



# HOW TO IMPROVE OUR CURRENT ON-CAMPUS METERED PARKING SYSTEM

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## Motivation / Research Question

On January 1st, 2011 the rates for the metered parking spots behind CMU were increased by the Pittsburgh Parking Authority to \$2 per hour from \$1 per hour, and the hours of enforcement for these meters were increased from 6 p.m. to 10 p.m. for all days except Sunday. This change has prompted both positive and negative commentary from the campus community as well as politicians, and thus we sought to research whether the net satisfaction of the people who are most affected, the CMU campus community, has been positively or negatively altered.

Our survey asked questions regarding satisfaction with the current system, including pricing and times when meters are checked, as well as satisfaction with a couple of potential solutions, including acceptance of other coins at the meters and acceptance of credit and debit cards at the meters. We also included demographic questions in order to check who is most affected by the metered parking system and what their opinions were as well as to see what the general opinion of non-car owners is regarding the system. Our survey methodology and analysis of the results are detailed below.

## Survey Methodology

Our target population contains all students and faculties at Carnegie Mellon University, so we chose C-Book as our sampling frame to avoid too much coverage error. We used a random number generator to obtain hundreds of sets of page number, column number and item number, and the corresponding person was added to our data set. In the first phase of our data collection process, we sent out 799 emails to students and 274 emails to faculties but only got 87 responses. Due to the low response rate (8.1%), we sent out reminders after one week to 700 students and 164 faculties, and received 113 responses in total. The overall response rate was 10.5%. Although in our initial sample size calculation, to ensure a 0.076 Margin of Error, we need 166 students and 133 faculties, we had to cut off data collection after the second phase because of time constraint. The response rate for students was 7.5% and that for faculties was 19.3%.

## Survey Results

Car owners were in fact far less positive about the parking system in Overall terms than non-owners. In terms of mean satisfaction, owners were significantly (at the 0.05 alpha level) less satisfied than their owning counterparts. Additionally, the more education a respondent had, the lower their reported Overall satisfaction, with the most satisfied being Freshman and the least satisfied being Faculty. This is, of course, in part due to the difference in the proportion of drivers and non-drivers between students and faculties.

Again, we see a similar relationship between Cost Satisfaction and Class as between Overall Satisfaction and Class. Freshman has the highest mean at 3 followed by Sophomore, Junior, and Senior at 2, with Masters, Ph.D. and Faculty at one. In terms of possible improvements, we asked respondents how much more satisfied will they be and how much more often will they park on certain streets if multiple coins/ credit card can be paid at the metered spots. It turned out most people will be much more satisfied and park there more often if they are able to pay with credit/debit cards. Therefore, one way to improve our on-campus parking system is to allow people to pay with credit/debit cards.

## Discussion of Results / Future Research

Overall, we conclude that a majority of the CMU community members are dissatisfied with both the cost and the quality of the metered parking spots on campus.

One of the strengths in our survey is the demographic questions where students and faculty members provided their class status, and these information help us understand whether the dissatisfaction of the current parking system is related to their class status in the post-survey process. A potential weakness in our survey is that participants in our study might overstate their dissatisfaction regarding the cost and the quality of the current parking system. Another weakness in our survey is the high non-response rate due to unit-nonresponse as well as item non-response.

For the future survey projects, incentives such as raffle for gift cars should be available to motivate the students for participation. Also ,We have yet understood whether there is a competition between the parking spaces in East Campus Garage and University Center Parking, and it would be interesting to understand if there is an increasing level of dissatisfaction due to the other existing parking facilities around the campus.

Type A: Demographic based questions

In what college do you belong to? (Only apply to undergraduate students)

Please select your gender

Type B: stratum-designating question

a) Class year and status

Please select which of the following best describe you:

Undergraduate-first year; Undergraduate-second year; Undergraduate-third year; Undergraduate-fourth year; Undergraduate-fifth year; Graduate-Master program; Graduate-PhD program; Faculty

b) Car ownership

Do you own a car that you use (either regularly or occasionally) to commute to and from CMU?

Do you use a friend's or family member's car to commute to and from CMU (either regularly or occasionally)?

c) Questions regarding parking habits

How many times in an average week in the past semester have you parked at a metered spot on Tech Street, Frew Street, or surrounding Schenley Park? If you leave campus and return on the same day please count each distinct number of times you have parked.

d) Overall satisfaction/fairness toward pricing

Please state your overall satisfaction with the metered parking spots on Tech Street, Frew Street, or surrounding Schenley Park. Think about the time periods in which the meters are checked, costs of parking, space availability, etc.

e) Possible improvements

How much more or less satisfied would you be if the following scenario happened?

(Check one box in each column)

	Much Less Satisfied	Less Satisfied	Equally Satisfied	More Satisfied	Much More Satisfied	I don't know
You are allowed to pay with multiple kinds of coins (quarters, dimes, nickels) at the metered spots.						
You are allowed to pay with credit and debit cards at the metered spots.						

