# Example

## Summary:

- Why did we do this activity? In one sentence.
- Where does this fit into the DAF?

## Description + duration:

- What prompt was given?
- How were people instructed to work? Was prompt physical or verbal?
- What materials were needed?
- How was time split up—individual, partners, and large group?
- How involved were the facilitators?

## Expected output:

- In what format were ideas recorded?
- Approximately how many ideas were recorded per person/pair/entire group?
- How involved were facilitators in recording output?

## Reflection / evaluation:

- How well did this work in each of the workshops?
- How did the participants respond to this activity – in each of the three workshops?

## Parameters:

- What could be changed about this activity to match groups?

## Possible alternatives:

- What activities could fulfill a similar purpose?

---

# Introduction

## Summary

- The introduction informed participants of the day's goals and established an egalitarian atmosphere by getting everyone (professors and students) slightly out of their comfort zone.

## Objective and expected outcome:

- Establish a creative environment – emphasize *challenge, playfulness/humor, idea time, freedom,* and *idea support* [Isaksen 1999]

- Create a culture of participation within the group – "cultures of participation need to be fostered and supported…in which all stakeholders are able to express themselves, combine different perspectives and generate new understandings" [Fisher 2011]
- Create a *mutual respect between participants* and *establish principles of interaction* [Sanders 2011]

### Duration and description:

- Approximately 15 minutes
- Used silly ice-breaker activity and inspirational quotes to establish *Idea support, mutual respect, playfulness/humor* and *risk taking*
- Displayed out a clear schedule for the day – emphasizing *idea time* and *challenge* by having a clear schedule for the day
- "A relaxed and judgement-free atmosphere encourages the flow of ideas which would be severely impeded if participants were allowed to convey their judgement on each idea" [Majaro1998]
- Established interaction rules to foster group creativity - no cell-phones and no laptops

### Reflection / evaluation:

- The introduction was well received in all three workshops as it framed the activities for the day and made strides toward a creative atmosphere.
- Although we were nervous to conduct the ice-breaker activity, we found that this actually had a very high reward in terms of establishing a culture of participation
- In WS2, we used quotes from experts in the participant's domain. When these quotes were brought up, there was conflict injected into the room – one of our participants criticized the quote's author. Therefore, we recommend staying away from quotes of experts in the domain.

### Parameters:

- More information could be taken from the participants during this session. For instance, what is their role in the lab or research group?

### Possible alternatives:

- Other forms of ice breakers – have facilitators and participants introduce each other

## Wishful Thinking

### Summary:

- This activity elicited from participants 'opportunity statements' focused explicitly on visualizations with the prompts: what would you like to **know**? What would you like to be able to **see**? What would you like to be able to **do**? Relate to SJ's email.
- This was a generative activity that helped us understand the problem domain and identify opportunities for visualization.

## Objective and expected outcome:

- This is a *generative* method meant to identify *opportunities, considerations, and constraints [McKenna14]* for visualization software. It corresponds roughly to the *understand* activity of the design activity framework.
- We wanted to get participants to think beyond what is currently possibly in their environment. So we used *paradigm-breaking* techniques [McFadzean1998] in order to introduce new "elements or relationships" into the problem space such as software capabilities or data aggregation.
- Generate as many ideas as possible – "the more ideas generated, the more likely that some very useful solutions will be developed" [McFadzean1998]
- Note: Brainstorming [Osborn 1957] but "classical brainstorming does not produce very many ideas that challenge or break away from a prevailing paradigm" [Nagasundaram1993]
- We also wanted to foster group creativity – as the sum of individual creativity is less than group creativity [Sanders 2011]
- The expected output is a set of ideas recorded in some physical medium. It is good if ideas can be moved around (making post-it notes idea).

## Description and duration:

- Roughly 50 – 70 minutes
- Each WS had domain specific which were handed out at the activities start – "Thinking about your aspirations for the smart home program," …
- Two of the three workshops worked individually then shared ideas as a group; the other workshop worked individually, then in pairs, then shared ideas as a large group
- In order to develop as many ideas as possible, we used various techniques to push participants beyond their initial exhaustion of ideas.
- Two of the three workshops used the "what next?" strategy to push beyond ideas. Picking the most important ideas in small groups then asking them "what if these were accomplished? What would that let us do? What would you like to know next?" We did this with facilitators in small groups.
- WS #2 used screenshots of existing software to push ideas beyond exhaustion. While this was fruitful during the session, it encouraged paradigm-preserving ideas.
- A large set of ideas generated by each individual along with a slight hierarchical grouping of ideas as the participants aggregate them through partners and group work.

## Reflection / evaluation:

- Screenshots used in WS#2 were ultimately paradigm preserving and resulted in short-term goals.
- The "what next" activity encouraged long-term thinking – and often paradigm breaking as participants imagined new possibilities from technological breakthroughs.

- This activity tied into the next "constraint removal" activity, so we were not finished with it.
- In all three workshops, there was a high-level of trust among participants. If working in a different context, we recommend starting with paradigm-preserving techniques at first [Mcfadzean1998]

### Parameters:

- The more "creative" that participants feel influenced whether they responded with longer-term or shorter term prompts.
- Whether there are existing conventions and software tools influenced what type of output we got from this activity.
- Amount of group working and aggregation depends on number of participants. More participants should probably do smaller group work -> this will lead to less time sharing with everyone.
- Are all three of the prompts needed for the aspirational thinking?

### Possible alternatives:

- Give this activity as homework – ask people to gather screenshots and artifacts from their work before the day begins. This would lead to incubation.
- ActivityMap [Kumar 2012]
- Love/breakup letters to express dissatisfaction with current software [HBR10]

## Constraint Removal

### Summary:

- This activity pushed participants even farther beyond their idea exhaustion from the previous activity by first identifying barriers to their desires, and then removing those barriers to generate new ideas.
- This was also a generative activity that helped us identify constraints of the domain, and push the generation of opportunities beyond the point of exhaustion.

### Objective and expected outcome:

- Push participants beyond their point of exhaustion and force them into 'paradigm-breaking' or supporting 'transformational' creativity [Boden 1990; Jones 2008] – vis design "ideation" [McKenna2015]
- Also, solidify our *understanding* [McKenna2015] of the domain – identify constraints in current technology or processes

### Description and duration:

- 50 – 70 minutes

- Continued with output of previous activity – we had participants identify barriers to their "I wish" statements.
- For the aspirations of the first activity, ask the questions: *What stops these from being achieved? Why have they not been done before?*
- In small groups, we then "removed" those and asked, "what would be possible if that's no longer a constraint?"
- We used a similar hierarchical group sharing to collect ideas.

### Reflection and evaluation:

- The constraints identified varied in breadth and tractability (feasibility?) – some of them were domain specific and tied to individual problems (WS#3) while others were more broad and applied to many domains (visualizing paths is in networks is hard – WS#2).

### Parameters:

- In WS#2, we combined this activity with the "what next" part of #1. This was due to time constraints. For instance, by giving the prompt "if this constraint was removed, then what next?"

### Possible alternatives:

- Persona analysis [Martin2012]
- Forced association [McFadzean1998]

## Lunchtime and Excursion

### Summary:

- We went to an external restaurant for the lunch break and we asked participants to find some artifact related to what we had discussed in the day. After lunch, we discussed these artifacts as a group.
- This generative activity was used for understanding the problem domain—generative in that we were forcing association between seemingly unrelated objects.

### Objective and expected outcome:

- Breaking for lunch – going to an external restaurant – was meant to support *incubation* of the morning's ideas [Sanders2011].
- The excursion activity was meant to encourage analogical reasoning (preparation for following activity) and push participants into a paradigm-breaking mindset by the addition of unrelated stimuli [McFadzean1998].

### Description and duration:

- Approx. 60 – 90 minutes in length (though we got feedback that this was too long).

### Reflection and evaluation:

- The excursion worked very well for WS1 but less well for WS2 and WS3. Many participants in WS3 admitted to not attempting this activity.
- The results from WS2 were uninspiring – perhaps because allowed photographs instead of physical artifacts, which lead to some bland responses. E.g., a photo of a security camera because it functions like the eye.
- We think the target domains may impact the type of responses from this activity – for instance, in WS#1 a lot of smart home analytics can be easily related to the environment where as the constraint programming in WS#3 are harder to relate.

### Parameters:

- Lunch venue parameters
    - Location of restaurant
    - Eat as a large or small groups
    - Continue to push on discussion topic or allow time to incubate
- Excursion parameters
    - Whether to allow photographs
    - Is the prompt too open ended?

### Possible alternatives:

- TODO

## Visualization Awareness and Analogical Reasoning

### Summary:

- While we have used visualization awareness to engage collaborators in previous user-centered design studies [needs reference], this activity is meant to generate ideas from participants by showing them a variety of examples and asking them to "consider any aspect of the examples (data, layout, interactions, colors, aesthetics) that spared connections with the thinking that had occurred during the morning session."
- Generative and evaluative activity – generative in that it is still identifying possible directions for work / evaluative in that it leads to the inclusion of certain constraints and considerations in the day's output. It fits into both the understand and ideate DAFs.

### Objective and expected outcome:

- Traditional *visualization awareness* is meant to "introduce *general* information visualization concepts to the users, illustrating the range of information visualization

techniques from standard statistical graphics to more specialists and innovative graphics"
- Adding the analogical reasoning aspect makes these *generative* methods – we encourage participants to relate visualization ideas to the concepts discussed earlier
- In particular, these methods tend to generate *constraints* and *considerations* for visualization designs [McKenna14] – for instance, in WS#1 the "everything in three clicks" constraint.

### Description and duration:

- Roughly 60 – 70 minutes: not a lot of time for each visualization to be discussed.
- Connected to previous activity because the excursion encouraged analogical reasoning – forcing relationships between stimuli.
- Display a variety of visualizations from various domains, and discuss feedback.
- WS#2 did not have a written prompt – that would have been useful. Did the other workshops have prompts?

### Reflection and evaluation:

- Important topics: multiple domains, mixture of mediums, keep participants interested, get them into the visuals if possible
- Analogies should not be too obvious
- Participants get the most out of this exercise, despite designers getting perhaps the least
- Can be used as a selling point of the workshop
- WS#2 was too ambitious with the number of visualizations and their content – perhaps a guideline is to stay away from design studies which focus on highly domain specific problems. It takes a lot of time to explain the data abstractions necessary to understand a visualization.

### Parameters:

- Domain, number, and medium of visualizations

### Possible alternatives:

## Storyboarding

### Summary:

- In the day's final activity, we ask participants to synthesize the main themes discussed and illustrate how these themes might be used by imagining "a day in their life."

- Mostly evaluative – goal is to evaluate the ideas generated during the day and synthesize them into stories. It fits into both the *understand* and *ideate* DAF activities.

## Objective and expected outcome:

- In the original paper, this activity was used in order to "draw together and prioritize ideas generated."
- Inspire combinatorial creativity [Boden1990] through the synthesis of ideas.
- Wanted to give the designers an open-ended activity at the day's end

## Duration and description:

- Roughly 50 – 70 minutes
- "Participants were provided with comic strip templates, writing materials, and hard copies of the various visualization awareness examples"
- Asked to "imagine a day in the life of [neuroscientists, energy analyst]"

## Reflection / evaluation:

- This was the most polarizing activity – a wide range of opinions on its usefulness.
- WS #2 found that it was valuable for forcing participants to articulate the context of their software needs as their workflows often involved collaboration within and between labs. Some of the storyboarding captured needs relevant to this.
- One participants said that he would have liked to see more storyboarding in WS #2, while another said that she thought it was a "waste of time."
- In all three workshops, the storyboarding helped us identify common themes from the day. Is it safe to say that these themes are *opportunities* for vis research?

## Parameters:

- Whether the storyboards are drawn out individually or in a group

## Possible alternatives:

- Organized discussion
- Mind-mapping or splat! [Sanders2011] the material
- "Buy a feature" [HarvardBusinessReview2010]