An Engaging, Communal, and Interactive Approach to Questionnaires

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ABSTRACT

Over the last few decades, much research has been conducted into the space of data visualization resulting in the development of increasingly advanced techniques and technologies for transforming information into insightful graphical representations. In contrast, the ways in which we approach collecting data—specifically with regards to questionnaires—has remained relatively static. Intuitively, we understand that one of the best ways to approach *showcasing* data is through visualizing it. So, what if the key to *collecting* data is also rooted in visualization? In this project, I set out to develop **2by2**–a web-based survey tool that allows users to submit data through interacting with a data visualization. Specifically, 2by2 enables users to (1) provide individual data by placing and manipulating points on a graph and (2) visualize both group and individual responses. After completing the project and interviewing users, I found that there is a large use case for this type of survey methodology, specifically in the space of shareable personality tests.

Keywords: Survey Design, Interactive Data Visualization
Links: GitHub Repo, Project Video.

1 INTRODUCTION

The roots of questionnaires—surveys themselves—have ancient origins existing as far back as 3000 BC where Ancient Egyptians recorded information on agricultural yields. Now, in the Age of Information, there is an unyielding demand for data. From a businesses holding a customer focus group to the government conducting a consensus, organizations are increasingly utilizing various survey methods to garner valuable insight into their subjects. Questionnaires—a specific type of survey distinguished by the autonomy of its completer—have become one of the most widely used means of data collection (Bethlehem, 2009). Questionnaires vary from other types of surveys in that users complete them independent of the presence of the survey author. As such, questionnaires are typically designed with usability and thus simplicity being the highest priorities.

As time has progressed, while the medium of questionnaires has shifted from pen and paper to mouse and screen, the methodology has changed very little. In fact, of the top 10 most popular questionnaire question formats, the vast majority have existed since the 1930's, decades before the popularization of computers. Simply put, in the pursuit of usability, survey designers have prioritized consistency with historical standards over innovation. However, with increasing levels of digital competency, the time has come to begin experimenting with new approaches to questionnaires. In the context of this report, 2by2 is demonstrated as a personality matrix questionnaire where users evaluate other members of a group by placing them on a personality matrix.

2 LITERATURE REVIEW

A review of related works in this field can be split into two sections: research pertaining to questionnaire design and research surrounding interactive questionnaire methods.

Questionnaire Design: Much research has been conducted into the field of questionnaire design. Generally speaking, the process of questionnaire design has three primary phases: (1) Formulating the guiding research question, (2) wording sub-questions that collectively answer the research question, and (3) choosing types of question, answer formats for each sub-question (Rowley, 2014; Bethlehem, 2009). In the use case of 2by2 outlined in the introduction, the guiding question is how do people think of themselves relative to what people think of them with the sub-questions being to evaluate each member of the group in two dimensions. In the third phase of questionnaire design that is most relevant to 2by2. In line with historical standards, this sort of sub-question would most typically be posed via a rating scale format such as "rate this person on a scale from -5 (Spicy) to 5 (Sweet)" (Krosnick, 2010). Rather than following this convention, 2by2 leverages the power of interactive data visualizations to enable respondents to answer by placing a point on a graph whose position is able to answer the sub-questions of the questionnaire.

Interactive Data Visualization Questionnaires: To my knowledge, surprisingly little research has been conducted into the space of interactive data visualization questionnaires. The only thoroughly covered facet of this topic I was able to find in academia or industry was answer-based path changes—essentially guiding respondents to different parts of a questionnaire based on their answers to specific questions (Bethlehem, 2009). One paper I found, titled "A web-based, interactive visualization tool for social environmental survey data" explored the use of manipulable data visualizations (specifically line sliders) as a way of collecting social science data from respondents. Their ultimate finding was that their tool was valuable in its ability to "facilitate the growing web-based interactions between citizens and governments" (Jones, 2016). In a review of the types of question formats offered by major survey creation platforms such as SurveyMonkey and Google Forms, line sliders were the only example I could find of an interactive data visualization being used to collect questionnaire input. From my research—as preliminary as it may be—I have not found a tool similar in both design and purpose to 2by2.

3 IMPLEMENTATION

In the context of this report, 2by2 is used as a shareable personality matrix questionnaire. First, a graph is created with customized axis labels and members. Second, each member places a point on the matrix as a way of evaluating the personality of each other member. Finally, a graph is displayed that shows the average location on the graph of each member as well as a graph depicting where each member placed a given individual.
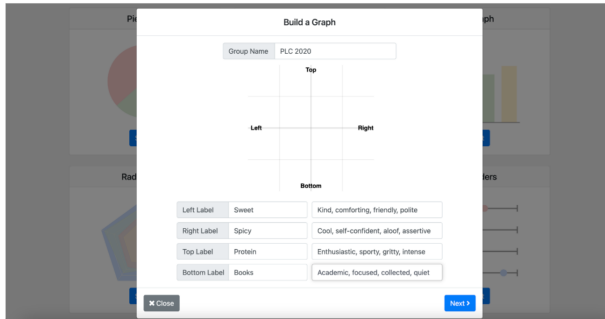
3.1 Create Page

Figure 1: Users customize their own graph.

- Create a Graph Form: Allows users to specify desired axes labels and descriptions.

- Add Tags Form: Allows users to add list of labels for each point to be placed on the graph.

- Share Link: Allows users to view customized graph and share link with others.
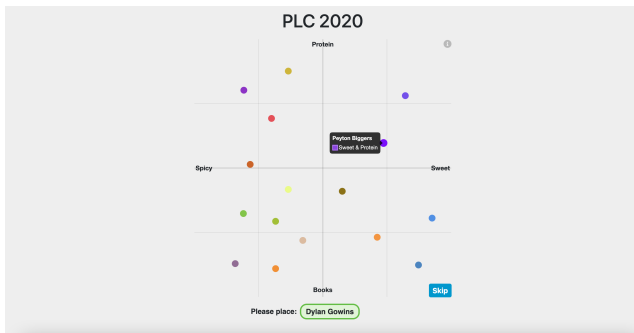
3.2 Edit Page

Figure 2: Users submit data by placing each point on the graph.

- Click and Drag Points: Allows users to add points to graph and reposition them as needed. Making points draggable was essential as users frequently change their minds.

- Point Hover Tooltip Info: Provides users with label and quadrant of point upon hover. Disappears when not hovering to reduce graph clutter.

- Axis Label Hover Tooltip Info: When users hover their cursor over the axis labels, a tooltip is displayed informing them of the description of that label.

- Info Button: Provides users with instructions on how to complete task as well as axes descriptions.
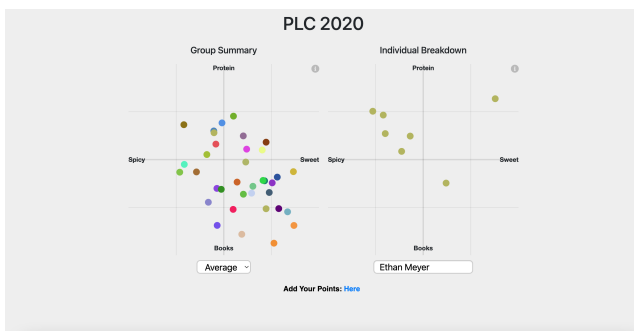
3.3 View Page

Figure 3: Users see a summary of the group and a breakdown of

individual responses.

- Search and Click to Filter: Allows users to select which label gets populated in the individual breakdown graph.

- Mean/Median/Extreme Dropdown: Allows users to select which function to apply to summarize data.

- Point Hover Tooltip Info: Provides users with label and quadrant of point upon hover. Disappears when not hovering to reduce graph clutter.

- Axis Label Hover Tooltip Info: When users hover their cursor over the axis labels, a tooltip is displayed informing them of the description of that label.

- Info Button: Provides users with description of what each graph is displaying.

4 DISCUSSION OF FINDINGS

In the specific use case of shareable personality matrices, 2by2 was an absolute success. Although the general premise of the application itself is very interesting, users greatly appreciated the overall user experience that was only made possible through interactive data visualizations. Interviewing users after they had used the product revealed two common sentiments. First, although there is a small learning curve to understanding how to interact with the graph, the process was both easy and fast for users to adapt too. I believe this is in great part due to the intentionally with which I approached guiding the user experience specifically with cursor manipulation, tooltip information, instructive modals, and more. Second, users loved how engaging the experience was. Simply put, just about every type of questionnaire you see in your everyday life is flat out boring. By taking a more interactive design approach, 2by2 is able to engage with respondents on a deeper level relative to traditional questionnaire formats.

In the future, it would be worth investigating the effect of interactive design on questionnaire response and completion rates. Stated as a research question, does designing a more interactive questionnaire (specifically through manipulable data visualizations) increase a users response and/or completion rate of the survey? Looking forward, I will continue to work on this project with my next goal being to design other manipulable data visualization questionnaire templates such as bar and pie charts.

5 ACKNOWLEDGMENTS

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