Alternatives to the Rutgers Bus System; a Bike Sharing Approach

To provide an environmentally friendly and healthy alternative form of transportation for the Rutgers Community, through a bike sharing system.

Tag Words: Bike; Bus System; Rutgers; Going Green; Environmental; Transportation; Bike Sharing

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Summary

Because of the Growing Number of Students and limited number of seats on the buses, overcrowding and carbon emissions, we propose a more environmentally friendly plan for using bikes to get around the New Brunswick Campus in a bike sharing system.
The Issue: Higher Enrollment Rate, Overcrowding

The increasing student population of New Brunswick is outgrowing the available resources to support it. As of the beginning of the 09 fall semester, the university welcomed more than 7,000 new incoming students. This is the largest enrollment figure in the last 30 years. This, coupled with the growth of the total New Brunswick population, puts tremendous pressure on the student and city transportation systems. The results of this on the bus system are long waiting times, overcrowding, and long travel times. Even if the resources were there to increase the bus fleet, the infrastructure of the city itself would still present a limit to such a strategy. This is also coupled with the pressures to limit the emissions and waste produced by the university. Rick Ludescher, Rutgers Dean heading off the bike path project, noted “I actually do not know anything about future bike programs here at RU. I have not heard of any specific plans to initiate such a program, although I have been at least one meeting where the possibility was raised (but nothing decided).” Below is an image of the bike path infrastructure already developed at Rutgers to support bicycle transportation. Here, a system is proposed that would address the growing need for a new transportation alternative. This system is based upon various successful third generation bike sharing programs such as Bicing program in Barcelona, Spain. The proposed system would be able to provide a practical, cost effective, environmentally friendly, and healthy transportation for the Rutgers community. The system would use electronic customer tracking and other 3rd generation bike sharing technologies to provide a convenient and reliable service.

Lack of environmentally friendly transportation alternative for a growing Rutgers Community.

Problems with Increasing the Bus System/ Bus System Infrastructure Problem
The first problem with such a solution is that it is not cost effective. Such resources might not be available due to the current economical situation and declining aid from federal and state government. Even if the resources were there to increase the bus fleet, the infrastructure of the city itself would still present a limit to such a strategy. This is not just a local trend, as this is being experienced in U.S. in general. It is argued that the current petroleum-based motor vehicle highway system is not sustainable due to the finite nature of petroleum reserves, air quality problems, global atmospheric problems, excessive fatalities, congestion and urban sprawl. There is also another problem with increasing the automobile infrastructure. Major highway capacity additions are likely to have larger effects on travel and to increase emission in the affected transportation corridors in the long run. That is to say, increasing automobile infrastructure will actually increase the traffic and environmental impact. This is one of the fundamental problems; if the student body continues to increase, how can the university accommodate this growth cost effectively and efficiently?

Environmental Awareness Problem
This is happening on the background of ever increasing environmental awareness and energy resource use. The growing student and resident population of New Brunswick can create a large impact on the environment. This is especially true for the student population, which often needs to commute from one campus to another, a situation which makes walking impractical. Thus much of the student body consists of active users of the bus system. The recent trends in attitudes about environmental issues show that American public is increasing the levels of their
environmental concern. Moreover there is a negative correlation between age and environmental concern (higher levels of environmental concern for younger citizens) and a positive correlation between education level and environmental concern (more education, more environmental concern). Thus it can be said that students, who are generally young and are in the process of being educated have higher levels of concern about the environment. Here is the second fundamental issue; what environmentally friendly alternative exists to the bus system?

**Practicality Problem**

It is also unpractical for a student to use typical personal transportation such as a car. Rutgers only allows parking in a single lot, thus taking a car from one parking lot to another is prohibited. The only alternative is to use pay parking such as parking meters. This is however impractical and cost prohibitive. Creation of more parking spaces runs into the same problems as the increase of the bus fleet or expansion of the city infrastructure. First off it can be very cost prohibitive. Building a new parking deck is a costly and timely endeavor. Also even if there were plenty of parking spaces, this might not help out the bus system load as not all students have access to a car. Even if most students had access to a car, their use would create bigger traffic problems and longer traveling times. Here lies the last issue; what alternative can be practical for most students (affordable, easy to use, and accessible for everyone).

This public bike system provides an alternative for local modes of transportation that encourages healthier lifestyle, directly and indirectly. It saves the earth from further pollution contributed by cars, busses and trains by using green energy. At the same time, students can integrate physical fitness and daily activities into their busy schedules. Public bike systems can even save money spent by user for gas or public transportation. The self-service bike rental system has proven itself efficient by its rapid growth all around the world and now it’s time to take advantage of these types of systems. Rutgers University serves as the perfect vicinity for this structural design.

The system will contain a network of self-regulated bike racks, each providing a determined amount of bikes. Each station will be serviced by a solar powered module to receive payments, release and dock locked bikes. Having solar-powered, self regulated racks will create an environmentally friendly structure and eliminate labor costs to each hub (rack assembly). A price analysis of the hubs is provided in the table below and reflects estimates made by other models in effect. Hubs will be conveniently located for students outside popular buildings and proximities. Suggestions for locations are bus stops, student centers, parking decks, commuter lots, off campus housing, and other highly utilized buildings on and off campus distant from transportation. Students’ IDs can be used to swipe for retrieving and docking bikes, which are locked and secured to the hubs. A membership program can be set up per semester of usage or pay-per-ride daily charges can be made using Knight Express. Limiting usage to Rutgers students will reduce theft and, as the responsibility is assigned to the student who swiped their card for the bike. The length of time a bike can be used can be limited to the day for pay-per-ride usage and unlimited for those who have a membership. The human labor needed for this system is for maintenance of docks, bikes, and redistribution of bike that accumulate in a specific location. A main station will be designated for repair, maintenance, customer service, and management. Initial funding for this project will be provided by two main sources. Initial investments for the bike system will come from government grants and/or loans as well as
commercial companies whom wish to use the bikes as a form of transportation. Dues paid by user will provide money for the maintenance of the hubs.

5 Stations - 10,000$ each, total 50,000$  
50 bicycles - 400$ each, total 20,000$  
Total: 70,000$  

Incurring Costs

Service Personal:
Maintenance and repair: 2 mechanics - 13$/hr, 10 hrs/week -> 260$/week  
Bicycle Movement: 2 movers - 10$/hr, 20hrs/week -> 400$/week  
Administration: 1 manager - 17$/hr, 40hrs/week -> 680$/week  
Customer Information: 1 Information worker - 10$/hr, 40hrs/week -> 400$/week  
Total: 1740$/week, 90480$/year
References

http://www.huffingtonpost.com/2009/05/06/bicing-barcelonas-communa_n_197050.html


Editorials

In today’s world everything seems to be a little tougher; whether it be eating healthy, getting proper sleep, or finding transportation. Well, I propose we go back to the basics and make everything a little easier. I propose we spark a new healthy revolution of bicycle riding. Bicycle riding is one of the healthiest forms of transportation. It uses no fuel source (well except the fuel from many of our chubby bellies), it is fast (sometimes faster than cars in cities), and provides an easy, fun, and low cost means of transportation. Unfortunately, it is hard to break patterns in people. For this reason, my proposition does not put all the weight on you. In fact my proposition is to build an infrastructure of bike “hubs”. These hubs would allow any passerby (with a credit card) to use a bike for whatever period of time they choose. Think about the freedom of this program. With no responsibility for storing, maintaining, or really buying a bike everyone and their mother can easily ride one. In the beginning this plan would obviously work best in large cities and college campuses where transportation is tough as it is. Once popularity has grown for the concept of bicycle rental the programs could work their way into suburbs and be further integrated into mass transit systems. With the integration of this system, we would eliminate thousands upon thousands of tons of CO2 pollution; make everyone a little healthier, and probably a little more tired (but who doesn’t need the extra sleep). To get more inspired check out some existing models in Amsterdam, Paris, Montreal, Washington D.C., and on college campuses like Emory University, Duke University, University of Washington, and University of Maine.

Russell Trzaska

Installing Health and Exercise on Campus

By Thu Nguyen

Many students fear Freshman 15, a term referring to the weight gained during a student’s first year in college. Gaining weight is not just problem for first year undergraduates but now an epidemic in the United States. An alarming third of the adult population today are obese and rates have risen by over 60 percent in the last ten years in the United States. Sadly, it has become a common and an increasing concern among all age groups. Main contributor of obesity is the lack of physical activity. It is suggested that we partake in moderately intense activity at least 3 times a week each with a total of 30 minutes each day. Only 26% of adults engage in the suggested routine. People are beginning to become more aware of growing health concerns and
are making more conscientious decisions to improve their health. Still, there isn’t enough effort to establish and maintain a highly beneficial habit.

According to the C.I.A.’s World Factbook, United States is ranked 50 in the world for life expectancy. Americans are expected to an average of 78 years. It seems like there isn’t enough realization how being active can significantly increase quality and possibly prolong lifespan. Maybe this is not a focus for the young adults who seem to be alive and kicking today. What we forget is, how well we maintain our bodies now is what will be expressed in our later years when we are older. Health concerns don’t appear to be serious and catch up to us until our bodies are exhausted from the stress we force on it. College students have it the worse. They are responsible for attending class, and then are required to spare an immense amount of time to fulfill assignments and study for exams. While juggling school work, friends, family, and partying, most also have jobs to attend to. This leaves exercise to only when there is enough free time to squeeze a random session of working out. The fast-paced American lifestyle has left no time and motivation for suggested amounts of physical activity.

Rutgers does provide gyms, recreational programs, and events that encourage students to participate in staying in shape but there is still insufficient activity. In a university environment, like Rutgers, this lack of routine physical fitness can be overcome by a system that has been established in countries outside the U.S. and is increasingly being implemented in some U.S. universities. The idea of installing a university bike system can integrate a routine of exercise into their busy schedules. These systems contain a network of regulated bike racks, with bikes provided, conveniently placed at various locations, where students are able to either retrieve or return bikes. Students can use their student ID as a swipe to release a bike, ride to another bike hub near their destination, and return the bike. These hubs should be placed next to bus stops and popular buildings, and other locations students may need. Instead of driving or taking the bus to class or anywhere else, a new alternative offered as a means of transportation can easily exceed the minimal activity recommendations by health experts.

Not only would this system help improve the health of students but many other aspects especially for Rutgers. Installing public bike systems help decrease traffic, pollution caused by cars, and maintenance and fuel costs of busses to Rutgers. If Rutgers should decide to establish this system, I believe students will be very excited and maybe become healthier.

Biking is one of the best means of transportation available for a student. It enables us to avoid the overfilled bussing system, does not cost as much as a car, and is just keeps you in shape while helping you get to classes much faster than your feet alone can.

Many universities and cities in the world implement a bicycle sharing program that enables the many citizens to enjoy the benefits of bicycle usage without the high introductory costs of a bicycle purchase. Sometimes it is free for the users, while sometimes it costs a small rental or buy-in fee.

Right this very instant a group of students at our University is working on a way to start a program like this up at Rutgers. I know this because I am one of the students in this group. We are working our darnedest to help the University out, by making it a more livable place for every person that decides to opt-in to our program.

However, the only way to get this started is with understanding and support from the administration, and for that we require your help. If you would like an easy way to get around campus that would cost you as a student almost nothing, then write to the administration so they
A Call to replace the Rutgers University Transportation System

Throughout its history, Rutgers University, the State University of New Jersey, has primarily relied on vehicles, namely buses, for the transportation of university students. However, as a direct result of its environment and urban location, the transportation system at Rutgers University has accumulated numerous problems and hazards that continue to restrict its capabilities. Rutgers University is spread among five different campuses, and this sporadic scenario has resulted in an elastic transportation system that is no longer able to fulfill the requirements of its users. The universities insistence on a singular transportation system has caused the over-crowding of buses, congestion of local streets and highways, and the leakage of a vast amount of money and economic resources. Observers of these defects may see these problems as largely localized to “private” issues, and thus do not impact national or even global issues. However, our research team has discovered that this transportation system’s problems may have national and global effects, as, its situation is not unlike that of other bus systems. For example, our team has isolated three issues that have detrimental effects on human society, one being increased carbon emissions and pollution, another being personal safety on the buses, and another being obesity issues within the country. To solve these problems, we have devised a new type of transportation system that relies primarily on bicycle transport rather than vehicle transport. Through this new system, we hope to reveal a plausible alternative to the bus system at Rutgers University, and show its potential impact on both the city of New Brunswick and global society.

An inherent problem within the Rutgers University transpiration system is its utilization of buses and other type of fuel vehicles. Buses are extremely convenient and can transport a large quantity of students to multiple locations throughout the university’s campuses. However, as a result of this situation, Rutgers University is able to deploy multiple buses which have the ability to emit dangerous levels of carbon emissions and detrimental pollution sources. According to the Environmental Protection Agency, a typical vehicle can emit 8,877 grams of carbon dioxide per gallon of gasoline used. (EPA, 2005) By multiplying the carbon emission value and the potential amount of buses the university could deploy, each bus could emit thousands of carbon dioxide into the atmosphere. Also, EPA studies have concluded that typical vehicles have the ability to emit 77.1 pounds of hydrocarbons, 575 pounds of carbon monoxide, 38.2 pounds of nitrogen, 11,450 pounds of carbon dioxide, and utilize approximately 581 pounds of gasoline on an annual basis. (EPA, 2000) As a result, the carbon emissions from the university’s transportation system could potentially accumulate with the multiple other carbon emission sources and cause detrimental damage to the Earth’s atmosphere, environment, and the
people who reside within it. However, bicycles do not contain any of these inherent problems, as, no carbon or elemental emissions are released, and thus, no environmental injuries are causes and inflicted. According to Lawyer, bicycles are 2/3 more energy efficient than vehicles, thus, the Rutgers University community will not experience a substantial difference in energy sources or transportation capabilities. (Lawyer, 2008) Through our proposed plan, the students of Rutgers University will be able to easily access university sponsored bicycles and use the transportation method to traverse the various campuses that compose Rutgers University.

Another problem that is contained within the current Rutgers University transportation system is the system’s reliance on only one type of transportation option. The only current option available within the system is for students to take a bus to their destination. This situation can cause the over crowding of buses, which may lead to various hazards and passenger injuries. This situation can especially arise during peak hours of system usage. For example, buses can become congested rather swiftly during the period of time after a particular class shift has ended, and during the time period once a majority of the classes on the various campuses had concluded. This over crowding can lead to uncomfortable commutes, and injuries may arise during transport. In order to alleviate this problem, the bicycle plan should be made available to all the students who desire to utilize it. To remedy this situation, we propose that several bicycle hubs should be available near bus stops and parking areas. By making bikes accessible, university students will most likely decide to utilize the system, and thus, alleviate the amount of people on a bus and minimize the probability of injuries.

Within the country, the issue of obesity has been vigorously debated and potential solutions have arisen, some slightly successful, while others unable to solve the issue. Obesity is not an inherent problem within the Rutgers University transportation system, however, the system does influence the issue. According to the Center for Disease Control, obesity is determined by analyzing the person’s Body Mass Index (BMI), with a BMI greater than or equal to the BMI of 30. Through their study, the Centers of Disease Control concluded that thirty-two states had a BMI equal to or over 25% and six states featured a BMI at 30% or above. (CDC, 2009) As these statistics show, obesity has become an issue within the country. The Center for Disease Control has concluded through their research, that obesity has been linked to a variety of human diseases and defects, such as cardiovascular disease, cancer, respiratory disorders, and diabetes. (CDC, 2009) By relying on vehicles for transportation and only providing one type of option featured by this particular system, the Rutgers University transportation system discourages recreational activity and does not allow students the choice to incorporate physical activity in their transport. Through our system, students will have the option to utilize bikes to arrive at their destination, and thus they will be able to integrate some sort of activity into their daily proceedings. This added physical activity would reduce the incidence of obesity throughout the state of New Jersey and decrease the appearance of disease.

Through the bicycle transport system, we hope to provide a transportation option to the students of Rutgers University. Through our research, we have concluded that this type of system is feasible and can replace the current transportation infrastructure to a limited extent. However, this limited extent can result in the solving of a variety of the current transportation system’s problems and flaws. This particular system does not only have to be localized at Rutgers University, on the contrary, we believe it can impact both national systems and global institutions. By using the Rutgers University bicycle transportation system as a model, we wish
to provide an example system that could be extrapolated to other existing transportation infrastructures and be used to develop a similar type of system in the area.

Bike sharing: A solution for Rutgers?
By: Sergei Pilipetskii

The increasing student population of New Brunswick is outgrowing the available resources to support it. This, coupled with the growth of the total New Brunswick population, puts tremendous pressure on the student transportation systems. The results of this on the bus system are long waiting times, overcrowding, and long travel times. Even if the reassures were there to increase the bus fleet, the infrastructure of the city itself would still present a limit to such a strategy. This is not only a local problem and is something many urban centers and universities are facing. Also, in American culture car ownership and usage are much more prevalent then other comparable nations. That is to say that Americans use personal cars much more then let’s say residence of European Union. This leads to overcrowded highways, and strained transportation infrastructure. This can easily be seen on George Street during rush hour. It takes about half an hour to take a bus down George Street from Douglass campus to College avenue campus. This is a distance of about a mile. To put it in perspective, according to The Presidents Fitness Award rankings for 17 year olds scoring in the 50 percentile it takes about seven minutes to run a mile. It actually takes about four times as long to take the bus, then for a 17 year old to run the same distance. Of course no one really runs from class to class carrying a backpack full of books, but even with a back pack full of books it actually takes less time to walk from Douglass to College ave. campus during rush hour (I have done this numerous times). So with that in mind, what alternative can there be to the current bus system? Although walking is very beneficial for your health, and environmentally friendly, it is unreasonable to expect students to walk a mile each time they want to get from campus to campus. However I believe a portion of a student body would take a bike from campus to campus if such an option was available. Such an option exists in a form of bike sharing programs. This has been something that various other urban centers and universities have figured out. In such a system a fleet of bicycles would be available for the use of the student body. This would be similar to the Bicing program in Barcelona, and Zot Wheels program in University of California at Irvine. The programs consist of bicycle hubs placed in key locations that are able to electronically release and lock bicycles. The users of the system would be able to access the bicycles through a swipe of a membership card. The bikes can be returned at any of the bicycle hubs. This system is very convenient, easy to use, environmentally friendly, and healthy. This would provide an alternative to the already overstrained bus system. This paradigm was a great success in Barcelona, as is evident by the rising subscriptions and growth of the system. What is very interesting to note is that the largest demographic group of the systems users are college students. College students are ideal customers for such programs for a number of reasons. First off, such programs are relatively cheap per subscriber, and thus within a typical students budget. Second, most students are unable to use cars from class to class, and thus are forced to used alternate modes of transportation. Lastly, due to the spread recondition of beneficial effect of cycling (exercise, less environmental impact), there has been growing public pressure for implementation of more bicycle programs. To summarize, a bicycle sharing program would be a wonderful alternative mode of transportation for students. It could cut commuting time between campuses, especially
during rush hour. It would also provide some environmental benefits to the community (less people on the bus, means less fuel is used), and health benefits to the users of the system. The real question is not why should Rutgers implement this system, but rather why Rutgers didn’t implement this system yet.

Sean Lee
A Plea for Responsibility

More and more, people are figuring out ways to combat the global climate crisis. Whether it’s some technological ingenuity that reduces our carbon footprint, or simply making a point to recycle, every effort makes a difference. That is why we need to stop thinking that individual actions or habits won’t change anything; it’s not just the things we do that make a difference, it’s the things we don’t do. I used to think that just throwing one plastic bottle out here, a paper plate there was no biggie, but it does make a difference to make the effort to recycle. Or bike. Or weatherize. Or, well you get the point.

And then, there is going above and beyond simple everyday habits. There is the next level that requires extra effort, careful planning, and perseverance. These are the ideas and innovations that will really shape what the next green generation will be. Without this and the people that make it happen we are screwed. That is why we need to keep these ideas coming full speed ahead. The cost of slowing down is too great; the cost of remaining at the same pace is just as great. So that is why we must accelerate towards a solution to the crisis of our generation.

A pressing issue here at Rutgers is the immense amount of traffic that plagues our streets. If we could just figure out some way to alleviate the stress we put on our environment, it would make even the slightest difference and that means a lot. Bike rental systems have been tried and tested in many parts of the world, and many have proved to succeed in providing an alternative to fossil fuels. Not only does it remove cars from the road and thus reduce our carbon footprint, it also encourages physical activity and thus improves general public health. By initiating a bike rental system here at Rutgers, we would alleviate much of the stress brought about by an overworked traffic system, and at the same time improve the overall health of the student body. It’s a win win situation. Acceleration of our strive towards a green revolution as well as an improvement in public health. How can we afford to not move forward. The time is now, the resources are here, the situation is beyond dire. Lets take on this challenge and give our children and grandchildren and great grandchildren the chance to say they had responsible and socially conscious ancestors.

Cycling to Work:
Reducing our Carbon Emissions and Waistlines

Dear Editor,
The Star-Ledger

Cycling to work for people who live close to their jobs could greatly improve our society’s weight problems and daily carbon emissions. Commuting to work in your car pollutes our skies while increasing your waistline. I believe that as a society we need to start to make better decisions when it comes to how we travel to our jobs. For those people who work far away from
their jobs, commuting by bike to work is an unreasonable task. Yet for those who live closer to
their occupation such as cities and suburban areas would greatly benefit from cycling to work.

America is a nation of overweight people. So overweight in fact the only a couple states
overall adult populations are considered not obese. A major reason for this heath epidemic is that
people sit motionless all day at work and in their daily commute. If we started to cycle more to
work we would raise our daily calorie burn and get into better shape. Biking a couple of miles a
day could have major health benefits for those people tend to drive work. Adding this physical
activity would lower our blood pressure; lower possible risks for disease, slim down our
waistlines, and improve our aerobic fitness.

Another important measure to take into account for biking to work would be to reduce
carbon emissions. One of global warming’s major contributors is the daily exhaust of worker to
and from work. Millions of people every day commute only a couple of miles by cars to get to
their professions. Those people who drive 5 miles or less put excess CO2 in the atmosphere that
instead could be not be there if we biked to work. A good example of a nation that utilizes the
bike then any other country would be china. Most of China’s citizens commute to work by
bicycle, yet know people there are starting to drive cars which will only increase the world’s
global warming problems. It would not require much effort for each individual to commute to
work by bike, and in turn this would greatly improve global conditions and set an example for
other nations to cycle to work.

Many people would say that they do not want to go to work sweaty and have no place to
change into dress clothes. In order for these kinds of changes to occur employees should suggest
to their employer that showers and dressing rooms should be added. Biking needs to become
more of a normal transportation in the work force along with car, bus, and train. People who
decide to start commuting by bike should carry wet wipes and a change of clothes for their work
environments. Cycling is truly the vehicle of the future, with no carbon emission, efficient
design, and improvement to our health there in no better time to start commuting to work on a
bicycle.

By Paul Lalancette
Rutgers University Undergraduate