Instructor Guide

Eytan Adar, Version 1.1: June 2020

Description (and changes)

We suggest watching the intro video before reading this guide.

These labs are intended to be used as design exercises. They are currently designed to run at around 75-80 minutes. The idea is to have students design many design variants as quickly as possible *before* they see the "professional" solution. After the workshop completes we have our students create a mini presentation comparing their solution to the professional one. The goal is to have them critique both their own work and the professional solution.

The workshop is a group exercise but in our class, we have the students create the final critique deck individually. We (the instructors) also offer our own critique for the final designs.

We've tried to streamline the process a bit since early versions of the exercise. To make things easy, we have a cheat sheet that walks the students through the process and a presentation explaining the workshop process. We also have a Google slides file that students can copy for their groups that allows them to document as they go. We suggest going through the intro presentation once to introduce the idea and then just providing copies of the cheat sheet for each subsequent session.

You're welcome to modify the material but see our note below on "time."

In the latest instance (2020) of our class we ran visualization exercises for the following:

- Beer—a communicative visualization exercise, suitable for using after teaching communicative visualization or multidimensional visualization techniques.
- Tennis—Building a tennis visualization. This is good after teaching hierarchical visualization methods. Note that you should try to have at least one person per group that knows the rules of tennis!
- Web evolution—A constructive visualization process that is focused on temporal data (but it also works to introduce network methods)
- Citation/Literature—Useful after a class on network visualization (and possibly after—or as a lead in to--text visualizations)
- Plagiarism—Useful after a text visualization class

We've gotten rid of the set comparison exercise but you can find it in the 2016 materials.

Don't be discouraged if the first lab isn't "smooth." Our experience has been that it takes a couple of times before they understand the structure well enough to make it through the whole thing effectively.

Creating Groups

We randomly assigned groups every lab section. Our experience is that groups of around 4-5 work best. Too many and it takes too long for discussion, too few and they don't have enough alternatives to consider. A few specs benefit from someone who knows the topic a little bit (e.g., tennis)

Notes on Time

Our experience is that you need to go through a couple of labs before students get used to the structure. The first one will likely overrun. We usually put up a countdown timer on the projector and announce key times to switch. We also walk around to provide prompts and feedback if they seem to get stuck.

If you have more time than 80 minutes, you can add more sketch/discuss steps (or extend the time for those). An alternative is to add a presentation step and to have the groups present either to each other (peer round-robin) or to the entire class.

If you have less time, you can make some adjustments (e.g., the number of individual sketches). You may also consider breaking apart the lab over two sessions.

Prompts

1. Timekeeping is crucial. It's important to make sure they switch steps. After the first lab this is rarely a problem.
2. It's important (at least it was for us) that students document their decisions. We ask them to take pictures of various pieces that they create and document group decisions. We had to remind them of this on occasion. A sample Google slide deck is shared and used for this purpose.
3. We encouraged students to pick domains that "worked well together." Sometimes they would pick sets that were not particularly suited to a good design. You may allow them to change their minds.
4. When sketching, we often would remind them that (a) neatness does not count… they should simply get as many ideas down as fast as possible, and (b) they should always consider the domain tasks they picked.
5. When presenting to each other ("group") we asked them to go around so that everyone has a chance to talk. When presenting multiple sketches, they were asked to present their favorite first and then move on to the next.
6. In the second round sketches they were always prompted to "steal, mashup, and consider alternatives."
7. Depending on the lab, we would often supply prompts about the domain task that they may not have considered (scaling of the solution, in particular, was often something they wouldn't think about). Depending on the learning objectives you can push groups to focus on the text, network structure, reminders about expressiveness/effectiveness, etc.
8. When they generate comparisons between their solutions and the "professional" ones (see below) we would prompt them with specific things to focus on (e.g., how text and labels were used in PivotPaths, and the potential tradeoffs in scale, etc.)
9. We would try to walk around the room and ask questions about designs and ideas (and just to listen). If the students share a Google doc with you, you can also follow along that way.

Materials

The various folders here contain everything you should need to run the labs. For each group you will need the following:

- Blank domain cards (4 per group member) – these are handed at the start
- A copy of the spec sheet (1 per group member) – handed out at the start (step 1 of the cheat sheet)
- A copy of the cheat sheet (2-3 per group)—handed out at the start as a reference. You can have students keep these and bring them to the next session
- Pre-made domain cards (1 copy per group)—we hand these out after they have created their own cards and instruct them to divide the cards equally (step 2)
- Blank sheets of paper and pens (many per group)—we hand these out at the start of the design phase (steps 3+4)
- At least one copy of the generic inspiration/layout cards. These are handed at the start of the design phase (step 3). We used to limit the inspiration/layout cards we gave to only those that are relevant to the topic (e.g., networks). However, we found that there's little harm in just making one copy of all the materials. This also makes it easy to collect the cards at the end and reuse them.
- A large poster board sheet (1-2 per group) and color markers—handed out at the final integration phase (step 5) to capture the "consensus" design.

Handing Out Materials

Note that we handed out materials as needed. Students tend to get distracted by the additional materials.

Building Your Own Decks

We printed our cards on sheets of "Avery Laser Business Cards, 2 x 3.5-Inches (5911)." They were cheap and disposable. You'll find that some sheets in the labs have duplicate cards (this was to avoid printing blank cards). We tended to group the ones we needed to hand out (e.g., a group of blank domain cards, a group of example domain cards, and a group of layout cards). If your students are organized you might get them back in that order, but we tended to just re-print.

Domain Cards

In some situations there are different kinds of domain cards. For example, the Tennis lab has cards that focus on the structure of the tennis match and others that focus on player properties. Depending on the focus of the lab you can restrict the types the students can pick (we usually said that they had to pick from at least two different types).

We suggest adding or removing task options as you see fit.

Post Lab Readings

The following were blurbs describing readings and responses. **These were only given after the lab was completed**. We asked each student to produce a slide deck and picked one at random to present and lead discussion.

Beer Visualization

Reading: Goldenberg, Russel, "The Capital of Beer," The Pudding, 2017, https://pudding.cool/2017/04/beer/

Example prompt:

You should do this individually. *Please upload a slide deck of 5-6 slides (no more than 5 minutes of presentation). You can safely assume that everyone has seen the site so no need to go over the features of the system. Instead, please have the following slides:*

- *Title slide (with your name!)*
- *Key benefits of the Pudding's solution -- what did they do well broadly for the domain? which domain tasks do you think they succeeded at?*
- *Encoding/Interactivity - What specific encoding decisions did they make that were interesting? Any interesting interactive features? Did they change your sense of expressiveness/effectiveness?*
- *Your solution - Briefly describe your group's solution and the tasks you were going for.*
- *Comparison points - Compare your solution to the one on the site. You can address points of similarity and differences in relation to the domain tasks you picked.*

And additional discussion points/summary you want to cover

Some advice on slides: (1) use images to highlight your points (text only is not appropriate for a vis class!), (2) avoid having a ton of text on the slide (focus on bullet points), (3) if it's not obvious what you are going to say from the text's slide please add information to the lecture notes, (4) you did a lot of thinking in your groups in lab--use what you learned when critiquing the solution, (5) practice so you're ready to give the talk if selected.

Web Evolution

Reading: Chi, E. H., Pitkow, J., Mackinlay, J., Pirolli, P., Gossweiler, R., and Card, S. K. 1998. Visualizing the evolution of Web ecologies. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (Los Angeles, California, United States, April 18 – 23, 1998)

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- *Title slide (with your name!)*
- *Key benefits of Chi et al.'s solution -- what did they do well broadly for the domain? which domain tasks do you think they succeeded at?*

- *Encoding/Interactivity - What specific encoding decisions did they make that were interesting? Any interesting interactive features? Did they change your sense of expressiveness/effectiveness?*
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Tennis Match

Reading: Jin and Banks, "TennisViewer: A Browser for Competition Trees," IEEE Computer Graphics and Applications, 1997.

We usually also offer the following:

- Please also take a look at the work over at gamesetmap (http://gamesetmap.com/.) The Web Archive version in case the site is down is here: https://web.archive.org/web/20190127013459/https://gamesetmap.com/nadalgametree/. and at the IBM Visualization (video here: http://vimeo.com/15162181). You can find more commentary on the original one at this blog (http://www.infiniteturtles.co.uk/blog/us-open-pointstream-from-ibm). You're welcome to use one of these for your slides, but you must read the TennisViewer paper regardless. If you're really into seeing alternatives, you can also take a look here (https://tennisvisuals.com/).

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- *Title slide (with your name!)*
- *Key benefits of the Jin and Bank's solution -- what did they do well broadly for the domain? which domain tasks do you think they succeeded at?*
- *Encoding/Interactivity - What specific encoding decisions did they make that were interesting? Any interesting interactive features? Did they change your sense of expressiveness/effectiveness?*
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Review Article/Citation Construction

Reading: Marian Dörk, Nathalie Henry Riche, Gonzalo Ramos, and Susan Dumais. PivotPaths: Strolling through Faceted Information Spaces. TVCG: IEEE Transactions on Visualization and Computer Graphics (Proceedings InfoVis 2012). 18(12), pages 2709-2718, Dec 2012.

Extra prompt: You can also check out a demo and video here: http://mariandoerk.de/pivotpaths/ (Links to an external site.) **Please pay specific attention to how they used text and the tradeoffs they make to support readability/navigation.**

Example prompt:

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- *Title slide (with your name!)*
- *Key benefits of Dörk et al.'s solution -- what did they do well broadly for the domain? which domain tasks do you think they succeeded at?*
- *Encoding/Interactivity - What specific encoding decisions did they make that were interesting? Any interesting interactive features? Did they change your sense of expressiveness/effectiveness?*
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Plagiarism Detection

Reading: P. Riehmann, M. Potthast, B. Stein & B. Froehlich, "Visual Assessment of Alleged Plagiarism Cases," Computer Graphics Forum, June 2015.

Additional prompt: Also watch the video http://www.uni-weimar.de/medien/webis/publications/videos/stein_2015z.mp4). Make sure to both read the material and watch the video, they cover different things.

Example prompt:

You should do this individually. *Please upload a slide deck of 5-6 slides (no more than 5 minutes of presentation). You can safely assume that everyone has seen the site so no need to go over the features of the system. Instead, please have the following slides:*

- *Title slide (with your name!)*
- *Key benefits of Riehmann et al.'s solution -- what did they do well broadly for the domain? which domain tasks do you think they succeeded at?*
- *Encoding/Interactivity - What specific encoding decisions did they make that were interesting? Any interesting interactive features? Did they change your sense of expressiveness/effectiveness?*
- *Your solution - Briefly describe your group's solution and the tasks you were going for.*
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Set Visualization (2016 version – not updated recently)

Reading: Bilal et. al, "Radial Sets: Interactive Visual Analysis of Large Overlapping Sets," TVCG 19(12):2496-2505, 2013. (focus on sections 1, 2, 4, and 5). There is a video and demos on the Radial Sets homepage (http://www.cvast.tuwien.ac.at/radialsets)

Example prompt (not updated):

- *You should do this individually. This will be a slide deck about the response reading (Radial Sets, see below). Please upload a slide deck of 5-6 slides (no more than 5 minutes of presentation). You can safely assume that everyone has read the paper so no need to go over the features of the system. Instead, please have the following slides:*
  - *Title slide (with your name!)*
  - *Key benefits of radial sets -- this should combine what the authors tell you is good but also your thinking from lab*
  - *Encoding - the actual radial sets implementation is a bit different than the example in lab. Does your opinion of expressiveness/effectiveness change? Are the solutions still equivalent?*
  - *Interactivity - what were the interesting interactive features? Did they change your sense of expressiveness/effectiveness?*
  - *Discussion points - a few questions that you'd like the class to discuss (you can bring up limitations you want to talk about here)*

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