From this I was able to then calculate yearly repair budget by multiplying (Years

X 3 Quarters/Year X Cost) and dividing this by the Estimated Lifespan. Ultimately this results in the cost of the component over a predetermined timeframe, in this estimation, 3 and 5 years.

Part	Description	Cost	Approximate Repair Frequency	Estimated Lifespan (Quarters)	3 Year Cost	5 Year Cost	Link
Crankset (Chainrings + Crankarms + Chain guard)	26/36/48t	$51.75	30000 miles[105]	60	$7.76	$12.94	Link
Pedals	Wellgo Platform	$14.00	?	60	$2.10	$3.50	Link
Chain	KMC X9	$18.00	3000 miles[106] [107]	9	$18.00	$30.00	Link
Freewheel	Shimano Acera 11-34t 9spd	$26.73	8000 miles[108] [109] [110]	24	$10.02	$16.71	Link
F/D	Shimano Altus	$21.51	8000 miles[111]	24	$8.07	$13.44	Link
R/D	Shimano Acera	$37.80	8000 miles[112]	24	$14.18	$23.63	Link
Shifters (Set)	Shimano Acera	$42.93	?	30	$12.88	$21.47	Link
Front Brake Rotor + Caliper + Lever	Tektro HDM285 160mm	$29.00	20000 miles[113]	45	$5.80	$9.67	Link
Rear Brake Rotor + Caliper + Lever	Tektro HDM285 160mm	$29.00	20000 miles[114]	45	$5.80	$9.67	Link
Headset	FSA No.10P	$18.00	10000 miles	30	$5.40	$9.00	Link
Front + Rear (Spokes, Hub, Rim)	Joytech 100x9mm	$197.00	30000 miles[115]	60	$29.55	$49.25	Link
Front Tire	Schwalbe Delta Cruiser 700x35c	$18.49	3000 miles[116]	9	$18.49	$30.82	Link
Rear Tire	Schwalbe Delta Cruiser 700x35c	$18.49	3000 miles[117]	9	$18.49	$30.82	Link
Disc Brake Pads (Set)	Tektro Disc Brake Pads	$15.00	2000 miles[118]	6	$22.50	$37.50	Link
Fenders	Planet Bike Hardcore	$38.00	?	30	$11.40	$19.00	Link
Lock	Kryptonite Kryptolok Series 2 STD U-Lock with Bracket: 4x9in	$40.95	15 years[119]	45	$8.19	$13.65	Link
Lights	Blaze Set	$70.00	8 years[120]	24	$26.25	$43.75	Link
Bike Computer/ Odometer	Planet Bike Protege Computer Black	$23.75	?	30	$7.13	$11.88	Link

[105] Jeff Poulin, 1.
[106] Ibid.
[107] John Stone, 1.
[108] Ibid.
[109] Andy K, 1.
[110] Jeff Poulin, 1.
[111] Ibid.
[112] Ibid.
[113] Stib, 1.
[114] Ibid.
[115] Jeff Poulin, 1.
[116] Ibid.
[117] Ibid.
[118] Spike Milligan, 1.
[119] Arron, 1.
[120] Planet Bike, "Blaze 180 SL & Superflash USB Light Set," 1.

Bike Computer/ Odometer Battery	Pack of 20 CR2032 ($8.35)	$0.42	1.5 years[121]	4	$0.94	$1.57	Link

The process I have implemented in estimating the lifespan of components and the resulting cost over a time frame is flawed, but according to my research, there are no standard methods for accurately estimating these costs. The only other method I was informed of was to find the cost of the component package and then estimate the lifespan of the bike and then divide the cost by the life span to find the yearly cost of maintenance. My method is very similar to this, but takes a more detailed approach to individual components. In the future, to avoid the frustration of not having accurate component replacement data, I plan to use bike computers to track the mileage of the bicycles. This will allow us to track the lifespan of the components we use on the fleet, as well as an average cycling mileage for the Cycle Pack Fleet. With these two variables we will be able to determine a more accurate repair budget in the future. If the Cycle Pack fleet is ever expanded, this data will be crucial in budgeting for the new bicycles. This data may also be useful to other colleges who are thinking of starting their own bike program.

Marketing Budget

Cycle Pack is partnering with EcoReps for promotional materials. In order to aid the organization, I propose setting up a hundred dollar budget per quarter in order to fund printing of promotional materials and other promotional ideas generated either through EcoReps or as a result of Cycle Pack's quarterly meeting. Any unspent money from one quarter will roll into the next making it possible to use this fund to buy promotional tools like Cycle Pack bicycle water bottles, or possibly mini bike lights.

Marketing Budget	3 Year	5 Year
Per Quarter	100	100
Total	900	1500

Revenue

Income	Quarter	Year	3 Year	5 Year
One Bike	$50.00	$150.00	$450.00	$750.00
Twenty Bikes	$1,000.00	$3,000.00	$9,000.00	$15,000.00

The revenue generated by the sustainability fee will be used to both fund the expansion of the Cycle fleet as well as the maintenance and marketing of the program once the initial grant money has dried up. If the program is fully utilized each quarter, the maximum revenue generated by cycle pack over five years is $15,000. This funding will be crucial to maximizing our ability to expand

[121] Planet Bike, *Protege 5.0 Instruction Manual, 1.*

operations while ensuring regular maintenance and marketing costs will remain consistent. The argument could be made that this funding should revolve back into the CSF, but this would be drastically detrimental to our long term goals of expansion. Our current three phase plan consist of; phase one, test out marketing strategies, determine the rate of component decay, and other operational costs over the first three years of operation. After three years, the program enters phase 2, the development of a long term expansion plan in the quarterly cycle pack meetings. Finally, phase 3, the expansion plan will begin to take effect in summer before the fifth year of operation, and continue throughout the fifth year. Cycle Pack meetings from this point forward be used to amend the expansion plan as new variables emerge.

Components: Bicycle

The Bicycle that has been selected for Cycle Pack's fleet is the Kona Dew Plus. Kona is a pacific northwest company with their world headquarters based out of Ferndale Washington. In the search for a bicycle I made sure to limit my search to local companies in order to promote our local economy and to cut down on pollution generated by shipping. UWild also already has a contract with Kona for Wild's existing short-term bicycle rental fleet. This contract allows us to purchase bicycles at wholesale rates which takes hundreds off the price tag for a bicycle.

[122]				
Name	Dr Dew	Dew Deluxe	Dew Plus	Dew
Whole Sale Price	659	560	463	324
Frame Material	Kona 6061 Aluminum Butted	Kona 6061 Aluminum Butted	Kona 6061 Aluminum Butted	Kona 6061 Aluminum Butted
Sizes	46, 48, 52, 55, 57, 59	46, 48, 52, 55, 57, 59	46, 48, 52, 55, 57, 59	46, 48, 52, 55, 57, 59
Rear Shock	n/a	n/a	n/a	n/a
Fork	Kona Project Two Aluminum Disc	Kona Project Two Aluminum Disc	Kona Project Two Aluminum Disc	Kona Project Two
Crankarms	SRAM NX	Shimano Alivio	Shimano Acera	Shimano Altus
Chainrings	40t X-Sync	26/36/48t	26/36/48t	28/38/48t
B/B	SRAM GXP	Shimano	Shimano	Shimano
Pedals	Wellgo Platform	Wellgo Platform	Wellgo Platform	Wellgo Platform
Chain	SRAM PC1110	KMC X9	KMC X9	KMC Z72
Freewheel	SRAM NX 11-42t 11spd	Shimano Alivio 11-34t 9spd	Shimano Acera 11-34t 9spd	Shimano Tourney 12-32t 8spd
Chainguide	n/a	n/a	n/a	n/a
F/D	n/a	Shimano Acera	Shimano Altus	Shimano Tourney
R/D	SRAM NX	Shimano Alivio	Shimano Acera	Shimano Altus
Shifters	SRAM NX	Shimano Acera	Shimano Acera	Shimano Tourney

[122]Kona, 1.

Brake Calipers	Shimano Acera	Shimano Acera	Tektro HDM285	ProMax V-Brake
Front Brake Rotor	Shimano Acera 160mm	Shimano Deore 160mm	Tektro HDM285 160mm	n/a
Rear Brake Rotor	Shimano Acera 160mm	Shimano Deore 160mm	Tektro HDM285 160mm	n/a
Brake Levers	Shimano Acera	Shimano Acera	Tektro HDM285	Shimano Tourney
Headset	FSA No.10P	FSA No.10P	FSA No.10P	CH281
Handlebar	Kona Aluminum Riser	Kona Aluminum Riser	Kona Aluminum Riser	Kona Aluminum Riser
Stem	Kona Commuter	Kona Commuter	Kona Control	Kona Control
Seatpost	Kona Thumb w/Offset 27.2mm	Kona Thumb w/Offset 27.2mm	Kona Thumb	Kona Commuter
Seat Clamp	Kona Clamp	Kona Clamp	Kona Clamp	Kona Clamp
Grips	Kona Race Light	Velo Ergo	Kona Commuter 27.2mm	Kona Commuter 27.2mm
Saddle	Kona Commuter	Kona Commuter	Kona Comfort	Kona Comfort
Front Hub	Shimano 100x9mm	Joytech 100x9mm	Joytech 100x9mm	Formula 100x9mm
Rear Hub	Shimano 135x10mnm	Joytech 135x10mm	Joytech 135x10mm	Formula 135x10mm
Spokes	Stainless Black 15g fr / 14g rr	Stainless Black 15g fr / 14g rr	Stainless Black 15g fr /14g rr	Stainless 15g fr /14g rr
Rims	WTB SX17	Double wall alloy	Double wall alloy	Shinning MT20
Front Tire	Clement X'Plor MSO 700x40c	Schwalbe Delta Cruiser 700x35c	Schwalbe Delta Cruiser 700x35c	Kenda K935 700x35c
Rear Tire	Clement X'Plor MSO 700x40c	Schwalbe Delta Cruiser 700x35c	Schwalbe Delta Cruiser 700x35c	Kenda K935 700x35c
Paint Color	Matt Orange/Black	Matt Green/ Green	Matt Gray/Black or Matt Blue/Black	Matt Charcoal/Gray or Matt Black/Gray
Extras	Fenders & Kona Bell	Kona Bell	Kona Bell	Kona Bell

After researching the bicycle options offer by Kona, I found that the Dew series offers the most affordable commuter bicycle. From the four bicycles offered in the Dew series, I chose the Dew Plus. I made this determination for two reasons; First, because Seattle is often subject to wet riding conditions, I wanted to include disc brakes in the bicycle package. Disc brakes vastly outperform V-Style rim brakes in wet conditions making the bicycles much safer for Cycle Pack users. This consideration eliminated the Dew standard bike from the lineup, although it came at a cost of $100 over the standard Dew. Second, the components offered through the three remaining bicycles were very similar so I weighted cost heavily in the selection between the three remaining options; the Dr Dew offers fenders and an 11 speed freewheel. While these would be an improvement over the 9 speed option on the other two bikes and save us from purchasing fenders, the $200 cost difference between the Dr Dew and Dew Plus made this a pricy option. Especially since Fenders only cost around $50 which means you'd be paying an extra $150 for 2 additional speeds. Next I compared the Dew Deluxe and Dew Plus. both of the bikes offer an extremely similar component package. From what I could determine the Dew Deluxe offers slightly improved brakes at a cost of $100. After weighing these two options, I determined that the benefit of slightly improved brakes doesn't outweigh the $100 price tag.

Components: Fenders

Fenders are an essential element on a bicycle, not only do they keep the user dry and comfortable in wet conditions, but they prevent the rusting of bicycle components like the chain and the

cassette. There are a couple of different types of fender; full length, partial fenders, and snap on fenders. From my research, full length fenders are the only ones that are really effective at actually keeping the user dry. With this search criteria in mind i looked into what was on the market for full length fenders and found that planet bike fenders were highly recommended, I also looked into some soma fenders that looked promising. Of the fenders I looked at the Planet Bike Hardcore fenders stood out as high quality fenders made from durable materials at a reasonable price.

Name	Material	Price	Link
Cascadia ALX 700 Medium	Aluminum	65	Link
Cascadia Hybrid - Black	Poly	55	Link
Cascadia Hybrid - Silver	Poly	55	Link
Planet Bike Hardcore	Poly	38	Link
SOMA RAIN DOG FENDER SET	Pastic	45	Link

Components: Locks

There are a variety of different bicycle locks on the market ranging from cain locks, to electronic locks that link to your cell phone. Initially I was very intrigued by the ELocks as they would prevent the needs for keys and they would give users a digital connection to their bicycles. However, the high cost that came with the ELocks features made this option inadvisable for the purposes of this program. I also considered chain/cable locks but upon reading about the safety issue of using chain/cable locks in densely populated areas made left me with only one other option, the U-Lock. U-Locks generally come in two different forms, combination and key locks. After reading some reviews for combination U-Locks and discussing the matter with Matt Jensen, it became clear that combination locks suffer much more severely in the weather than key locks and combination locks also pose a threat to theft from people who have used the program in the past. Landing on standard key U-Locks I proceeded to look at two different Kryptonite U-Locks. I personally own the 4x9 inch model and have been impressed by the durability and the size. I think that going with anything with smaller than a 4 inch gap would make properly locking up a bike on campus challenging. Therefore I selected the the 4 x 9 inch model for this program.

Name	Cost	Smart	Type	Combo	Key	Solar	Battery Life (Months)	Optional Fob	Alarm	Geo Tag	W/ Cable	Link
BitLock	129	yes	ULock	yes	no	no	60	no	no	Yes	no	Link
Linka	129	yes	Frame	yes	no	no	9	no	yes	yes	no	Link
Noke U-Lock	129	yes	ULock	yes	no	no	60	$25	yes	yes	no	Link
Lattis ellipse	199	yes	ULock	yes	no	yes	solar	no	no	yes	no	Link
Amazer Bike Lock	20	no	ULock	yes	no	no	no	no	no	no	no	Link
Kryptonite New York U-Lock	72	no	ULock	no	yes	no	no	no	no	no	no	Link
Kryptonite Kryptolok Series 2	32	no	ULock	no	yes	no	no	no	no	no	yes	Link
TiGr mini	99	no	ULock	no	yes	no	no	no	no	no	no	Link

Lightweight Titanium Bicycle Lock												
Missm Bike Anti Theft Lock Chain	29	no	Folding Lock	no	yes	no	no	no	no	no	no	Link
Kryptonite Kryptolok Series 2 Mini-7 U-Lock: 3.25 x 7 in.	38.95	no	ULock	no	yes	no	no	no	no	no	no	Link
Kryptonite Kryptolok Series 2 STD U-Lock With Bracket: 4 X 9 IN	40.95	no	ULock	no	yes	no	no	no	no	no	no	Link

Components: Lights

Lights are an essential safety item in the evening for seeing where one is going and alerting other bikers and driver of one's presence on the road. Bike lights are also required by law after dusk. A rider needs to have both a front and back light to be considered legal. There are two main types of bike lights, rechargeable and battery powered. For the purpose of this program I wanted to use rechargeable batteries to ensure a long life span of the lights and to prevent the waste created by disposable batteries. The other variable to consider when choosing lights are the lumens put out by a bike lights. I ended up choosing the Blaz 180 SL set because it comes with both a front and back light, both of which pump out a considerable amount of lumens.

Name	Brand	Cost	Battery	Front Lumen	Back Lumen	Charge Cycles	Type	Link
Bike Light Set	Team Obsidian	16					Removeable	Link
Blaze 180 SL (USB)	Blaze	40	Rechargeable	180		500	Removeable	Link
Shiner (USB)	Shiner	40	Rechargeable	56			Removeable	Link
Blaze 180 SL (USB) Set	Blaze	70	Rechargeable	180	100	500	Removeable	Link
HOTROD Set	Cygolite	67.45	Rechargeable	110	50		Removeable	Link
Lava Set	Infini	49.99	Rechargeable	80	15		Removeable	Link
DASH PRO + Hotrod	Cygolite	89.95	Rechargeable	600	50		Removeable	Link
STREAK 450 + HOTSHOT SL 50	Cygolite	62.95	Rechargeable	450	30		Removeable	Link

Other funding sources

In addition to the funding provided by the CSF Grant, UWild will use its program's funding in order to pay for the labor necessary to service the Cycle Pack Fleet, as well as the check in/check out services. EcoReps will also use its printing budget to print flyers to hand out at their tabling events and posters to hang up around campus during open application periods.

Grant or loan status?

This application is for a grant from the CSF. In order for this program to be successful and reach the largest crowd of students possible, the program needs to focus on usings its revenue to expand its operations.

Environmental Impact

Problem

Bicycle ridership in the United states is abysmal by european standards. In 2009 the percent of bicycle commute trips in America was 0.5%. [123] This pales in comparison to the Netherlands where 26% [124] of commute trips are made by bicycle. There are many reasons for this large difference in cycling rates but one of the largest has to do with the decentralization of American cities in the 20th Century as a result of the mass production of the automobile. American cities of the early 20th century were overcrowded and heavily polluted as a result of the industrial revolution. Cars made it possible for citizens to live farther away from the urban core and escape the smog of polluting industry. Europeans underwent a similar growth pattern, but due to the limited space they had to expand into, and the cost of oil after WWII, the dream found in America wasn't as feasible in Europe. This meant that the growth found in European cities corresponded to the need for public and active transportation networks. In America, our cities are finally beginning to densify, but they are still being designed to handle massive amounts of single occupancy vehicles. Because the focus has remained on cars; the American transportation network is not designed for active transportation modes, housing choices do not take into consideration using active transportation modes to get to work or the store, and there is an active resistance to funding transportation projects that don't improve the ability of citizens to commute by car.

In America, 26% of greenhouse gas emissions are a result of or transportation. Transportation is "the second leading source of GHG emissions in the United States."[125] CO2 and other greenhouse gasses are not the only problems associated with automobiles; Cars pollute the air with noxious fumes that are carried by the wind and settle in areas surrounding the roadways; rain water sweeps away oil and chemical byproducts left on the roadways and this can pollute the land and waterways surrounding a road; the noise pollution generated by cars can also negatively impact humans and animals surrounding roads; the construction and maintenance of our roads generates large amounts of pollution both from the materials used and the machines that install them; the manufacturing and transportation of automobiles are huge sources of environmental degradation and generation of greenhouse gases. Clearly as a society, we need to rethink of the car as a convenient option, and really look at how it is hurting both our health and the health of the environment as a whole.

[123] Pucher, 10
[124] Pucher, 10
[125] EPA, 1.

How your project addresses the environmental problem?

Recently there has been a lot of pressure to increase the efficiency of vehicles and reduce the pollution they cause, but to truly target the problem, more effort needs to be done to make alternative transportation options more feasible. While there will always be certain trips that make vehicles necessary, there is no reason that the majority of trips can't be made by using public or active transportation modes.

Seattle and Portland have been leaders in the effort to integrate the bicycle into their city. Through the construction of bicycle infrastructure, cycling is made safer and more convenient for riders of all ages. While infrastructure improvements are the ideal solution to the problem, there needs to be public support for these changes. Therefore education and grass root efforts targeting social change are needed to build public support for infrastructure projects. The project that I am proposing fosters public support for bicycles by supplying users an experience of bicycle ownership. Even if a user doesn't end up ultimately purchasing a bike at the end of the program, they will learn about the value a bicycle can offer a user in the city.

In addition to educating students on the value a bicycle can play in their everyday life, this program will also get more cyclists out on the road. When researching the psychology behind the choice to cycle, I found that one of the easiest ways to encourage people to cycle is simply by having more cyclists on the road. There are two reasons for this; first, the more cyclists on a road contribute to a feeling that the road is meant to be used by the user; second, users, and especially college age users, are attracted by the social aspect of cycling. While this program is intended to have the biggest impact on the users of the program, this aspect has the potential to motivate commuters to the university as a whole.

How your project's impact will be measured?

Many of the effects of this program will not be measureable. However, in an attempt to improve the program, and access if the program's message reached the user, a survey will taken after each user completes the program. The survey will ask students to reflect on their experience, ask them what elements contributed to their experience and what could be changed, and finally, if they are more likely, after completing the program, to own a bicycle in the future.

Education and Outreach

How will the UW community find out about your project?

EcoReps will be responsible for the generation of advertising materials which will be distributed at; tabling events, posted in campus buildings, displayed on sandwich boards, and published

digitally by EcoReps, UWild, UW Sustainability, and Cycle Pack, on their respective websites and facebook pages. EcoReps will assign the duties of advertising Cycle Pack to the Cycle Pack Outreach and Marketing Coordinator. This position will either be filled by one of Ecoreps quarterly service learners or a volunteer with the organization. Each quarter Cycle Pack will provide $100 for marketing of the program in order to purchase materials, and supplement the EcoReps printing budget. In addition to the network of supporting organizations I have brought together, this program is a result of my senior project in Community, Environment & Planning. I anticipate that my major would also be interested in advertising this program to their students and using it as both an example of the work CEP students produce and as a marketing tool for attracting new students to their program in the future.

How will the UW community become involved in and/or support your project?

While this program is only available to UW students, there are many ways the UW community can get involved in the program. Organizations interested in partnering with program can help fund the expansion of the fleet or assist in advertising efforts, and in exchange the logo of the organization will be added to the Cycle Pack fleet as well as our promotional materials. In one bicycle program I looked into, the head trauma research center of the associated university funded the purchase of bicycle helmets with their logo on for use by the bicycle library. Another way for the UW community to get involved in Cycle Pack is for faculty and staff who are interested in Cycle Pack to hand out informational materials to their students, or offer up Cycle Pack as a case study for their students to research, analyze, and suggest design improvements. Currently, the only way this program plans to involve the UW community, is through the currently partnered organizations, and the student involvement efforts conducted by EcoReps.

Student Involvement

How will your project directly involve/affect UW students?

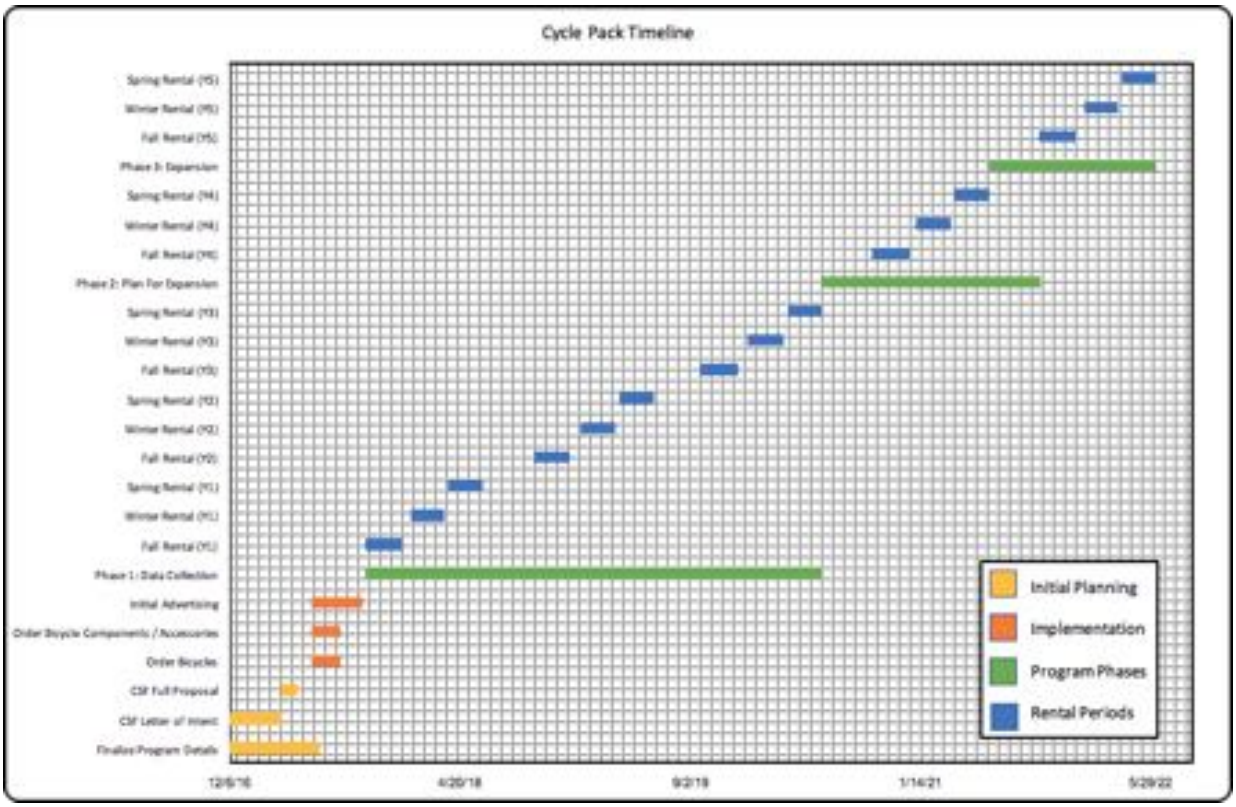
This project will specifically target UW students in order to foster sustainable transportation habits before students graduate and start making long term housing decisions that lock them into less sustainable transportation modes. Cycle pack will also be enlisting the services of EcoReps, a student run organization dedicated to advancing the sustainability efforts on the UW campus, in order to provide marketing support for program. By engaging EcoReps in the planning and marketing process, we are ensuring a student presence in the governing structure and messaging of the program.

If you plan to use student volunteers in your project, how will you identify and recruit student volunteers?

While Cycle Pack will be enlisting students to help with the program, this relationship is conducted through EcoReps. EcoReps is an organization that already conducts massive outreach to the UW community and engages students to participate in sustainability projects. One aspect of ecoreps that will make them indispensable is their ability to take on quarterly service learners. This structural element ensures consistent engagement in the organization, and as a result, guaranteed engagement in this proposed program. In the operation manual I drafted, I created a role of an EcoReps: Cycle Pack Marketing and Outreach Coordinator. This information will allow EcoReps to either advertise the role to the UW community, or enlist a service learner each quarter by posting the position to the Carlson Center website.

Accountability & Feasibility

Timeline



Potential Funding Reductions

If you review the operational manual, there is a section titled "Expansion & Budget Reductions" in which I unpack how reductions in CSF funding would affect the overall goal of program expansion.

In short; a 30% reduction in CSF funding would result in a 40-90% increase in fleet size over 10 years. A 20% reduction would result in a 60-115% increase in fleet size over 10 years. A 10% reduction would result in a 80-155% increase in fleet size over 10 years. Finally, no reduction would result in a 100-180% increase in fleet size over 10 years. While the funding from the CSF grant could be reduced, this reduction will directly impact the expansion rate of the program.

Project Longevity

The revenue generated by the sustainability fee will be used to both fund the expansion of the Cycle fleet as well as the maintenance and marketing of the program once the initial grant money has dried up. If the program is fully utilized each quarter, the maximum revenue generated by cycle pack over five years is $15,000. This funding will be crucial to maximizing our ability to expand operations while ensuring regular maintenance and marketing costs will remain consistent. The argument could be made that this funding should revolve back into the CSF, but this would be drastically detrimental to our long term goals of expansion. Our current three phase plan consist of, phase one; test out marketing strategies, determine the rate of component decay, and other operational costs over the first three years of operation. After three years, the program enters phase 2; the development of a long term expansion plan in the quarterly cycle pack meetings. Finally, phase 3; the expansion plan will begin to take effect in summer before the fifth year of operation, and continue throughout the fifth year. Cycle Pack meetings from this point forward be used to amend the expansion plan as new variables emerge.

CAMPUS SUSTAINABILITY FUND
UNIVERSITY OF WASHINGTON

Project Approval Form (PAF)

Project Title:	Cycle Pack
Primary Contact:	Christian Cole Laush

By signing this form, I confirm that the project lead(s) has/have discussed this project with me, and that I *(please check all that apply)*

- ☐ approve the stated project to be conducted on the University of Washington-Seattle campus (this approval can only be given by campus units or by individuals on behalf of campus units) **(REQUIRED)**.
- ☐ agree to be a part of the project team.
- ✓ will provide support to the project by being a partnering organization, department or individual.
- ☐ am the administrator for my campus unit and agree to for the financial and human resources Transactions associated with this project.
- ☐ agree to take over the operational costs of this project following completion.

Other notes *(if applicable)*:

Name/Signature: **Christian Cole Laush**	**Date:** **4/24/2017**
Title: Coordinator	
Department/Organization: EcoReps	
Phone: 206 854 3258	**Email:** **ecoreps@uw.edu**
Additional Notes:	

Please save this completed form as "Project Contact Name_Project Name" and email it to csfcoord@uw.edu. The email originating directly from the approving body will be considered a signature. Paper copies may be sent through campus mail to Attn: CSF Coordinator, Box 351248 or dropped off to the CSF Office at Gerberding Hall, Room B-40 and must include an original signature of the approving body.

Updated January 2014

CAMPUS SUSTAINABILITY FUND
UNIVERSITY OF WASHINGTON

Project Approval Form (PAF)

Project Title: Cycle Pack

Primary Contact: Christian Cole Laush

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Other notes *(if applicable)*:

Name/Signature: **Ted Sweeney**	**Date:** **5/1/2017**
Title: Active Transportation Specialist	
Department/Organization: UW Transportation Services	
Phone: 206 616 7493	**Email:** **sweeney2@uw.edu**
Additional Notes:	

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Updated January 2014

CAMPUS SUSTAINABILITY FUND
UNIVERSITY OF WASHINGTON

Project Approval Form (PAF)

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- √ agree to take over the operational costs of this project following completion.

Other notes *(if applicable)*:

Name/Signature: Matt Jensen	**Date:** 4/20/2017
Title: Assistant Director	
Department/Organization: UWild Adventures	
Phone: 206-616-2083	**Email:** mcjensen@uw.edu
Additional Notes:	

Please save this completed form as "Project Contact Name_Project Name" and email it to csfcoord@uw.edu. The email originating directly from the approving body will be considered a signature. Paper copies may be sent through campus mail to Attn: CSF Coordinator, Box 351248 or dropped off to the CSF Office at Gerberding Hall, Room B-40 and must include an original signature of the approving body.

Updated January 2014

CSF CAMPUS SUSTAINABILITY FUND
UNIVERSITY OF WASHINGTON

Project Approval Form (PAF)

Project Title: Cycle Pack

Primary Contact: Christian Cole Laush

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- ☐ agree to take over the operational costs of this project following completion.

Other notes *(if applicable)*:

Name/Signature: Christian Cole Laush	**Date:** 4/24/2017
Title: Coordinator	
Department/Organization: EcoReps	
Phone: 206 854 3258	**Email:** ecoreps@uw.edu
Additional Notes:	

Please save this completed form as "Project Contact Name_Project Name" and email it to csfcoord@uw.edu. The email originating directly from the approving body will be considered a signature. Paper copies may be sent through campus mail to Attn: CSF Coordinator, Box 351248 or dropped off to the CSF Office at Gerberding Hall, Room B-40 and must include an original signature of the approving body.

Updated January 2014

Analysis & Reflection

On June 2nd, I was alerted that my application for the $25,055.29 grant through the Campus Sustainability Fund was approved. This means that starting Fall 2017 the Cycle Pack program will open its doors to UW students. This is one of the last milestones that needed to be hurdled for this project to come to fruition. Other major milestones included; striking an agreement with UWild to house, maintain, and provide administrative functions for the program; compiling the multifaceted literature review; producing the comprehensive cost analysis; and compiling all the program features in the operations manual.

One of the hardest aspects of working on this project has been the constant stream of deliverables, which often overlapped, and the need to keep consistent communication with the sponsoring organizations and stakeholders in order to get the information and approval necessary to move forward. One of my biggest strokes of luck over the course of this project was finding a home for the program. If I hadn't of identified Matt Jensen, the assistant director of UWIld, early in the planning of this project, I struggle to see how I would've been able to keep up with the necessary deliverables. While luck may have gotten my foot into the door, my time management, and communication skills, as well as the hard work I invested in researching, and planning the various elements of this program were ultimately the tools which resulted in the successful grant application, and will ultimately result in the opening of Cycle Pack's doors in just a couple months.

There were several parts of this project I would have changed or gone more into detail if I had more time and resources at my disposal. For example, In compiling the cost analysis for the program, I had to make many assumptions about the component breakdown rate for the bicycle fleet. The calculation I ultimately made was derived from research into part warranties, and general rules of thumb and personal experiences found in bicycle blogs. Ultimately the component breakdown rate is highly inaccurate for a variety of reasons. First, each bicycle model utilizes relatively uniques components. Second, the level of maintenance performed on one component of a bike can directly affect other component life spans on the bike. Third, each user utilizes their bikes in differing climates, topography and weather conditions. Fourth, each bicycle users conducts a varying degree of trips, some users will travel 50 miles every saturday, others will make a 2 mile trip to work every day of the week. These are a few of many variables I came across in my research on how to calculate component breakdown. In order to account for this error in data available to me, I added a tool to the program in order to calculate real time component breakdown over the course of cycle packs lifespan. Each bicycle will be equipped with a bicycle computer which will keep track of mileage so we can track how long it takes for components on each bicycle take to wear down. Due to the fact that milage doesn't account for all the variables that affect component breakdown, each quarter, the bicycles will be assessed for damages and photo documentation will also be used to track the breakdown of the components. Despite these steps, I think another element I may include to help us understand the speed of decays is an additional end of use survey for the rider which asks questions about the type of use each bicycle underwent including where the bicycle was primarily stored, the frequency of used, and weather conditions the bicycle was used in. All this data collection may seem fairly intense, but I think there is a huge research

opportunity to be had in mapping the variables which affect component breakdown, as well as gathering information which will inform the program about future costs of the program.

Another aspect of the program that I wish I had more time to work on was the sponsorship opportunities and funding structures to assist in the funding and marketing of the program. I primarily focused on striking partnerships with complimenting organizations in order to supply an administrative support team for the program. I still think this element will be extremely beneficial in order to the support the program over time, but I think pursuing sponsors who would be willing to supply monetary support in exchange for advertising space on the bicycle itself or on Cycle Pack's facebook page would be extremely helpful. These relationships could allow the sustainability fee to be reduced, or accelerate the expansion rate of the program itself. One innovative example of a complimentary sponsorship comes out of the Wildcat Wheels program where UkHealthCare Level I Trauma Center donated helmets to the program.[126] In the university of washington context, a department with UW Medicine could easily step in and provide a similar donation. Other prospect for partnerships that I didn't end up pursuing were on departmental levels. I think organizations like UW Transportations Services, or colleges like the College of Built Environments, of the College of the Environment could supply vouchers to students participating in certain programs for a free quarter of use through Cycle Pack. This would reduce the upfront costs to students and set up connections between the program and large groups of students. Through my own major, CEP, there are small grants available to students for their individual and projects, I just barely missed the opportunity to apply for this grant to set up a voucher program within my own major to provide free bicycle rentals to a small amount of CEP students. I imagine these types of opportunities are available in other departments and this could be an opportunity to explore potential for the EcoReps volunteer/service learner that takes on the Cycle Pack Marketing & Outreach Coordinator position.

An opportunity that would've given this project more qualitative merit would've been to conduct surveys of the UW student body in order to gauge their interest in the program what features they would be most excited to see in the program. The surveys could also have doubled as invitations to help in the planning process and potentially set the groundwork for a student committee to be added to the quarterly Cycle Pack meeting!

One missed opportunity that would have been super beneficial to the program is to establish a relationship with the ASUW BIke Shop. I did have a meeting with the bike shop manager, but there we couldn't establish a way for our two programs to officially work together. The manager, Chet, was interested in the project, but the purpose and commitments the bike shop already performed already required a lot of student commitment and extending their services to assist Cycle Pack would stretch their workforce thin. There is definitely a way to eventually partner with the Bike Shop, but I wasn't able to identify a relationship in the short term. It's possible that once the program starts running, and the full extent of how the program operates is better understood that the ASUW Bike Shop might have a better understanding of how to work with Cycle Pack. Until then, the relationship with the organization has been put on the backburner.

These are a few of the puzzle pieces I wasn't fully able to assemble over the course of this project. I have high hopes that the governing structure of participating organizations will

[126]UK Sustainability, 1.

eventually be able to tackle these pitfalls, but in the meantime, much still needs to be done to complete the implementation of the program.

Next Steps

With the approval of the Campus Sustainability Fund Grant, the actual implementation of the Cycle Pack program can begin. This past quarter, in my position as the EcoReps Coordinator, I test run the relationship between Cycle Pack and EcoReps by tasking two service learners with the responsibility of generating marketing materials and brainstorming a marketing strategy for the Cycle Pack program. Due to the fact that approval of the project didn't come until the end of the quarter, the service learners were unfortunately caught in a sticky place of working on a project that wasn't guaranteed to exist. The point at which I brought on the service learners was also at a time where I was still grappling with all the program features that needed to be included. This meant that I had difficulty explaining certain features of the program. Ultimately, despite the hardships the service learners faced, they did end up producing an informational hand out for the programs as well as a poster advertising features of the new program. In all the experience working with the service learners greatly helped in drafting a position for the Cycle Pack Outreach & Marketing Coordinator. The immediate next step for the program at this point is to start the Summer advertising campaign for the opening of the program in the fall and in order to outreach to students interested in applying for the program. The materials from the service learners can be used to poster around campus, as well as provide handouts at EcoReps tabling events.

In addition to advertising for the program, a lot of purchasing needs to occur once the grant money is made into a budget that UWild can use. Not only do bicycles, bicycle components, and stickers to brand the bicycles need to be acquired, but all of these elements will need to be assembled and stored in the UWIld facilities. Assuming everything is delivered on time, this step of the process shouldn't be difficult, however I've never worked with a bicycle supplier before and I have no idea if they'll have enough bikes in stock or if more will have to be manufactured. The bicycles should be geared up and ready to go come the first week of fall quarter 2017. At this point It'll be a learning curve to see If Matt Jensen will need assistance reviewing and approving applications, performing the rental transaction, and conducting the safe cycling/user responsibility orientation.

While this report contains an overview of the program up until this point, the documents within it will continue to be updated and changed as the program morphs between now and the start of the program starting at the end of September. This Summer I will be working with Matt Jensen to ensure that the program is successful and comprehensive enough to speak for itself. I'll also be the primary promoter of the program and function as the Cycle Pack Outreach & Marketing Coordinator until a new EcoReps volunteer can be identified. From start to finish, this Senior project has been a whirlwind of opportunities, challenges, and late nights mulling over ideas in my head. I look forward to both, being able to see the first student ride off on a Cycle Pack bicycle, feeling confident in transitioning power over to the governing structure of the sponsoring organizations..

Works Cited

AASHE, The Association of Advancement of Sustainability in Higher Education. "University of Washington, Seattle Seattle, WA, US." The Sustainability Tracking, Assessment & Rating System. October 14, 2015. Accessed February 01, 2017. https://stars.aashe.org/institutions/university-of-washington-seattle-wa/report/2015-10-14/.

Adams, William C. "Chapter 19: Conducting Semi-Structured Interviews." In *Handbook of Practical Program Evaluation*, 492-505. 4th ed. 2015.

Akar, Gulsah, and Kelly Clifton. "Influence of Individual Perceptions and Bicycle Infrastructure on Decision to Bike." Transportation Research Record: Journal of the Transportation Research Board 2140 (2009): 165-72. doi:10.3141/2140-18.

Arcata Library Bikes. "Arcata Library Bikes Annual Report 2003-2004." Arcata Library Bike Program. Accessed March 05, 2017. http://www.arcata.com/greenbikes/annualreport2004.html.

Arron. "How long does your U-lock last? - Bike Forums." Bike Forums - A cycling and bicycle discussion forum. Accessed April 21, 2017. http://www.bikeforums.net/general-cycling-discussion/887393-how-long-does-your-u-lock-last.html.

ASUW Bike Shop. "Services." Bike.asuw.org. Accessed March 08, 2017. http://bike.asuw.org/.

Beaver Bike Rentals. "Beaver Bike Rentals." Oregon State University Transportation Options. January 13, 2017. Accessed March 05, 2017. http://transportation.oregonstate.edu/transportation-options/bicycling/beaver-bike-rentals.

Berséus, Jesper. "F.A.Q." Cykelbiblioteket. Accessed March 05, 2017. http://www.cykelbiblioteket.se/f-a-q/.

"Bike Calgary." Calgary Bicycle Transportation FAQs | Bike Calgary. Accessed February 01, 2017. http://www.bikecalgary.org/faq.

Blue Big Cycles. *Blue Big Cycles: Promoting a Car-Free Campus Experience with Bikes at the University of Kentucky*. PDF. 2014.

http://www.aashe.org/files/2014conference/presentations/secondPresentationUpload/Tedder-Shane_Road-Scholars-Promoting-a-Car-Free-On-Campus-Experience-with-Bikes.pdf

Burton, Bill Wright. *Anybody's LibraryBike Book*. Bill Burton, 2007.

Cohen, Alison, Dani Simons, Matteo Martignoni, Jeff Olson, and Chris Holben. "The Bike-Share Planning Guide." Bike Share. December 5, 2013. Accessed January 29, 2017. http://bikeshare.com/research/the-bike-share-planning-guide/.

Daggett, John, and Richard Gutkowski. "University Transportation Survey: Transportation in University Communities." Transportation Research Record: Journal of the Transportation Research Board 1835 (2003): 42-49. Accessed January 29, 2017. doi:10.3141/1835-06.

Demaio, Paul. "Bike-sharing: History, Impacts, Models of Provision, and Future." *Journal of Public Transportation* 12, no. 4 (2009): 41-56. doi:10.5038/2375-0901.12.4.3.

Eklund, Daimon. "University of Washington receives gold sustainability rating from STARS." UW Today. November 25, 2015. Accessed February 01, 2017.

http://www.washington.edu/news/2015/11/25/university-of-washington-receives-gold-sustainability-rating-from-stars/.

Folbre, Nancy. "The Bicycle Dividend." Economix (web log), July 4, 2011. Accessed February 1, 2017. https://economix.blogs.nytimes.com/2011/07/04/the-bicycle-dividend/?_r=0.

Hembrow, David. "Health, Wealth and Happiness. The Benefits of Cycling Last through Your Life." A View from the Cycle Path. June 18, 2013. Accessed December 06, 2016. http://www.aviewfromthecyclepath.com/2013/06/health-wealth-and-happiness-benefits-of.html.

Iowa City Bike Library. "About." Iowa City Bike Library. Accessed March 05, 2017. http://www.bikelibrary.org/about.html.

Jensen, Matt. Interview by author. January 27, 2017.

K, Andy. "Realistic life span of components - Bike Forums." Bike Forums - A cycling and bicycle discussion forum. Accessed April 21, 2017. http://www.bikeforums.net/commuting/799084-realistic-life-span-components.html.

Kona. "Dew Plus." Kona World. Accessed April 22, 2017. http://www.konaworld.com/dew_plus.cfm.

Milligan, Spike. "How long should disc brake pads last? - Bike Forums." Bike Forums - A cycling and bicycle discussion forum. Accessed April 21, 2017. http://www.bikeforums.net/general-cycling-discussion/486953-how-long-should-disc-brake-pads-last.html.

NJ BPRC. "The Top 10 Ways to Encourage Bicycling Among College Students." NJ Bicycle and Pedestrian Resource Center. July 01, 2015. Accessed January 29, 2017. http://njbikeped.org/the-top-10-ways-to-encourage-bicycling-among-college-students/.

Outdoor Program. "Pokes' Spokes Bike Library." Bike Library | Outdoor Program | Campus Recreation | University of Wyoming. Accessed March 05, 2017. http://www.uwyo.edu/rec/outdoor-program/bike-library.html.

Poulin, Jeff. "Realistic life span of components - Bike Forums." Bike Forums - A cycling and bicycle discussion forum. Accessed April 21, 2017. http://www.bikeforums.net/commuting/799084-realistic-life-span-components.html.

Pronto. "Pronto." Pronto Cycle Share. Accessed March 07, 2017. https://www.prontocycleshare.com/.

Parkin, John. Cycling and Sustainability. Bingley: Emerald, 2012.

Planet Bike. "Blaze 180 SL & Superflash USB Light Set." Planet Bike. Accessed April 21, 2017. http://ecom1.planetbike.com/3082.html.

Planet Bike. *Protege 5.0 Instruction Manual*. Madison, WI: Planet Bike, 2016.

Pucher, John, and Buehler, Ralph. Urban and Industrial Environments : City Cycling. Cambridge, US: The MIT Press, 2012. Accessed December 7, 2016. ProQuest ebrary.

Richardson, Barbara. "Toward a Policy on a Sustainable Transportation System." Transportation Research Record: Journal of the Transportation Research Board 1670 (1999): 27-34. Accessed January 29, 2017. doi:10.3141/1670-05.

Schneider, Robert J. "Theory of routine mode choice decisions: An operational framework to increase sustainable transportation." Transport Policy 25 (2013): 128-37. Accessed January 30, 2017. doi:10.1016/j.tranpol.2012.10.007.

Shaheen, Susan A., Stacey Guzman, and Hua Zhang. "Bikesharing Across the Globe." In City cycling, edited by John R. Pucher and Ralph Buehler, 183-210. Cambridge, MA: MIT Press, 2012.

Stone, John. "How many miles will a road bike's chain and cassette last?" John Stone Fitness. October 08, 2014. Accessed April 21, 2017. http://www.johnstonefitness.com/2014/10/07/how-many-miles-will-a-road-bikes-chain-and-cassette-last/.

Stib. "When Should I replace the rotors on disk brakes?" Bicycles Stack Exchange. Accessed April 21, 2017. https://bicycles.stackexchange.com/questions/17981/when-should-i-replace-the-rotors-on-disk-brakes.

Sweeney, Ted. Interview by author. January 13, 2017.

Tolley, Rodney. "Green campuses: cutting the environmental cost of commuting." Journal of Transport Geography 4, no. 3 (1996): 213-17. doi:10.1016/0966-6923(96)00022-1.

Transportation Survey Report. Report. UW Transportation Services, University of Washington. Northwest Research Group, 2014.

UCLA Recreation. "UCLA Bike Shop Rentals." Outdoor Adventures. Accessed March 05, 2017. http://www.recreation.ucla.edu/oa#rentals.

UCSC Bike Library. "Getting People on Bikes." UCSC | Bike Library. Accessed March 05, 2017. http://bikelibrary.weebly.com/.

UK Sustainability. "Wildcat Wheels." Wildcat Wheels | Sustainability. Accessed March 05, 2017. https://www.uky.edu/sustainability/wildcat-wheels.

UO Bike Program. "Bike Rentals." UO Outdoor Program. Accessed March 05, 2017. https://outdoorprogram.uoregon.edu/bikes/rentals.

UWild. "What is UWild Adventures?" Recreational Sports Programs. Accessed March 07, 2017. https://www.washington.edu/ima/uwild/about/

Appendices

Case Studies

Program Name	Cykelbibliotket	Iowa City Bike Library	Arcata Library Bike	UCSC Bike Library	Wildcat Wheels	Big Blue Cycles/ Departmental Blue Bikes	Bruin Bikes	Pokes' Spokes Bike Library	University of Oregon Bike Program	Beaver Bike Rentals
City	Malmo, Sweden	Iowa City Bike Library	Arcata, California	Santa Cruz, California	Lexington, Kentucky (University of KEntucky	Lexington, Kentucky (University of Kentucky)	Los Angeles, California (UCLA)	Laramie, Wyoming (University of Wyoming)	Eugene, Oregon (UO)	Corvallis, Oregon (OSU)
Who Can Rent	Users must live in Malmö or a crane municipality and be over 18	Anyone	Anyone	Students	Students, Faculty, Staff	Dorm Residents (160 bikes) / Departmental Checkout	?	Students, Staff	Students	Students
Length of Rental	12 days	6 months	6 months	1 quarter (priority given to new riders)	Semester	Yearly/Semester	?	Semester	Quarterly up to 4 quarters	Quarterly
Cost of Rental	100, For repairs/maintenance and in order to give users an idea of how much biking cost	Refundable Deposit, $75-$300 ($50 sustainability Fee)	Refundable $20 deposit	Free	Free	Free	$65	$25 student, $50 Staff	$30	$40
Application Process	Apply for waiting list, fill out questionnaire with travel habits	First come first serve	First come first serve	500-700 word essay of intent, property given to new students, requires students to take a bicycle safety class	Lottery	Lottery (Students with vehicle parking permit the previous year given priority), and Orientation	First come first serve	First come first serve	First come first serve and orientation	First come first serve
Type of Bicycle	New expensive bicycle, Cargo/Electric, constantly being serviced	Refurbished donated bicycles	(All donated bikes) Regular, and Promise bikes, Promise bikes were given out to those that pledge not to drive	Kona	Refurbished Abandoned Bicycles	Gian VIA II	Felt-Cafe-8 or Felt-Verza-Speed -40, and a small fleet of Electric Bicycles	Atlas Industrial Cruisers	Refurbished	?
Accessories	Fenders, two locks, built in bicycle lights	You get what you get	You get what you get	light, fenders, locks, helmet	Locks, Fenders, Helmet, Bell	Locks, Basket, Fenders, Helmet	Helmet, Ulock, Lights	Helmets & Locks	Lights, Basket, Fenders, ULock, Optional Helmet	Fenders, Lights, Locks, Helmet
Bike Shop as Well?	No	Do it yourself repair bench	Repair consultation	No	Yes	Yes	Yes	Yes	Yes	No
Started	?	2004	1997	2008	2004	2014	2009	2005 ASUW & UW Cycling Team -> 2007 Outdoor Program	?	?
Sponsors	Sponsored by the Swedish Transportation Administration and run by the Bicycle Kitchen in Malmo	Volunteer run, community bike project	City of Arcata, the Del Norte County District Library, North Coast Unified Air Quality Management District, The North Coast Co-op, the Arcata Recycling Center, and the Humboldt Waste Management District	?	Student Sustainability Council, UK Parking and Transportation, UkHealthCare Level I Trauma Center, UK Student Government, UK Executive Vice President for Finance and Administration	?	The Green Initiative Fund (UCLA CSF)	ASUW & Outdoors Program, Ability to Donate a bike through a $250 check	Outdoors Program	?
Repairs	Minor Repairs Serviced by Shop	Minor Repairs Serviced by Shop	Free	?	Typically Free Departmental: $100 Bike, $30 Lock, $15 Key	Big Blue: Typically Free Departmental: $100 Bike, $30 Lock, $15 Key	?	User Responsibility	?	User Responsibility
Links	link	link	link - report	link	link	link	link	link	link	link

Marketing Materials

CyclePack_White

CyclePack_10% Fade

CyclePack_Transparent

Sponsors_Line

Sponsors_Block