Experiment and Metrics Design

Facts:

1. The neighboring cities of Gotham and Metropolis have complementary circadian rhythms

2. On weekdays, Gotham is most active at night, and Metropolis is most active during the day.

3. On weekends, there is reasonable activity in both cities.

4. However, a toll bridge, with a two-way toll, between the two cities causes driver partners to tend to be exclusive to each city.

Proposal:

The Ultimate managers of city operations for the two cities have proposed an experiment to encourage driver partners to be available in both cities, by reimbursing all toll costs.

Questions:

1. What would you choose as the key measure of success of this experiment in encouraging driver partners to serve both cities, and why would you choose this metric?

    A. The metric would be the driver availability before the experiment, and the availability during the experiment (post-experiment availability - baseline availability)

    B. I would choose this metric since it is simple, and thus easy to convince others of the results.

2. Describe a practical experiment you would design to compare the effectiveness of the proposed change in relation to the key measure of success.

    C. Experiment 1
    Measure baseline and then measure the effect of reimbursing toll costs has by measuring post baseline. Caveat: time would be an uncontrolled factor (that is, the past may not be a good baseline for what's happening in the present). A simple t or z-test would be sufficient for testing the differences between the two groups.

    D. Experiment 2
    To control for time, another experiment would be to split the drivers into two groups - ones that receive reimbursement and ones that do not. Caveat: if the drivers talk to each other, they may become angry that some receive reimbursement and others do not, then complain to the city about unfair practices, etc. A simple t or z-test would be sufficient for testing the differences between the two groups.

Experiment 1	Pre-Experiment: Number of times visited both cities (weekday)	During Experiment: Number of times visited both cities (weekday)	Pre-Experiment: Number of times visited both cities (weekend)	During Experiment: Number of times visited both cities (weekend)
Driver 1	10		3	
Driver 2	0		4	
Driver 3	4		2	

Experiment 2	Reimbursed?	Number of times visited both cities (weekday)	Number of times visited both cities (weekend)
Driver 1	Y		
Driver 2	N		
Driver 3	N		