

Dupo Main Study Protocols

Procedure overview (1 hour)

- 1) Introduction and consent (3 minutes)
- 2) Training (7 minutes)
- 3) Task instruction (3 minutes)
- 4) Trial (up to 30 minutes)
- 5) Self-evaluation (2 minutes)
- 6) Interview (15 minutes)

Protocol

Introduction and consent

Hi, I am ____ from _____. Thank you for participating in this study. Have you had a chance to read the consent form that I sent you previously? I will first briefly recap the study, and you will have two-three minutes to review the document again. Does this sound okay?

Alright, we are running this study to understand your experience of using a newly designed authoring system for responsive visualizations. You will have a training session for five minutes. Then, you will do one trial. In the trial, you will be creating responsive versions for the visualization we chose for 30 minutes. I will provide further instructions right before the trial. After creating them, you will respond to a short survey for about five minutes. After the trial, you will have an interview session for 15 minutes, and I will ask some questions about your experience. Do you have any questions so far?

Great. For each trial, when you are creating visualizations, you will have remote control access to my device while thinking aloud. Your voice for think-aloud and my screen will be recorded. The log recorded in our system will also be collected. You may mute your video while you are creating visualizations. Do you have any questions so far?

Okay. In the interview, your voice will also be recorded for analysis. However, the voice for the interview and think-aloud will all be deleted after transcribed. Any questions?

Your visualizations will be later evaluated by a panel NOT to evaluate your work BUT to evaluate our system's effectiveness. Your creation will always be anonymized for evaluation and in our paper. Do you have any questions?

Thank you. You can withdraw this study at any time, just let me know. After fully completing this study, you will be compensated with an Amazon gift card for USD 60. This might take a few weeks. Are we good to proceed?

Alright. Do you provide your consent for participating in this research study?

[If a participant provides a consent] Thank you for the consent.

[If not] I am sorry that you don't agree. Thank you for the time!

Training

Now, you have a five-minute training session. While you are using the system, I will give you instructions and check your connectivity. This is not part of the study. I will ask you to join a remote control over Zoom, if you accept, then you will be able to use the system. Please mute your video for this training session. Also, feel free to ask questions.

 See the Training section for more details.

Task Instruction

Now we will start the trial. In the trial, your role is a data journalist. So far, you have created a news visualization—the one that we chose for this study, and you need alternative versions for responsive contexts for it. That is, you have already confirmed the desktop version, and now it's time to adapt this desktop version for readers with different screen types.

You are going to create several responsive versions for other devices. That is, you will be creating those for smartphones, tablets, thumbnail, and paper printing given a desktop version. You must create a smartphone version for this task. You have up to 30 minutes total. If the time allows, you should also try to create other versions to cover other screen sizes like tablets, thumbnails, and printing. Do you have any questions about this trial?

As you start this trial, you will see the first version already loaded in the system.

It's up to you to decide when you are done with any given responsive version you create. We encourage you to make responsive versions carefully, as you would if you were going to publish them online. But don't be too bothered by tiny details. I will let you know every 10 minutes. While using this system, please let me know if you have any questions about how to use it.

While doing the trial, please keep thinking aloud--saying what you think while using the system. Again, I'm interested in hearing how you interact with the system, including what you like, what you are confused with, etc. Again, the whole study's point is to evaluate the system, not you, so don't be shy about speaking aloud your thoughts. For example, if you find something confusing, it would be nice if you say "I'm confused" and describe the confusing part. I'll keep reminding you to think aloud. Now, I will ask you to join a remote access session over Zoom/Microsoft Teams, if you accept, then you will be able to use the system. Please mute your video for bandwidth during the trial.

Trial

We allowed users to ask questions regarding how to use the system.

Questions to answer:

- “How to do ___specific edit (e.g., change the color of text)___?”

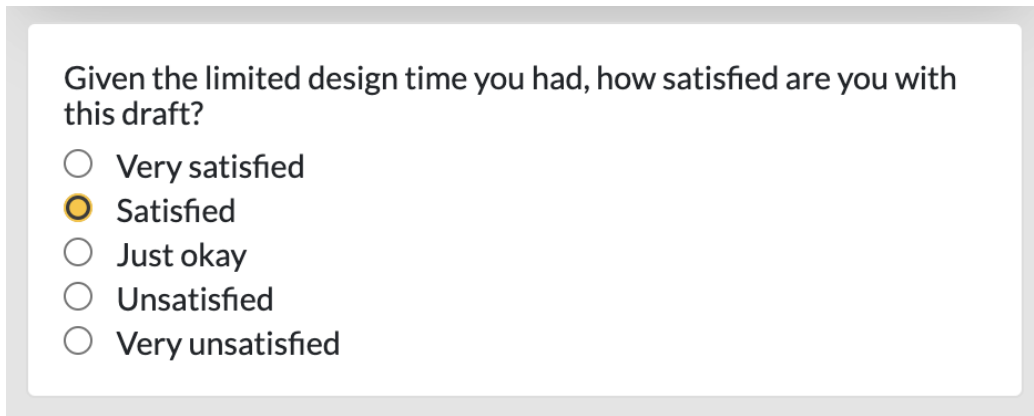
Questions to not answer:

- “How should I change the design” types of questions.

Self-evaluation question

Now, you are going to respond to a self-evaluation question for each version you created.

The below evaluation prompt was shown below each artboard.



Given the limited design time you had, how satisfied are you with this draft?

- Very satisfied
- Satisfied
- Just okay
- Unsatisfied
- Very unsatisfied

Prompt: Given the limited design time you had, how satisfied are you with this draft?

Response options: Very satisfied, Satisfied, Just okay, Unsatisfied, Very unsatisfied

After each response, we followed up with the below question:

What changes or refinements would you make to your final design given more time?

Interview questions

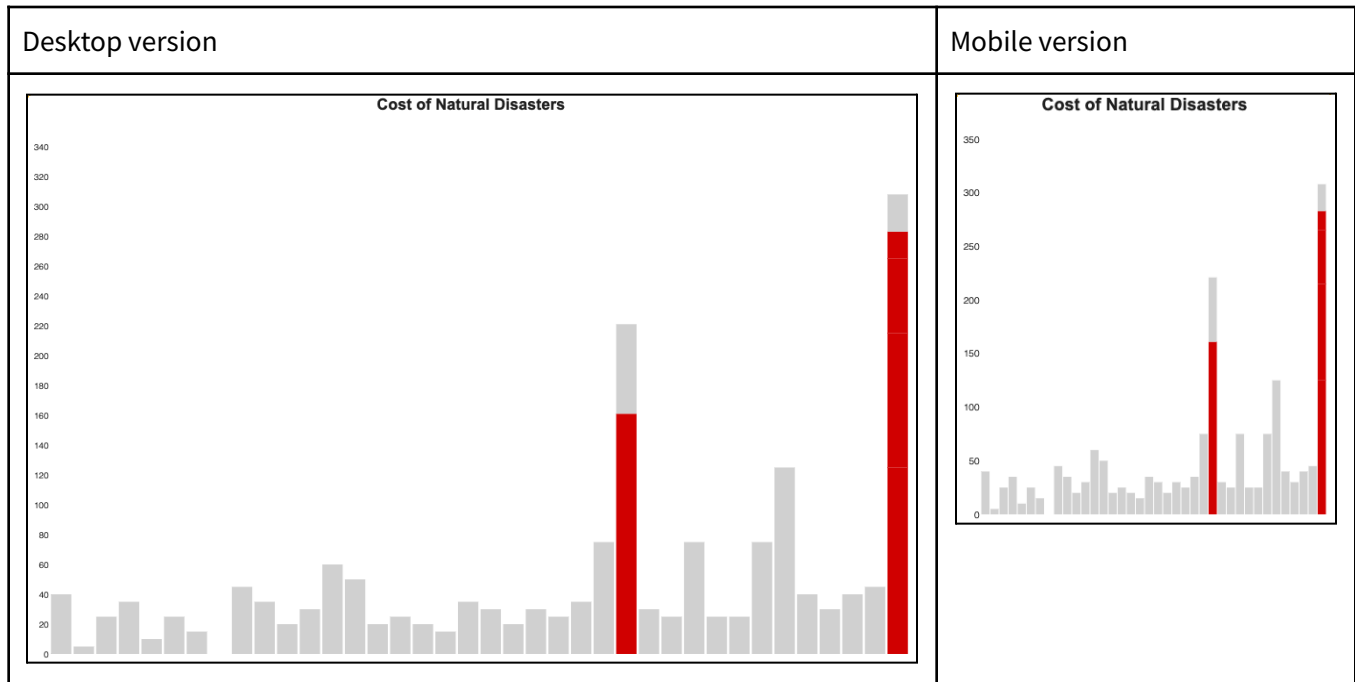
1. What was your overall reaction to seeing design suggestions at the beginning?
 - a. How was being able to make edits to the design suggestion that you have chosen?
2. What was different between using this system and your day-to-day visualization tasks?
3. If you can take out individual features from the system and embed/apply them to your whatever existing tools, which feature would you choose, and why?

[With showing the suggestions]

4. How useful were the suggested design examples for responsive versions?
5. How would you rank them?
 - a. Why did you rank them in that way?
6. Any suggestions for improvements?

Training Details

The training goal was to create the below desktop version and then explore design suggestions for the mobile version.



Instructions

1. Check dataset:
 - a. For this study, the dataset for visualization is already loaded. To check, click the data icon, it looks like a table.
2. Creating an artboard:
 - a. To create a visualization, you need to create an artboard for a screen type.
 - b. Click the artboard icon with an easel on the left sidebar to create one. You can also see the tooltip messages to see the menu description.
 - c. Then, click “New responsive artboard.”
 - d. For the name, use “cost”.
 - e. Choose a device type as “Desktop-Landscape”, then a preset device screen dimension will be loaded.
 - f. If you click “Advanced,” then you’ll be able to change the size.
 - g. For size, enter 1,000 for width and 600 for height.
 - h. For this study, you don’t need to customize the device screen dimensions.
 - i. Lastly, click “create” to finalize.
3. Setting layout (use shelves):
 - a. Assuming that the data is already loaded, you need to set the layout of a visualization first, like which fields you want to use for x and y axes.
 - b. To do so, click the layout menu icon with four filled squares in the left sidebar.
 - c. First, set “layout type” as “single”.
 - d. Next, we will assign data fields to the x and y axes.
 - e. You will see a small widget for data fields. If you hover on a badge, then you will see a preview of that field.

- f. Rows are vertical axes and columns are horizontal axes.
 - g. Drag the “year” field badge and drop it on the “columns” shelf.
 - h. Drag the “cost” field badge and drop it on the “rows” shelf.
4. Change mark type
 - a. The previous step automatically generates point marks.
 - b. Now, let’s change the mark type.
 - c. Click the mark menu icon with a filled circle overlaid on a square. It’s in the third icon group.
 - d. You’ll see a list of mark layers. Click the pencil icon next to the one for the point mark.
 - e. Then, you’ll see different mark types. Click the “bar” mark for this training session.
 5. Set a mark property encoding
 - a. Now, you will change the fill color of the mark.
 - b. Click the fill color attribute below.
 - c. If you want a static value, you can click “static.” Or, if you want to pipe a data field to the marks, click “encoding.” Let’s choose “encoding” for now.
 - d. You’ll see a data field widget. Drag the “labeled” field badge to the shelf.
 - e. Then, some preset values are shown.
 - f. To change the scale by providing specific domain and range values, you can change it below. Domain means the data values and range values are visual values.
 - g. For this session, enter “true” in the domain and click the color picker. Choose some red color, and click “confirm” in the picker.
 - h. Then, click “add a scale row” for another value.
 - i. Enter “false” in the domain and click the color picker. Choose some gray color and click “Confirm”.
 - j. Click “Apply” to finalize this edit.
 6. Selection menu
 - a. You can also double click an element, and a context menu will show up on the left.
 7. Duplication (In the pilot study, this and later instructions were for the second trial training)
 - a. Now, we are going to create a mobile version.
 - b. To do so, click the artboard menu icon.
 - c. Click “new responsive artboard.”
 - d. Choose a device type “Phone-portrait,” then the size preset will be loaded. You can check it by clicking “Advanced.”
 8. Exploration:
 - a. You will see our exploration panel that provides some design ideas for bigger responsive transformations.
 - b. For each design,
 - i. If you click “apply” then the design applies to your mobile version.
 - ii. If you click “branch” then it will create another artboard for your mobile version.
 - iii. If you click the “hide this” button, then the design is removed and similar designs will not be suggested in the future.
 - c. To access again, click the magic wand button.

9. Alteration:

- a. To explore some subtle changes, click the “see similar” button when you hover an example.
- b. Close the exploration panel.

10. Active, propagation, lock, and solo.

- a. Double click the title, and change the text in any way.
- b. Now, you’ll see the title is also applied to the duplicated version.
- c. To make changes to specific artboards, you can “lock” an artboard by clicking the lock icon on the top right corner of the artboard. Now you’ll see that the locked artboard is less visible.
- d. Let’s lock the desktop version, and then change the text alignment to “left.” Then this change applies only to the mobile version.
- e. If you want to apply edits only to the current artboard, click the “S in a square” icon to solo that artboard.
- f. To easily lock and solo artboards, you can use the artboard list on the bottom right of this application.