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Metric Choice

List which metrics you will use as invariant metrics and evaluation metrics here. (These should be the same metrics you chose in the "Choosing Invariant Metrics" and "Choosing Evaluation Metrics" quizzes.)

Metric	Type	Why? And Expected Results?
Number of Cookies	Invariant	Number of unique cookies should not be effected here since the experiment is testing for post “Start Free Trial” Experience. Should remain same in each recipe (Control/Test)
Number of Clicks	Invariant	Since the free trial experience is triggered post “Start Free Trial” Experience number of clicks should remain same in each recipe (Control/Test)
Click through probability	Invariant	Unique Cookies those who click free trial remains will not be effected by this test since the test is triggered post click. Should remain same in each recipe (Control/Test)
Gross Conversion	Eval Metric	Great metric to track the influence the experience had in effecting the number who converted. Expecting this to be significantly different than control group.
Net Conversion	Eval Metric	Measure of how many converters came from top of the funnel those who clicked start free trial with one payment. Since the experiment intent to see higher conversion rate for students to continue than users who only click the button.

Retention	Eval Metric – but will not use since it will take longer to measure	People who are serious about the course will stay enrolled – should be higher for experiment group than the control group.
User_ID	Not an invariant	Since user_id is only for those who end up taking the free trial/signing up it will not be equal in both test and control buckets.

Gross Conversion we should expect after the experiment to significantly reduce the number who left trial because they don't have time commitment. (Significantly different than control group). We do not want to compromise loosing Net conversion due to this launch so in order to launch we must ensure that experiment group does not cause a decrease to the net conversion.

Measuring Standard Deviation
List the standard deviation of each of your evaluation metrics. (These should be the answers from the "Calculating standard deviation" quiz.)

Gross Conversion: 0.0202
Net Conversion: 0.0156

Since unit of analysis is the same as unit of diversion, we can expect the empirical to be the same.

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Sizing
Number of Samples vs. Power
Indicate whether you will use the Bonferroni correction during your analysis phase, and give the number of pageviews you will need to power you experiment appropriately. (These should be the answers from the "Calculating Number of Pageviews" quiz.)

Not using Bonferroni Correction.
For Gross Conversion you will need: 25,835 cookies who clicks with alpha of 0.05 and beta of 0.2
For Net Conversion you will need 27,413 cookies who clicks with alpha of 0.05 and beta of 0.2

Looking at above numbers, we can use the bigger number 27,413 but multiply by 2 to get the total number and divide it by the the probability of someone actually clicking "Start Free Trial" = 685,325

Duration vs. Exposure
Indicate what fraction of traffic you would divert to this experiment and, given this, how many days you would need to run the experiment. (These should be the answers from the "Choosing Duration and Exposure" quiz.)

This is low risk test since those who are adamant about enrolling will definitely enroll and continue. Furthermore, we are not dealing with sensitive data and not making a monumental change that might cause a news/blog leak. I would divert 100% of the traffic and run the experiment for approximately 18 days (40,000 unique cookie pageview per day)

Experiment Analysis
Sanity Checks
For each of your invariant metrics, give the 95% confidence interval for the value you expect to observe, the actual observed value, and whether the metric passes your sanity check. (These should be the answers from the "Sanity Checks" quiz.)

Metric	Type	CI
Number of Cookies	Invariant	0.4988,0.5011 Obeserved: 0.5006
Number of Clicks	Invariant	0.49588,0.50411 Observed: 0.5004
Click through probability	Invariant	0.08121,0.08304 Observed: 0.0821

All sanity checks pass since the observed is within the CI.

Result Analysis
Effect Size Tests
For each of your evaluation metrics, give a 95% confidence interval around the difference between the experiment and control groups. Indicate whether each metric is statistically and practically significant. (These should be the answers from the "Effect Size Tests" quiz.)

Gross Conversion	Eval Metric	CI: -0.0291,-0.0120 Reached Statistical Significance Reached Practical Significance
Net Conversion	Eval Metric	-0.0116,0.0019

		Not reached Statistical significance Not reached Practical Significance

Sign Tests

For each of your evaluation metrics, do a sign test using the day-by-day data, and report the p-value of the sign test and whether the result is statistically significant. (These should be the answers from the "Sign Tests" quiz.)

Gross Conversion: pvalue=0.0026 (Stat Sig)
Net Converison: pvalue=0.6776 (No Stat Sig)

Summary

Bonferroni Correction will not be used for this test. The use of Bonferroni Correction is more useful when we have multiple metrics and we only need one of them to meet the criteria to launch. Since we need both Gross and Net conversion, where we want Gross Conversion to increase and Net Conversion to not decrease, to meet the criteria. Bonferroni Correction will not be used here.

Recommendation

Make a recommendation and briefly describe your reasoning.
Gross Conversion is statistically significant and passes the practical significance boundary. However Net conversion is not statistically significant and does include the negative of the practical significance boundary. So I recommend further testing since Udacity might loose money.

Follow-Up Experiment

Give a high-level description of the follow up experiment you would run, what your hypothesis would be, what metrics you would want to measure, what your unit of diversion would be, and your reasoning for these choices.

Seeing that proactive messaging can definitely be useful in controlling and filtering those who are not as committed to signup for trial. I think what might be an interesting follow up test to see how a different message that encourages users to keep going can drive more conversion.

One thing that the experiment above does is gives an option for not enrolling and just use the free service, I hypothesize that if a positive message is displayed encouraging users to keep going on the last day of their trial. For example, a quick success story that shows how someone benefited from that course. Udacity can convince more people to not abandon and continue to with the service.

Hypothesis: Showing a positive message on the last day of trial will drive more units for udacity.

Control: Continue the existing experience where one signs up and goes through free trial and has the option of leaving/continuing with no message on last day of trial.
Test: On the last of trial a proactive message is displayed for the user to keep going.

Unit of Diversion: User_ID

Invariants:
User_Id: Since we are running the test after a student enrolls user_id should remain equal in our control and test bucket.

Evaluation:
Retention: This is will measure how sticky the customers become and long they stay. Expect this to be higher in experiment group.