Template Format

This template can be used to organize your answers to the final project. Items that should be copied from your answers to the quizzes should be given in blue.

Experiment Design

Metric Choice

Invariant Metrics Selected:

Number of cookies - Invariant Metric
Number of clicks - Invariant Metric

Evaluation Metrics Selected:

Gross Conversion - Evaluation Metric
Net Conversion - Evaluation Metric

Explanation for invariant Metrics:

Before discussing the reasons for selecting the following invariant metrics, it is important to understand the goal of the study. The business goal here is to ensure that students are not frustrated after enrolling in the free trial and end up leaving the course. Thus, it would allow not only for the students's experience with audacity but also ensure that each enrolled student gets proper attention from the coaches.

Keeping in mind these goals I selected the above metrics as invariant that is to say they won't change over the control or experiment group.

- I selected number of cookies, number of clicks as invariant simply because the change we are testing does not really affect the usability of free trial button, the users who view the course overview page or the click through probability of free trial button.
- Simply, put the experiment is designed to look at the overall conversion from starting free trial to proceeding to checkout and later completing the course.
- If the number of users who went on from going to free trial to checkout to course completion is more after the change is introduced, the experiment can be said to be successful.

Explanation for Evaluation Metrics:

- gross conversion for the simple fact that the screen is shown just before clicking the free trial and proceeding to checkout. Thus, this becomes one of the important metrics to be considered for evaluation.
- You would later also want to track the users who went on to make the first payment and did not cancel on their subscription midway through the free trial. This is important as you are already letting them know the hours they wish to commit by letting only users who indicated atlas 5 hours a week proceed to the checkout.
- gross conversion simply tracks a user to the checkout, but the net conversion looks at the entire set of operation, which includes from clicking on free trial, checkout,completing the trial period and finally making the first payment.

All the above have a direct relation to the feature we are testing and hence become candidates for evaluation metric.

Measuring Standard Deviation

Standard deviation for my metrics are
Gross Conversion:0.0202
Net Conversion:0.0156

Since both the evaluation metric are probabilities, they can be assumed to have a binomial distribution, thus not needing ay kind of empirical estimate. Hence, I feel it won't be necessary to an empirical analysis.

Sizing

Number of Samples vs. Power

I decided to not use Bonferroni's correction, because I felt that the events have a correlation between them. Using the R code provided, I plugged in the following values to get a page view of 169810 in each group:

required_size(s=0.0156*sqrt(5000), d_min=0.0075, Ns=seq(10, 500000, 100))

This was done due to the fact that unit of diversion in our study is a cookie. the analytical estimates of both gross conversion and net conversion were made based on 5000 page views. It cannot be assumed that cookie and page views have a 1:1 correspondence. Hence, I went ahead with the above calculation.

Duration vs. Exposure

I would divert around 50% of the traffic to experiment and 50% to control group respectively. as far as the risk is concerned, Udacity could lose potential candidates who could perform well with less commitment to the course. The experiment should be run for around 2-4 weeks based on the page views calculated.

Experiment Analysis

Sanity Checks

number of cookies: 0.4988- 0.5012 Observed:0.5004 passes test
number of click on start free trial:0.4979 - 0.5021 Observed:0.5004 passes test

I used the method as described in lesson 5. I assumed a 50% split in experiment and control group. using which I computed my standard deviation and my margin of error. Observed calculations were done by using the values from the control group.

Observed: Ncntrl/(Ncntrl+Nexp)

Both the metrics pass the sanity test, hence suggesting to move ahead with the experiment.

Result Analysis

Effect Size Tests

gross conversion:-0.0736 - 0.0321
Net conversion:-0.0663 - 0.0565

Sign Tests

gross conversion: 0.0106 statistically significant
net conversion: 1.0000

Summary

I did not go ahead with bonferoni's correction, simply due to the fact that my evaluation metrics were depended on each other. Both gross conversion and net conversion move together thus suggesting that Bonferroni's correction would not be significant.

Recommendation

I would go ahead with launching the experiment because gross conversion is statistically significant and hence it would be productive to launch

Follow-Up Experiment

I would go ahead with userid as my unit of diversion. The metrics would be the same. I would use the alternate hypothesis as opposed to the null hypothesis used in this experiment.