A Framework for Creative Visualization-Opportunities (CVO) Workshops

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Goal

• Effectively understand requirements and opportunities for a data (visualization) software development / research project

• Build rapport with stakeholders
Interviews and observations require tremendous time and energy from all stakeholders.
Creative visualization-opportunities (CVO) workshops:
structured workshops in which domain collaborators and researchers explore opportunities for a collaboration.
When to run a workshop?

• You want to develop a novel visualization / data analysis tool

• Initial couple of meetings are promising
  • Collaborators have interesting data
  • Collaborators have time to work on a project
  • Off-the-shelf tools won’t suffice

• Don’t use CVOs for very initial getting-to-know each other
CVO workshops are flexible: they can accelerate early stages of practically any collaboration.
Explore opportunities for funded collaboration between visualization researchers and phylogenetic analysts.
Better understand the main tasks of psychiatric researchers

[Nobre et al. 2017]
CVO workshops are effective:
they provide tremendous value, both intellectually and interpersonally.
CVO workshops explore a wide range of possible directions for collaborations.
“The interpersonal leveling and intense revisiting of concepts made more progress in a day than we make in a year of lab meetings ... [the workshop] created consensus by exposing shared user needs.”

- Workshop participant [Kerzner et al. 2017]
A framework provides understanding, instead of causal or predictive knowledge.
How to Run A Workshop
Six TACTICs for effective CVO workshops:

- (T)opic
- (A)gency
- (C)ollegiality
- (T)rust
- (I)nterest
- (C)hallenge
Planning a workshop is a design problem.

A workshop theme, its central topic or purpose, must be defined and iteratively refined.
Workshop Format

• **Opening**: pulling people in, making them comfortable, setting up a creative mindset

• **Core**: generating and evaluating ideas

• **Closing**: prioritizing, reflecting
Best practices depend on local context, preference, and experience.
Example Workshop
In effective CVO workshops, methods work in concert to explore visualization opportunities.

<table>
<thead>
<tr>
<th>Opening</th>
<th>Introduction presentation <em>(interpersonal, passive)</em></th>
<th>5 - 10 min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Establishing shared context and guidelines for effective participation.</td>
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<tr>
<td>Core</td>
<td>Analogy introduction <em>(interpersonal, active)</em></td>
<td>10 - 20 min</td>
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<td>Promoting a creative atmosphere and interpersonal leveling.</td>
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<td></td>
<td>Wishful thinking <em>(divergent, active)</em></td>
<td>45 - 60 min</td>
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<td>Identifying aspirations and opportunities for visualization software.</td>
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<tr>
<td></td>
<td>Visualization analogies <em>(divergent, passive)</em></td>
<td>45 - 60 min</td>
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<td>Inspiring requirements-by-example from existing visualizations.</td>
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<tr>
<td>Closing</td>
<td>Reflective discussion <em>(convergent, active)</em></td>
<td>20 - 30 min</td>
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<td>Reflecting on key ideas for validation and continued collaboration.</td>
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Analogy Introduction

• Playful introductions-by-analogy to prime for creative thinking and to support interpersonal leveling.

• For example:
  • “If you had a superpower, what would it be?”
  • “If you were an animal, what would it be?”
Wishful thinking: elicit shared domain challenges.

Think about aspirations for your data...

*What would you like to* **KNOW**?

*What would you like to* **DO**?

*What would you like to* **SEE**?

*Individually...*
Visualization Analogies

• A curated presentation of visualizations inspires requirements-by-example.

• Ask participants to individually record analogies to their domain and to specify aspects of the visualizations that they like or dislike.
Reflective Discussion

• “What has surprised you most today?”

• “What do you know now that you did not know this morning?”

• “What will you do differently tomorrow?”
Other Methods

**Storyboarding**
Creating a graphical story can synthesize and summarize ideas from the workshop.

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**Visual Improv**
Rapidly drawing ideas of increasing complexity helps to prime for sketching and to suspend judgement.

**Description**
A facilitator reads a list of prompts, allowing participants 5 - 10 seconds to draw each idea. The prompts gradually increase in challenge, and include both concrete and abstract ideas. For example, we may ask participants to draw a line, a squiggle, a shape...then turn one of those drawings into a mountain, mode of transportation, a pet, a meal...Then, turn one of those drawings into a friendly mode of transportation, a helpful pet, a friendly meal...

After a few minutes of drawing, participants can be asked to find three pictures from around the room and create a story to introduce themselves or tell a story.

When facilitated effectively, this is a high-energy method that can engage participants — garnering interest in the workshop. It encourages agency as participants express themselves through sketching. Importantly, it also prepares participants to think visually, a key part of the topic.

**Materials**
- markers for drawing
- butcher paper or poster board

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**Visual Ranking**

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Post-Workshop Data Analysis

• Transcribe and Code artifacts
• Tangible Outcome: Prioritized Lists of Requirements, Problems, Ideas...
• Check back with participants

Workflow Walkthrough

Prompt: So we can get a better understanding of your workflow and the process of generating tasks, we want you to walk through the of a typical analysis. Please answer the below questions as you go through.

- What are the most important tasks? (note: TRT or CT)
- What are you looking for? (note: clinically relevant findings)
- What are the good/bad aspects of your current workflow?
- What are some constraints you have with your current workflow? (note: patient and molecular variation)
- How do you expect this to change in the future?
- What are some areas for improvement?

ARUP CVO Workshop, October 9, 2018

Adam Clayton, Clinical Variant Scientist
Genomics and Genomics

Current Workflow

1. Exon/gene level CNV and CNV
2. Exon/gene level CNV
3. Quality of the call
4. View of supporting reads of CNV

Post-it Notes

What would like to know from this data
What would you like to be able to do
What would you like to see

Group 2

Algorithm:

1. Exon/gene level CNV's (without false positives or negatives)

View of raw data
View of supporting reads of CNV, translocation, etc

Algorithm for detecting deletions/duplicates with confidence score
Pitfalls

• Recruit diverse and creative participants.
• Know the Domain
• Create physical and visual artifacts.
• Promote continued collaboration.
• ...