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The issue of parking expansion has sparked strong opinions among students for years, as evidenced by the opinion editorials on parking that are published in the Daily Universe almost every semester. Most students find themselves pushing for parking expansion after dealing with the frustrating experience of a long search for parking leaving them late to class. Even more often, when students find an open parking spot, they are not able to park there without fear of receiving a citation. The parking passes made available for purchase to students only allow them to park in a few lots which are scattered across the outskirts of campus, leaving the lots which are conveniently placed on campus inaccessible for students. There are several possible solutions that students could support, with two of the most common being parking expansion and a university shuttle system.

Students often feel that they should have convenient parking especially when they pay for passes, and want the University to create parking garages or expanded lots to accomplish this. This seems like a simple solution, but analyzing the costs and benefits of expanding parking versus alternative options reveals a much more complicated problem. Parking garages are expensive to build, and with the growth of the BYU and Provo population, there will be continual demand for more. There are also environmental costs associated with driving to class that may be a consideration for environmentally conscious citizens. An alternative to parking expansion is creating university shuttle buses to complement the UVX bus line that can get

students to campus without necessitating new parking facilities. This has the advantage of being more cost effective than parking garages per student and reducing environmental impact. Shuttles reduce driving accidents and improve student safety while at the same time providing a more scalable solution than parking. A well-planned shuttle system could replace the need for parking if it can address student concerns about delays and inconvenience associated with public transit. Students and administrators both are invested in answering the same question: Does expanding student parking benefit student experience in the long run?

Parking expansion is naturally the first solution considered because driving to campus is the status quo and carries with it the convenience and flexibility of deciding one's own commute schedule. This is very enticing for many students who have jobs or other commitments off-campus that require them to drive. Additionally, when a student is off schedule or running late to class, a car can be driven at any time whereas a shuttle follows a schedule that must be planned around.

With this in mind, walking or taking public transportation may seem far less convenient than driving a personal vehicle. However, when you take into consideration the amount of time that is wasted while driving up and down a parking lot looking for an available spot, it becomes less clear if driving is any more convenient.. In fact, students at universities with shuttle systems reported higher satisfaction with commute times and convenience than when driving was the only option for transit (Force 1). Shuttles can take students to all the places a car can get you on campus, or even closer if shuttle stops are placed on campus roads. Typical shuttle systems pass by a stop every 10 minutes, so the amount of waiting introduced by taking a shuttle is actually minimal. After an adjustment period the student population at BYU would benefit from the convenience of a shuttle with no frustration surrounding parking.

Driving can feel like more of a necessity in the winter months when a long wait for a shuttle means standing out in the cold and snow. Taking a car allows students to avoid harsh weather as well as get closer to their final destination when a bus stop isn't nearby. These are valid points, and there are studies showing how public transit usage drops during bad weather for these very reasons (Miao et al. 1). That being said, there are solutions to these problems that still maintain the advantages of public transit over driving for the BYU population. Quality bus and shuttle stop shelters have been shown to mitigate the effect of cold weather on transit usage (Miao et al. 2). Shelters like those used in Provo on the UVX line are perfect for protecting students from the elements as they wait. The University of Chicago even has heated shuttle stops to provide a comfortable rest during the cold winter.

The remaining issue during the winter months is the fact that transit may leave students in the cold by not getting them all the way to their destination. Previous discussion of the shuttle system shows how it can reach anywhere on campus to actually get students closer than they would be able to park. To decrease demand for cars and parking even more, BYU might want to partner with the city of Provo to integrate their shuttle routes with city bus routes that could get students to popular destinations in Provo. Provo is small enough that a relatively small number of routes could significantly decrease the demand for cars and therefore parking. Quality shelters and an integrated shuttle and bus system can solve the problems introduced by bad weather for student commuters traveling by car while decreasing costs for BYU and its students.

A secondary consideration when considering a change in commute patterns is cost. Shuttles are not cheap, so students and school administration would be justified in being concerned about the expense. For students a shuttle system would be far cheaper making the cost side of the decision a simple choice. A car requires insurance, maintenance and gas costs that are

expensive when you consider that young adults are the most expensive to insure and gas prices are rising. Shuttles are affordable enough that most universities provide them to students for free, and cities provide them for under $100 a year if they charge at all. For school administration, the costs of a shuttle system are a significant upfront investment that should be compared to the total cost associated with parking

Cost can be measured in many ways and it can be easy to ignore long term or indirect costs. Something could initially cost more, but if it continues to bring in more money, it will eventually become the better financial choice. Parking garages cost $21,000 per spot on average just to build. A nice shuttle with 20-25 seats is under 100,000 and can cover the transportation needs of hundreds of students throughout the day. The upfront cost of shuttles is far cheaper than a parking garage and they require less long term expenses from security and maintenance than garages. Parking garages need extensive security cameras and police presence to make sure they are being used only by those with passes. A shuttle only needs a machine to scan student ID cards to accomplish the same level of security. Parking lots deteriorate quickly in a state with lots of snow and ice which means they require consistent maintenance and construction. Shuttles are clearly the more cost-effective option when it comes to both short and long-term direct costs.

The discussion of cost so far has considered only direct costs to students and to BYU. Environmental costs are important to consider as well even though they aren't born directly by any particular party. Taking into account environmental cost reflects the university's commitment to responsible stewardship of its resources and citizenship. According to the United States Environmental Protection Agency, transportation is the largest source of greenhouse gas emissions (GHG) in the United States and accounts for 30% of the country's energy demand. Along with that, 58% of the GHG emissions from the transportation sector come from personal

vehicles (EPA.gov). Most cars use gasoline combustion engines which burn fossil fuels at a high rate. This creates massive amounts of pollution that is unhealthy for the whole community. Utah's citizens are advised by the Utah Department of Transportation to carpool, take public transit, or consider working remotely in order to reduce the pollution that contributes to climate change and damages lung health. A switch from individual cars to a shuttle system would drastically reduce the amount of pollution created by transit in Provo. This shift would create a corresponding improvement to air quality and help the environment while diminishing harm done to population health.

Looking beyond the costs, there are also hidden benefits that turn a shuttle transit system into an investment. The American Public Transportation Association says that, "Every $1 invested in public transportation generates $5 in economic returns. Every $1 billion invested in public transportation supports and creates approximately 50,000 jobs. Every $10 million in capital investment in public transportation yields $30 million in increased business sales." While the Provo transit system would be on a much smaller scale, these statistics reflect the fact that public transit is a good investment in a variety of ways. Businesses near stops get new revenue from the increased visibility. Effective and convenient transit around Provo would make it more of a draw for people to move to the area. A recent economic study I conducted showed how UVX increased transit capacity while decreasing total traffic which is very attractive to outsiders looking to move. Convenient commuting creates a larger market for housing, food services, and can boost the overall economy. A shuttle system should be seen not only as a cost-effective solution for students, but also a worthwhile investment that benefits the entire city.

Advocates for expanded parking may think that shuttles are limited and that it is easier to service a large population with parking than with shuttles. This seems reasonable because large

parking garages are how most cities in the west have handled high density populations. This raises a legitimate question over whether shuttles or parking while scale better to meet the needs of a growing student population at BYU. A Stanford study addressed this question for their campus and found that “adding parking lots or constructing parking garages only encourages increased traffic to campus and will not have a positive effect on the air quality of the community” (Polacek). In other words, adding parking tends to exacerbate the problem by increasing car usage. A shuttle system has the opposite effect by decreasing the incentive to drive. It is also much easier to purchase shuttles than construct parking garages which means that this system will adapt much more capably to shifting student demand.

Discussion surrounding public transit often focuses on safety issues. Many students could feel that if they are encouraged to walk or ride public transportation to get to campus instead of driving themselves, their safety may be jeopardized. This is an extremely valid concern, especially for female students at BYU. As reported by the Daily Universe, from January to November of 2021, there were 43 cases of sexual assault or rape reported in Provo. Out of 43 cases, 28 of them occurred within a mile of or on BYU’s campus (O’Rullian). BYU has multiple resources in place to ensure student safety in situations like this. One of them is the SafeWalk app. Through this app, BYU police are able to track your location as you are walking until you reach your destination. BYU police may be notified of an emergency with the use of an emergency button on the app, and keep a close eye on students who are using the app (O’Rullian). These resources can be used while on a shuttle and during any walk to or from the stops.

Beyond criminal activity, it is important to consider the impact on safety from driving accidents. In fact, studies show that public transit is much safer than driving because trained

drivers make fewer mistakes and are lower risk drivers than college students. According to the American Public Transit Association "a person can reduce his or her chance of being in an accident by more than 90 percent simply by taking public transit opposed to commuting by car" (Mackie). Not only is safety increased on an individual-trip basis, but overtime, community and neighborhood safety is increased as public transit use is increased. "Better transportation contributes to more compact development, which in turn reduces auto-miles traveled and produces safer speeds in those areas" (Mackie). Safety is an important consideration when it comes to commuting. Safety concerns can be addressed and even improved when a switch is made from individual driving to a shuttle system.

In terms of convenience, cost, and safety, a shuttle system is as good or better than driving and parking for the majority of people. With those concerns met, there are other benefits of a shuttle system that are worthy of consideration. A shuttle system allows for resources that would have previously gone towards accommodating cars to be redirected elsewhere. There are also social and health benefits that are connected to increased public transit usage. These two kinds of benefits will be considered in turn.

A shuttle system creates lower demand for cars and parking among students. This could free up some of the parking lots on BYU campus and they could be used for other purposes. The University recently built a new music building in the parking lot behind the law school. New buildings for other departments could similarly use old parking lots to create more areas for students to study and take classes. This decrease in parking demand would also mean that fewer students would need parking passes from their apartment complexes. This would create lower cost parking passes for those who truly need a car for other purposes. It is also possible that

parking demand drops enough that more condos could be built to service students where parking once was. This redistribution of resources would strongly benefit students overall.

Perhaps surprisingly, there are social and health benefits to taking public transit like a shuttle due to the shift in life habits. A shuttle creates more opportunities to run into friends on the way to school, and more chances to walk to places the shuttle doesn't go for those without cars. One of the benefits of college life is the social interactions that come from it. The increased social activity combined with the potential increase in walking for students could create positive health and social impacts over time. The social isolation of the pandemic made it clear how beneficial small interactions with other people can be for mental health. A public transit system can create a stronger sense of community for students that driving cannot match.

As explained above, shuttles can be faster than driving when run efficiently. This is not only more convenient, but can lead to long term increases in happiness. In behavioral economics, there is a phenomena called the "hedonic treadmill". It describes how people become accustomed to their current lifestyle so buying something new only improves your happiness for a short time until you get used to having it. The only things that have been shown to not fall into that trap are time with friends and family, exercise, and shorter commute times. Even the small change to commute times could potentially create more lasting daily happiness for students that don't have to deal with the frustration of a long commute.

Taking a shuttle to work benefits students across the board by creating social interaction and allowing for campus resources to be used on other things that improve student life. A shuttle is also the best option in terms of cost, safety, and convenience. There are a few barriers for such a positive change to actually occur. Many students aren't used to public transit and will likely not realize how great a shuttle system could be. BYU administrators also need to recognize the need

for a change towards a shuttle. The quick uptake of the UVX train by students is evidence for student demand for other transit options and could be referenced in appeals to administrators. Outreach to other students and campus administrators will be essential for raising support for a shuttle system and ultimately implementing it.

Students who are convinced of the merits of a shuttle system should do their part to raise awareness and increase support for it. The decision to actually make a change towards a shuttle system would need to come from BYU administration with potential cooperation from Provo City. BYU sends surveys out to all graduating seniors about the BYU experience with questions about how student services can improve. This is an ideal time for student voices to be heard with regards to transportation. For students who are not seniors, they can raise awareness in other ways. This could include writing articles to be published in the Daily Universe, or simply mentioning the benefits of a shuttle system to friends when the inevitable complaints about parking come up in conversation. If enough popular support is raised, a change to a shuttle system could happen fairly quickly and resolve many common complaints about parking at BYU. A switch to a shuttle system would improve student experience at BYU while allowing the school to adapt more readily to student needs.

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