

100/100

please do not do the "survey on the windshield" method. there are too many selection bias issues to believe this would create a representative sample.

on the other hand, randomly sampling email addrs' from cbook seems fine to me.

# Team\_C\_I.3

*by* Shu Wang

Nb, you probably want to use a stratified sample, with at least the strata "faculty" and "students", since their experiences are probably rather different.

## How to improve our on-campus parking system?

Team members: Shu Wang, Yijia Zhou, Silvia Manolache, Nicholas Thieme

A.

The city of Pittsburgh has recently increased the rates at the parking meters on Frew and Tech Streets. They have also increased the hours at which the meters must be paid: until 10pm on all days except Sunday. However, this has created a lot of problems for the users of these spaces – the students, staff, and faculty at CMU. We want to implement a survey in order to understand what the effect of this policy on the community at CMU. It is possible that there are better, more efficient ways for the parking on Frew and Tech Streets to be handled, either by CMU or by the city of Pittsburgh. For instance, if nobody parks behind on these streets any longer, the city loses revenue instead of gaining revenue as expected.

B.

The basic question we wish to analyze is how satisfied are members of the CMU community with the current parking conditions on Frew Street, and what kinds of alternatives would they find more satisfactory. We will ask questions such as, (we can also use anchoring vignettes!) how much inconvenience does it cause you that the only method of payment at the meters is quarters? We will also ask how much more convenient various alternatives would be, such as offering a day pass for parking at a meter, or lowering the price at the meters.

C.

A good bit of research, from parking rates and meter use to consumer perceptions of parking, has been done. The research on this topic is presented below:

(1)

### **Financial Analysis of Parking Assets of the Public Parking Authority of Pittsburgh-**

<http://www.city.pittsburgh.pa.us/council/assets/parkingassets/meterstudy.pdf>

This contains a range of details about parking in Pittsburgh, including comparisons of its meter costs with other US cities, graphs of peak times that meters are used, and historical revenues due to parking. It could be used to suggest price ranges that may seem fair to our sample, and to compare the use of meters now with previous meter use.

(By Silvia Manolache)

(2)

### **Parking Research**

[http://www.city.pittsburgh.pa.us/council/assets/parkingassets/Final\\_Report\\_Sept\\_22.pdf](http://www.city.pittsburgh.pa.us/council/assets/parkingassets/Final_Report_Sept_22.pdf)

Finance Scholars Group

September 24th 2010

This is a report regarding monetizing Pittsburgh's parking assets completed by a

professional finance consulting firm. It describes a number of different ways to increase revenues from parking. This is a relevant document as it describes a number of different methods that are currently being used in Pittsburgh, as well as methods which could be implemented but are not that may potentially make the parking system more efficient (By Nicholas Thieme)

(3)

#### **On-Street Parking Meter Behavior**

<http://141.213.232.243/bitstream/2027.42/64/2/74189.0001.001.pdf>

The study included both an analysis of historical data and a survey of selected on-street parking meter sites in Ann Arbor area, and the objective of the study is to examine the questions of parking behavior, trying to understand the violation conditions and law enforcement results. The studies found that 1/3 of parking vehicles violate meter regulation while only 5.9 % was issued a citation.

(By Yijia Zhou)

(4)

#### **University Parking Survey**

<http://facweb.knowlton.ohio-state.edu/jevanscowley/crp852/survey.pdf>

In this survey, the University District randomly asked residents their household's parking habits, work and commute characteristics, parking problems and improvements they would like to see so that they could determine the current parking situation and improve it in the future. They found that the most frequent improvements noted are: improved safety, more parking lots, more parking spaces and improved transit.

(By Shu Wang)

D.

For our study, the sampling frame is people whose e-mail address can be found in the c-book or on the CMU website directory. (We may have a problem using the directory because of its disclaimer not to use the directory for solicitation of information)

yes, cbook is a better choice

E.

The target population is going to be students and faculty members of CMU who own a car and have utilized the parking spaces on Frew Street at least once since the beginning of the Fall 2011 semester. Our sampling frame is larger than the target population since we may reach people who don't have a car or have not parked on Frew Street since the start of the fall 2011 semester. Thus, we have over-covered our target population. As we mention below, we can reduce this error by standing on Frew Street and attempting to survey people who we observe parking there. Or, we may leave a survey in the windshields of cars parked on the street and request that it be returned to us in the UC. Since by leaving surveys we will have reduced our frame substantially (and biased our sample because people who have already parked on

why restrict in this way? it might be that some don't own a car or use campus parking because the parking situation is so bad; you will miss these responses....

This is a bad idea. You cannot guarantee representativeness this way, but if you do a random sample from Cbook you can guarantee representativeness.

Frew Street may have done so because they are less annoyed than others by the parking conditions), we feel it is important to also send emails. Duplication can occur if we send emails to the same people who we contact on Frew Street. This can be reduced if we ask participants on Frew Street whether they have filled out our survey before.

F.

We have chosen to use email as our mode of reaching our sample, but we are also considering leaving surveys on windshields or conducting in person surveys by standing on Frew Street. We will make final decisions regarding this depending on whether we may use the directory to reach faculty and staff or not. If we cannot use the directory, we will probably leave surveys on windshields. Email is the only way we can reach a fair number of dissatisfied and satisfied people without risking bias, which is why it is our first choice. However, if we cannot reach faculty in this way, because they are a large part of our target population, we will amend our technique.

bad idea. use email addresses in a sample taken from cbook.

G.

Satisfaction score (outcome variable, range from 1 to 10)

Several indicator variables are:

Hours (On average how many hours per week do you park in the certain area?)

Availability (What percent of the time can you find a parking spot easily?)

Quarters (Do you always carry enough quarters to pay?)

Tickets (How often do you get tickets?)

Length (On average how long do you park there at a time?)

Satisfaction with various methods of fixing the parking situation, such as allowing meters to take credit cards, lowering the price, allowing purchase of a daily parking pass, etc.

H.

We have decided to choose this parking project because it seems more interesting to us and also very doable. Moreover, there certainly exist some problems in our current on-campus parking system and we would like to contribute some findings and even improve the system.

I.

For the IRB form, we'll start filling it out and submit on Mar.8<sup>th</sup>

J.

For the survey, the only things we want to find out are people's satisfaction towards our current on-campus parking system and their parking habits, as well as their suggestions, so they are really not private. But our survey will be anonymous. We might have to write down the license numbers of those people we already gave a survey to or e-mail addresses of the people we sent out a survey, but they are just for recording purposes in case we send out survey to the same people.