

Colorado State University Student Transportation Use

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Background Information

Sustainable transportation leads to a variety of social, economic, and environmental benefits. Currently, we are experiencing a trend where more automobiles are being driven for larger distances, and with fewer people traveling in them (Steg & Gifford, 2004). Our current transportation system is not sustainable and can lead to a variety of negative effects on one's quality of life, as well as the environment. Additionally, approximately 25% of worldwide carbon emissions come from transportation (Zhao et al., 2020).

The city of Fort Collins has some of the best bike lanes and multi-use paths, and this all connects with the CSU campus. There are more than 500 km of bike lanes or multi-use paths in Fort Collins (Good et al., 2015). The entire CSU campus was designed around considering bikers and pedestrians (Parking and Transportation Services). However, we are still seeing an increase in students who drive to campus. Therefore, more research needs to be done to understand why students make the choice that they do about their primary and secondary modes of transportation. This information can then be used to form new systems to increase the use of buses, biking, and walking.

Methodology

To conduct this project, we sent out a survey to CSU students containing questions about demographics as well as transportation methods and what factors encourage or discourage use of the bus system. This survey was distributed using google forms, which allowed both easy access for the responders and allowed our group to easily get responses into a spreadsheet for analysis.

Our project also involved an in-person interview with Aaron Fodge, the Director of Alternative Transportation for CSU. The purpose of this was to get the University's perspective on sustainable transportation, and see if the issues students brought up in the survey matched the areas the University is addressing. He also gave us CSU's 2022 Transportation Survey results, allowing us to more directly compare our data.

Survey Questions

1. What year are you? (multiple choice)
2. What if your major (and minors if any)? (short answer)
3. Are you an in-state or out-of-state student? (multiple choice)
4. Which housing statement best describes where you live? (multiple choice)
 - a. On campus | Apartment complex | House | Other
5. If you live off campus, how far away is your house / apartment / other from campus? (ratio scale)
 - a. Less than 1 mile | 1-5 miles away | 6-10 miles away | 11-15 miles away | 16+ miles away | I live on campus
6. What is your primary mode of transportation to get to campus? (multiple choice)
 - a. Bike | Walk | Drive | Bus | Skateboard | Carpool | E bike / scooter | Other
7. Why is this your primary mode? (open-ended)
8. What (if any) alternative modes do you use to get on campus? (multiple choice)
 - a. Same options as primary mode of transportation
9. When would you choose to use an alternative form of transportation (if you use one at all)? (open-ended)
10. Could CSU make any improvements to their bus system that would persuade you to consider making that your main mode of transportation to, from, and around campus. How? (open-ended).

Interview Questions

1. What is your job at CSU? What do you do for this job?
2. Why should students be concerned about sustainable transportation?
3. What modes of transportation do you think students use most often to get to, from, and around campus?
4. Why do you think students choose to use these modes of transportation?
5. How does CSU choose to advertise its bus system to students?
6. Do you feel like this is an effective method of persuading students to take the bus?
7. What challenges is CSU facing when trying to get more students to take the bus?
8. Do you feel like there is anything that CSU could do to make taking the bus more attractive to students?
9. Is CSU taking any other action to help students make a sustainable transportation choice?

Objective

This project focused on CSU students and their primary and secondary modes of transportation, as well as the reasoning behind these choices. This information can then be used to help nudge behavior choices toward more sustainable modes of transportation.

Results

Our survey found that a large portion of students use sustainable transportation methods like walking or biking. However, this percentage is much lower in the CSU survey. This may have been because we had a higher percentage of responders from natural science or health-related majors, due to the fact that we are in those majors and promoted the survey to people we knew or were in classes with.

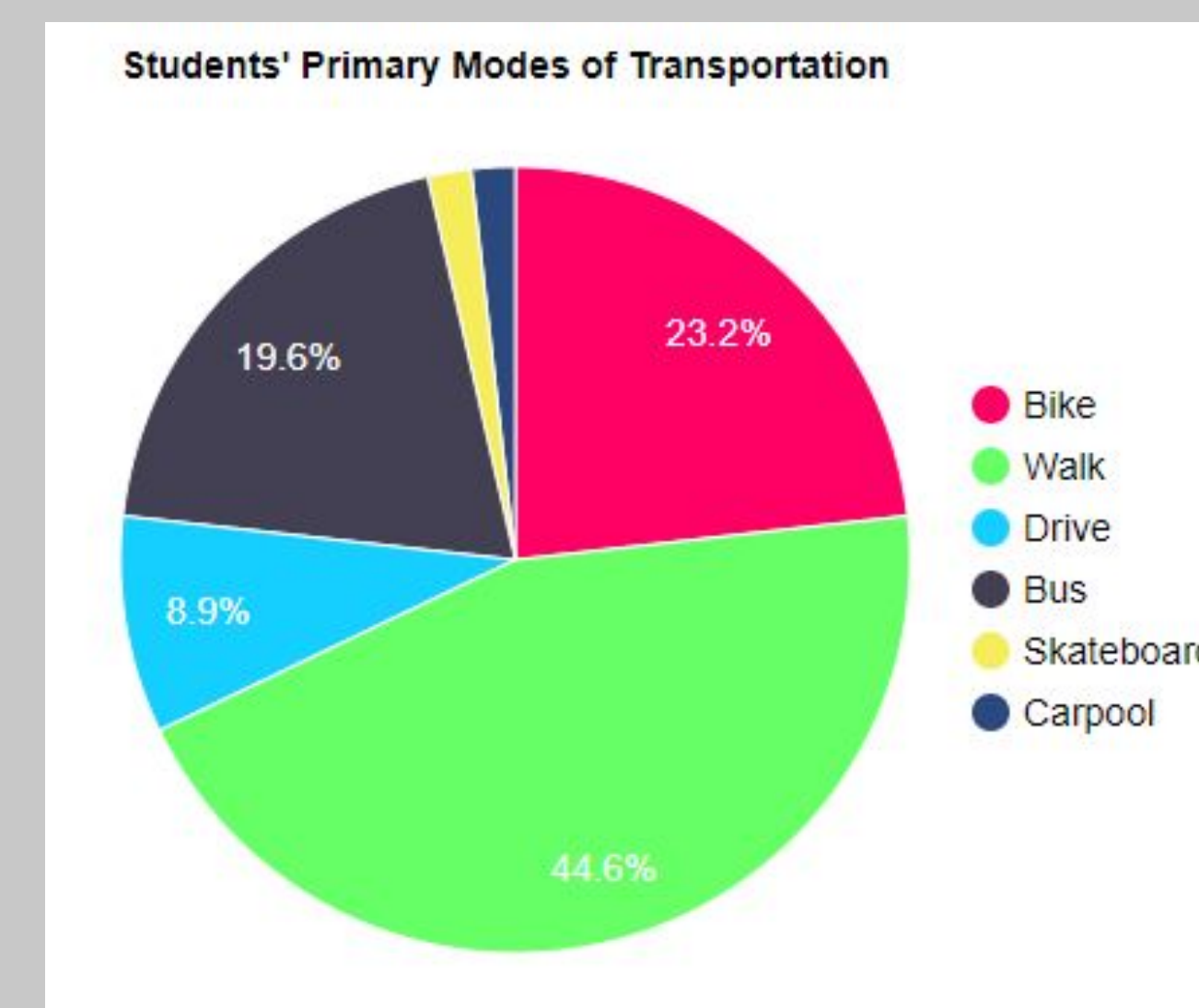


Figure 1: A pie chart showing the responder's primary modes of transportation. 44.6% listed walking as their primary method, 21.4% listed biking, 19.6% listed the bus, and 8.9% listed driving. All other modes of transportation totaled less than 6%.

About 6% more people reported using a personal vehicle as secondary transportation in the CSU survey than in ours. Our survey responses also showed higher rates of walking, biking, and taking the bus than the CSU survey. Skateboarding and carpooling had higher response rates in our survey as well, but they were some of the least common methods in both surveys.

Code	Number of Codes
No alternative	4
Weather	28
Scheduling (aligns or doesn't align with bus routes)	3
Physical ability or distance	4
Location of alternative methods	11
Convenience or to save time	21
Mechanical issue (car/bus breaks down)	2
Save money	5
Type of trip	1

Table 2: Qualitative analysis for the reasonings given for using alternative transportation methods. Weather and time limitations/convenience were the most common, and mechanical issues or what materials someone was bringing with them were the least common.

STUDENTS: YOY PRIMARY MODE						
Primary Mode	2017	2018	2019	2020	2022	YOY*
driving a personal vehicle	32%	28%	30%	32%	43%	+11%
taking the bus	26%	31%	26%	21%	23%	+2%
walking	19%	23%	26%	22%	20%	-2%
biking	20%	14%	14%	17%	9%	-8%
car/van/pooling	<1%	2%	1%	2%	1%	-1%
getting a ride	<1%	1%	1%	2%	1%	-1%
skateboarding	1%	1%	1%	1%	1%	--
ride sharing	--	--	--	0%	<1%	+<1%
e-scooters	--	--	--	<1%	<1%	--
virtual classes	--	--	--	<1%	<1%	--
other	<1%	0	1%	2%	1%	-1%

Table 4: A table from the CSU Parking and Transportation Services Annual Survey showing the primary transportation methods used by CSU students and how they have changed over recent years (2022). Data not collected for 2021 due to pandemic lockdowns potentially causing skewed data.

Code	Number of Codes
Lives close to campus	21
Convenient	18
Fun or good for mental or physical health	6
Quick	7
Flexible schedule and Reliable	4
Cheaper	12
Environmentally-friendly	3
Don't have other modes	2
Other	10

Table 1: Quantitative analysis of the reasons given for using the primary mode of transportation. The most common reasons included proximity to campus, convenience, and financial reasons. The least common reasons given were environmental impact and not having other methods.

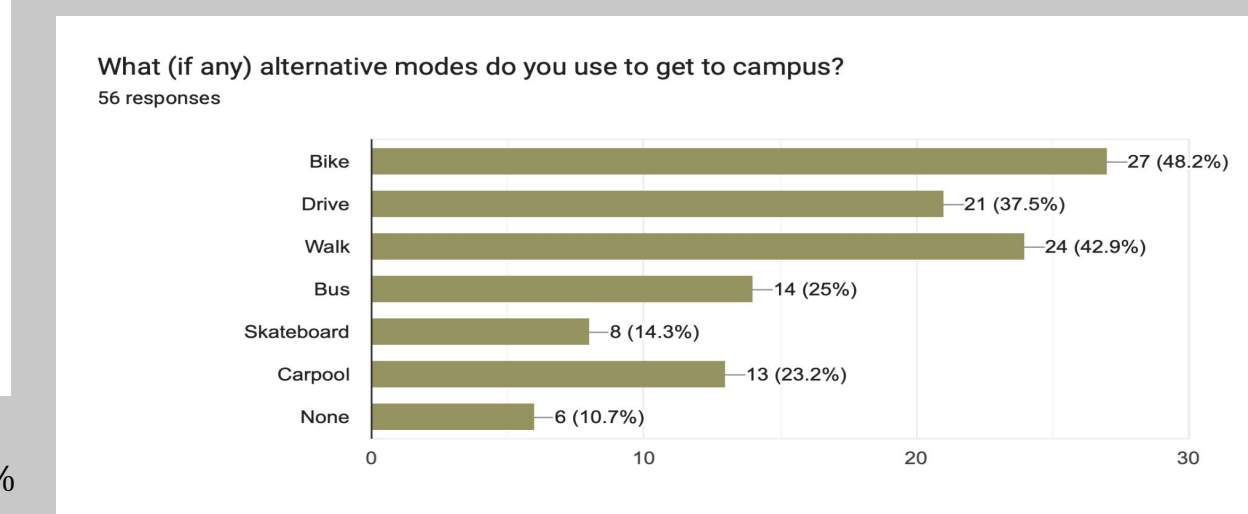


Figure 2: A bar graph showing the alternative methods of transportation used by the people who responded to the survey. Biking, walking and driving were the most common, with skateboarding being the least common.

-Aaron Fodge informed us that the buses used to run later and much more frequently, but this changed during the pandemic. CSU Transportation and the City of Fort Collins have been trying to hire more bus drivers but are having trouble finding people.

-Students said that the buses don't run where they need them too. Aaron Fodge informed us that CSU and the City of Fort Collins are working on an addition to the bus line that would run east and west across the north side of campus.

-Covid has prevented, members of CSU Transportation from meeting with freshman and their families in person during orientation to talk about other modes of transportation.

Code	Number of Codes
More frequency	13
Easier to understand	11
Run later on weekends	10
More stops	10
I live close to campus	8
I like the bus already	4
Not really	5
More safety	1
More advertising	2
Too crowded	1
Don't like busses	1

Table 3: Qualitative analysis for the question of what would encourage students to use the bus system more. Adding more buses during busy times, running the buses for longer, reducing confusion around the bus schedule or increasing the area of bus routes were the most common reasons given.

STUDENTS: YOY SECONDARY MODE						
Primary Mode	2017	2018	2019	2020	2022	YOY*
driving a personal vehicle	21%	24%	27%	26%	23%	-3%
taking the bus	17%	17%	14%	18%	10%	-8%
walking	16%	11%	15%	15%	17%	+2%
biking	18%	19%	14%	12%	11%	-1%
car/van/pooling	4%	5%	6%	4%	9%	+5%
getting a ride	4%	4%	5%	5%	5%	--
skateboarding	2%	3%	2%	1%	2%	+1%
ride sharing	--	--	--	0%	<1%	+<1%
e-scooters	--	--	--	1%	1%	--
virtual classes	--	--	--	--	1%	--
other	0	0	0	0	1%	+1%
no second mode	17%	17%	17%	18%	20%	+2%

Table 5: A table from the CSU Parking and Transportation Services Annual Survey showing the secondary transportation methods used by CSU students and how they have changed over recent years (2022).

Conclusion

This data has far-reaching implications on both the Colorado State University community, the wider Fort Collins area, and even locations across the country. Not only will it give the CSU valuable input as to the methods of transportation that their students use, it also provides them with crucial information about ways that they can encourage students to use more sustainable transportation in the future. Additionally, this data can be used to improve the transportation infrastructure of the city of Fort Collins as a whole. For instance, the city bus system is closely associated with the CSU bus system, so many of the desired changes that students mentioned would be even more beneficial if they were applied to the whole community. Our data could also be useful on a nationwide scale, especially for other universities similar to CSU. Sustainable transportation is a goal that many universities' now hope to reach, especially with sustainability becoming a more important criteria for many prospective students. Therefore, a research project like this could greatly help them to get ideas of what types of transportation that students typically use, in addition to ways to make sustainable transportation more appealing to them.



References

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