**Digital Marketing Analytics**

*MSc in Business Analytics 2019-2020*

Imperial College London

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**Group Assignment 2 (Part 2)**
**A/B Testing**

***Introduction***: In this assignment we will use the Google Optimize in order to conduct an A/B experiment for our http://londonchess.weebly.com/ webpage we have created.

## *Question*

We wanted to decide if a new layout we had in mind for our home page would lead to a different performance of our website. As a result, we wanted to conduct an A/B experiment with the following setup:

- **A**: Our original homepage with an image of a chess board and a video regarding the history of chess

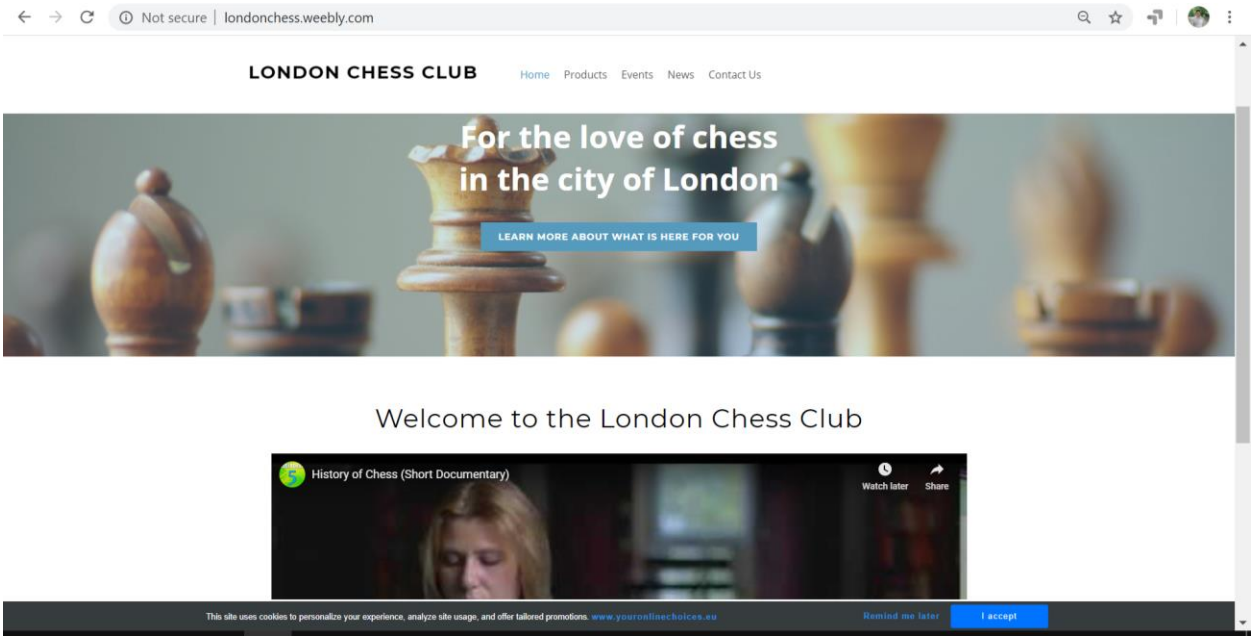



***Figure1: Original homepage of our website***

- **B**: A new style of our homepage, a little bit updated on the news of chess, with a photo featuring the current World Chess Champion Magnus Carlsen and a video with Garry Kasparov launching a new chess class

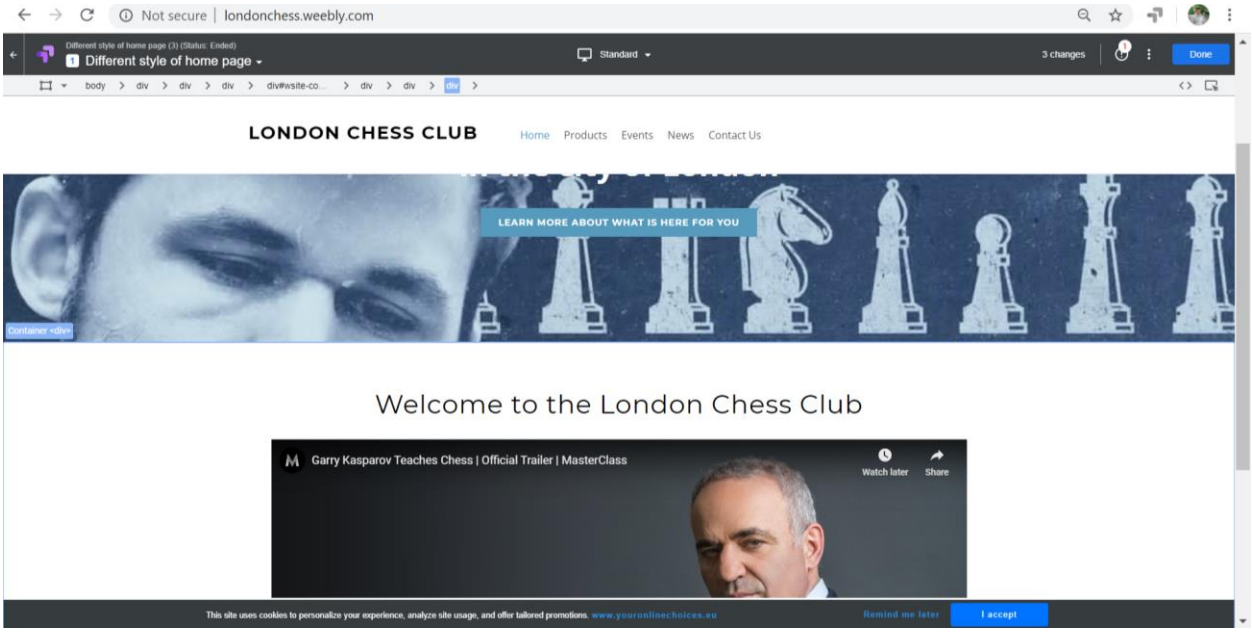
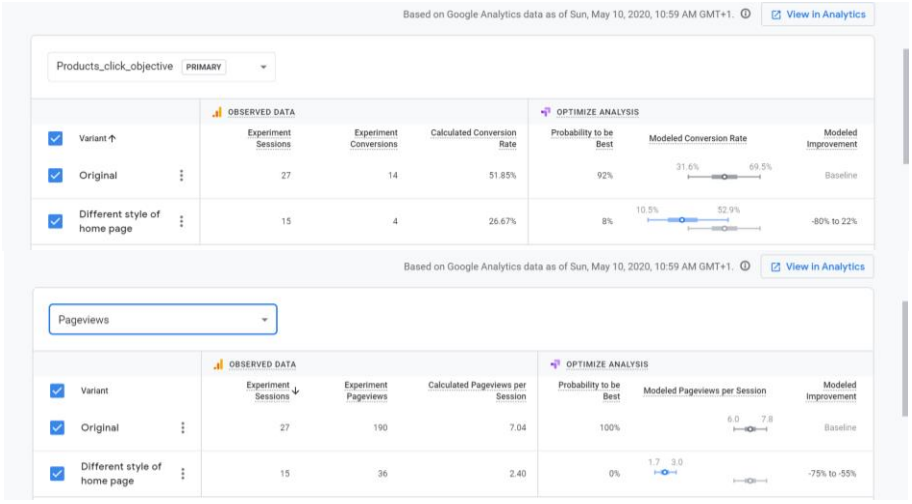



***Figure2: Alternative homepage of our website***

- **Objective**: Our objective is to evaluate if there is any difference between the two homepages on their effect on the performance of the page. Our metrics to evaluate this are:
    - *How many were interested in the content of the website by clicking on products (utilizing the tag event we had created for clicking on the text box products)*
    - *How many pages they visited on their visit to the website*
    - *What is the average session duration of their visit*

We run the experiment for 4 days and we received the following results from Google optimize:



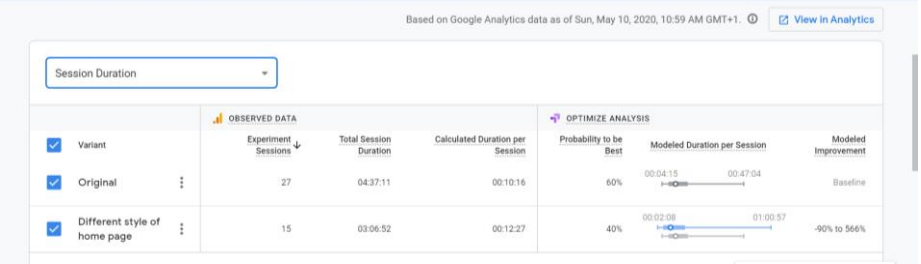



***Figure3: Results from experiment in Google Optimize***

In order to conduct our hypothesis for the product click, which was our primary objective, we can follow the methodology of *"Inferences about Two Population Proportions"*. More specifically, we have:

- A total of 42 experiments sessions
- 27 experiment sessions on the original homepage, n1 = 27
- 15 experiment sessions on the alternative homepage, n2 = 15
- 14 visitors clicked on products on the original homepage, x1 = 14
- 4 visitors clicked on products on the alternative homepage, x2 = 4

We want to test if the proportion of people who clicked products on the original homepage, p1, is equal to the proportion of people who clicked products on the alternative homepage, p2. This means that it is a two-sided hypothesis testing where:
H0: p1=p2
H1: p1≠p2

The point estimates in our experiment are:

$$\widehat{p1} = \frac{x1}{n1} = 0.52$$

$$\widehat{p2} = \frac{x2}{n2} = 0.27$$

$$pooled\ estimate\ of\ \bar{p} = \frac{x1 + x2}{n1 + n2} = 0.49$$

$$z\ statistic = \frac{\left(\widehat{p1} - \widehat{p2}\right) - (p1 - p2)}{\sqrt{\frac{\bar{p}(1-\bar{p})}{n1} + \frac{\bar{p}(1-\bar{p})}{n2}}} = 1.58$$

| Inferences about Two Population Proportions | |
|---|---|
| x1 | 14 |
| n1 | 27 |
| x2 | 4 |
| n2 | 15 |
| pooled estimate of p | 0.428571429 |
| p1_sampled | 0.518518519 |
| p2_sampled | 0.266666667 |
| z_statistic | 1.580357828 |

***Table 1: Two populations proportions calculations***

This z statistic, looking at the z statistic table, lets us know that we can be sure with a 88.6 % confidence interval that we can reject the null hypothesis and understand that p1≠p2.