**DUKEPOOL: Reducing Student Emissions through a Mobile Carpooling App**

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**Motivation**

Since 2007, Duke University has reduced greenhouse gas emissions by 24% as part of its Climate Action Plan. However, transportation-related emissions have increased by 31%, and Duke's calculations do not include emissions from students. We decided to create a mobile carpooling application for students who live off campus to help reduce these emissions. To inform our app design, we used surveys and collected valuable data about student transportation to and from campus.

**Methods**

- Meeting with Duke Sustainability Office
- Survey distributed to Juniors, Seniors, and Graduate students to determine driving patterns and emissions baseline
- Meeting with Duke Transportation Office to review incentives
- Focus group of 11 peers to evaluate app features
- Adobe Creative Cloud XD CC to create app prototype

**Survey Results**

- 36% of students who live off campus drive alone
- 27% of students who live off campus take the bus
- 10% carpool
- 70% of students live in high-density residential complexes
- Students go to campus 5x per week
- Juniors and Seniors are more likely to drive alone than graduate students

**Features**

- **Riders:** Choose pickup location, destination, and time slot
- **Drivers:** Choose pickup location, destination, time, and number of seats in car
- **Filter:** Ability to filter both passengers and drivers by a friends feature
- **Rate:** Anonymous rating will allow feedback and transparency

**Incentives**

At the start of a carpool, the app would produce a unique barcode that the driver could scan at the entrance to a parking lot. This would register the carpool and its occupants.

With this data, Duke could offer two incentives:
- **Refunds on parking passes**
  - Based on number of carpools a student has completed and car occupancy
- **Better parking spots**
  - Designated spots in Zone 1 & 2 of Blue Zone
  - Barcode would link to car's license plate, so Duke parking enforcement can verify carpooling cars

**Environmental Benefits**

- Based on our survey results, we calculated the baseline CO₂ emissions from student commuting and the associated reductions in emissions due to increased carpooling.

**Assumptions**

- 11 - total no. of trips per week per student
- 2.5 - Distance (miles) traveled per trip

**Emissions**

- 1 trip per student leads to 2.18 lbs of CO₂ emissions
- Total Weekly Trips (all student commuters) lead to 84,815 gallons of gasoline usage

**Gasoline**

- 1 trip per student leads to 0.11 gallons of gasoline usage
- Total Weekly Trips (all student commuters) lead to 78.5 tons of CO₂ emissions

**Mode Sharing**

- Current Mode Share - 84% drive alone, 16% carpool
- New Mode Share with the use of app - 50% drive alone, 50% carpool can lead to a 25% decrease in emissions

**Looking Forward**

The next steps for creating this application:

- Development of the app
  - Cost around $20,000
- Continued coordination with Duke's administration in order to solidify incentives for carpooling and ensure the app is free for all students
  - Work with the Duke administration to gauge what would be an appropriate amount to refund on parking pass and what parking spots they could offer to carpoolers.

We think our app has the potential to make a large impact on student transportation at Duke. We believe Duke will continue to lead by example in sustainability as the university works towards its 2024 goals.