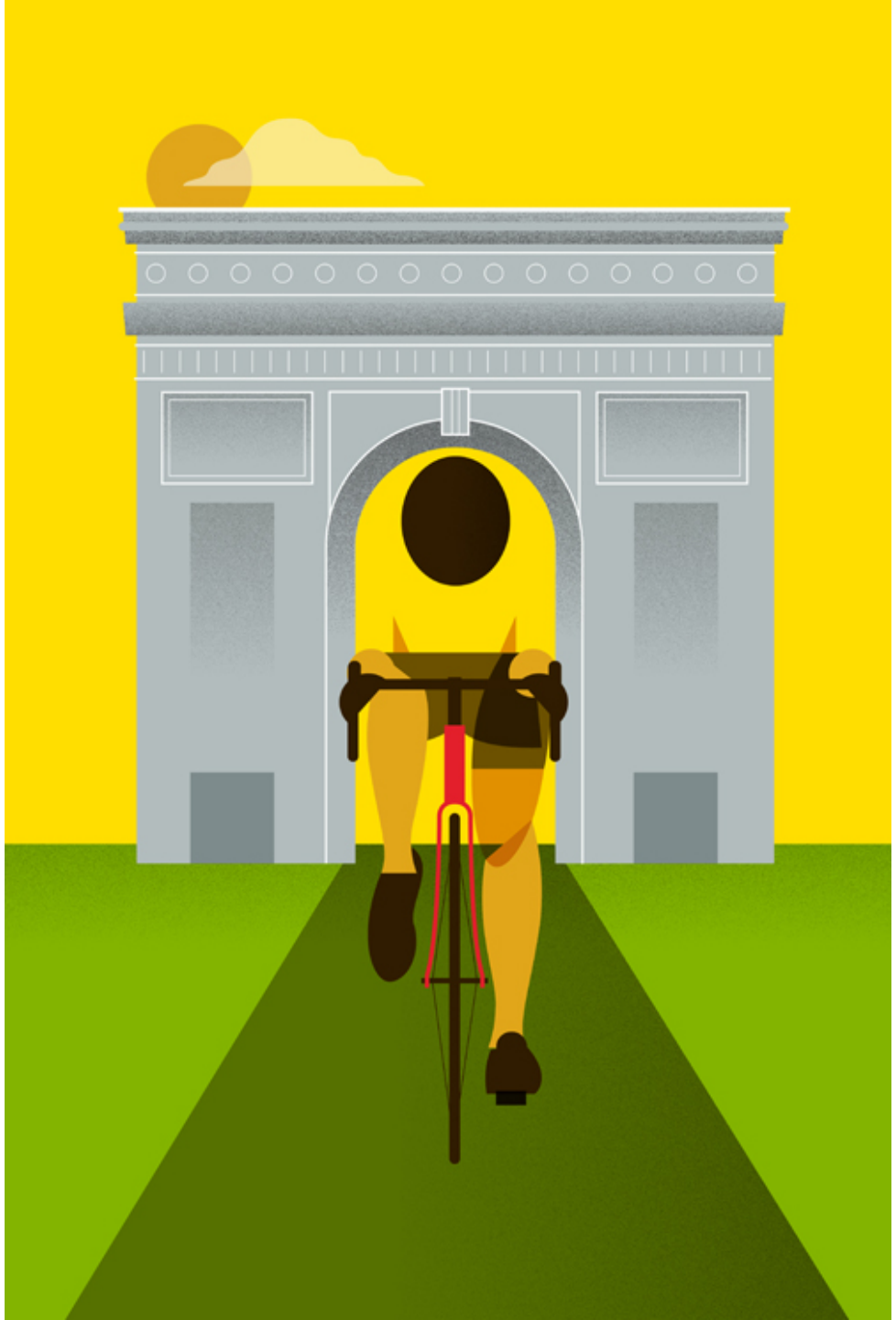
TEACHING AS COACHING

Marti A. Hearst
UC Berkeley

Statement for Panel:
Vis, The Next Generation:
Teaching Across the Researcher-Practitioner Gap
IEEE Vis 2015

Do you go to a yoga (or spin/karate) class and just take notes?

Active learning means we all sweat!



In a traditional classroom, learning is a solo contest.

It’s a battle of the student against the exam.

Those of us in academia were able to thrive in this environment, or we wouldn’t be where we are.

I prefer now to think of teaching as coaching, the way it is done in athletics.

Often it is a team sport.

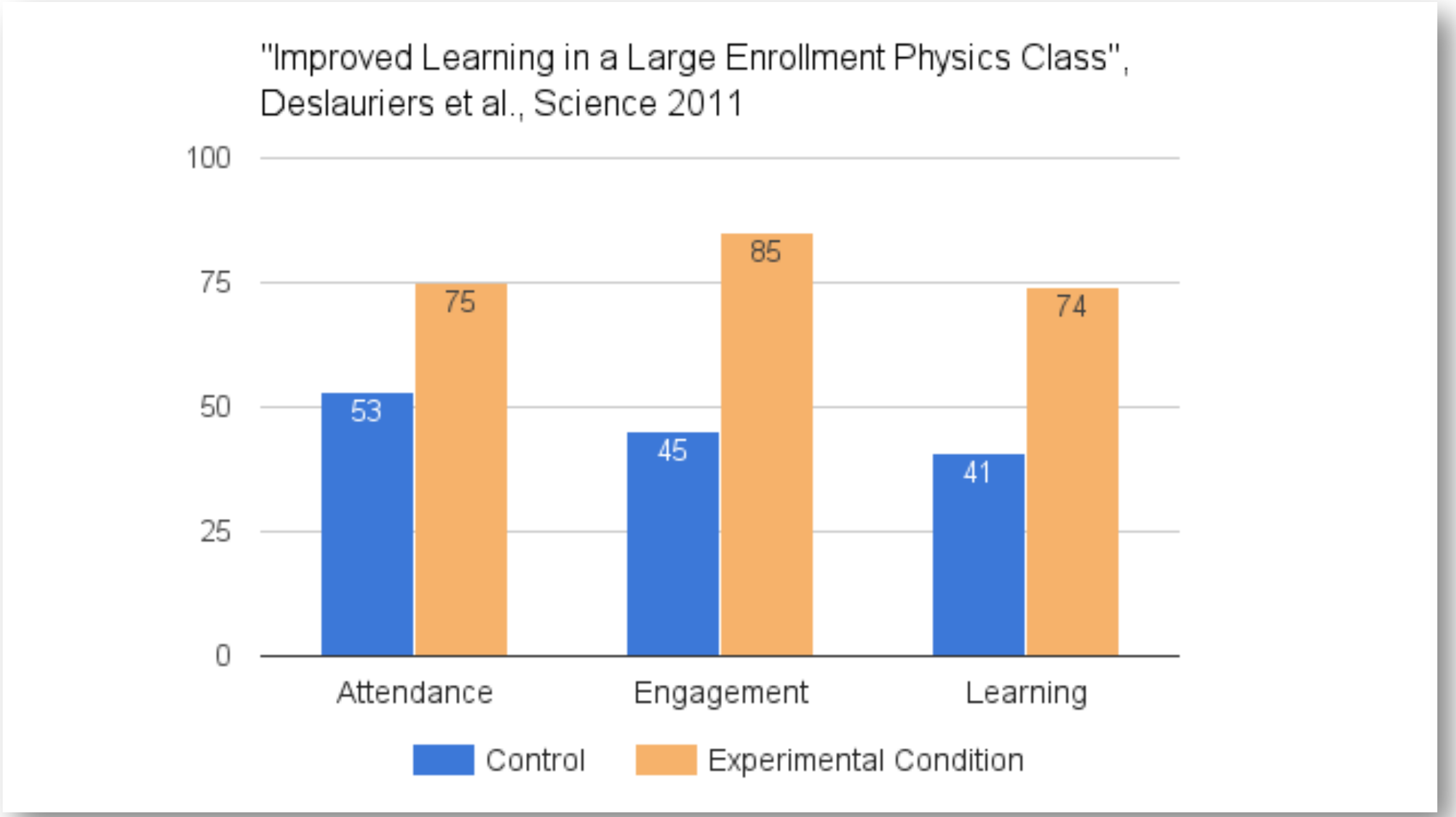
We make it ok to fail and retry and redo.

We sweat together.

Illustrations by www.justeleanor.com
Used with permission

eleanor
Design + Illustration

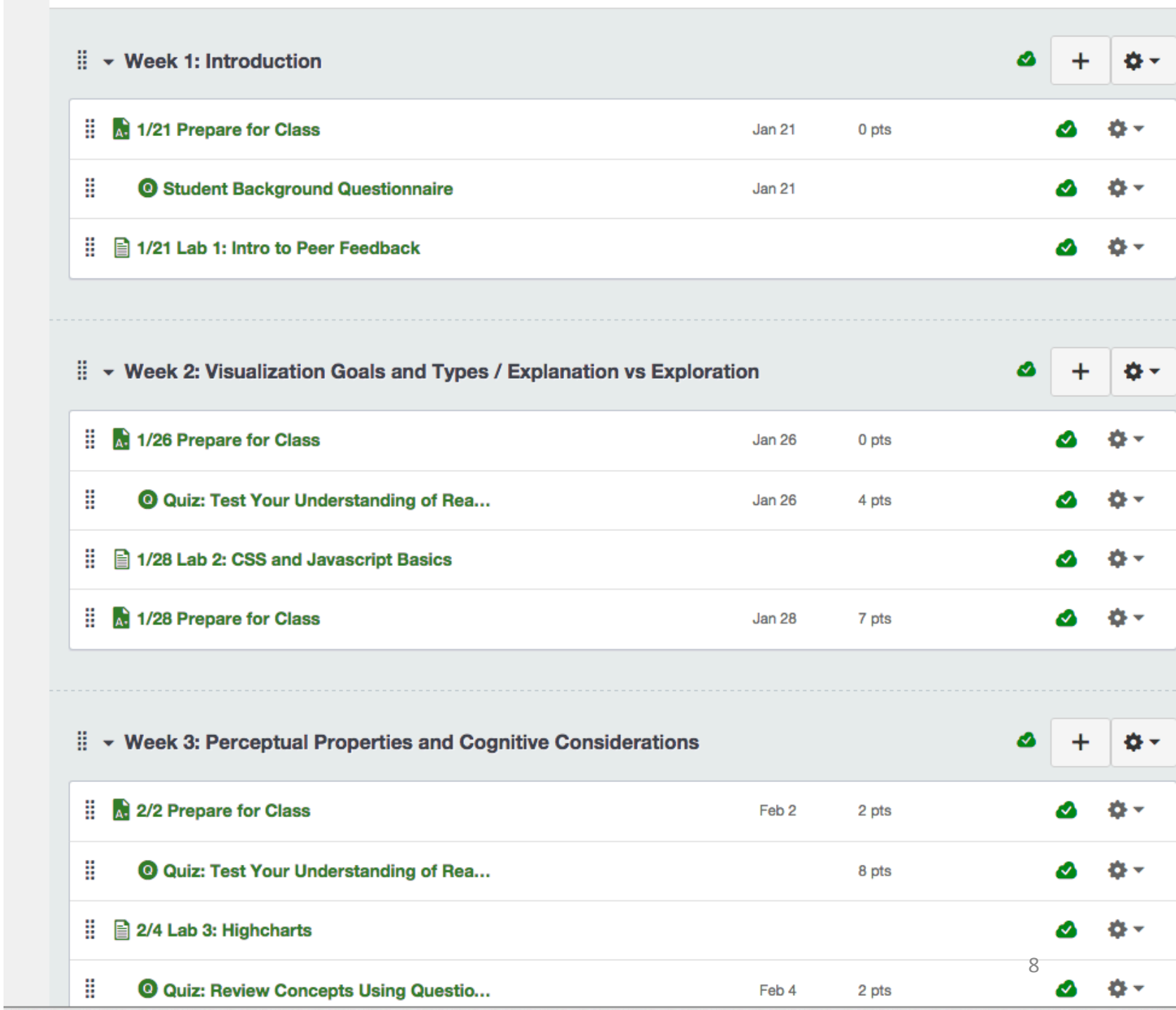
Active Learning Improves All Aspects of Learning



Many small preparatory exercises

Students earn points

Good faith efforts can be redone

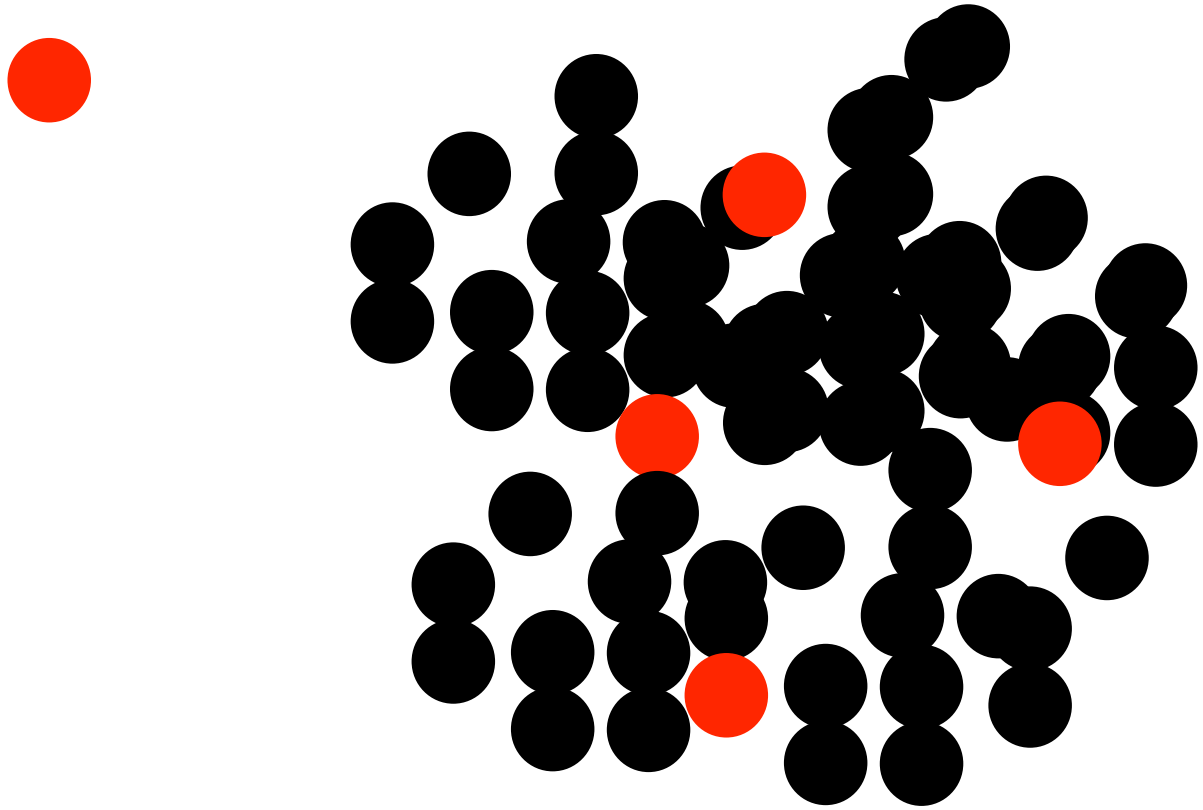


Why is Active Learning Like Coaching?

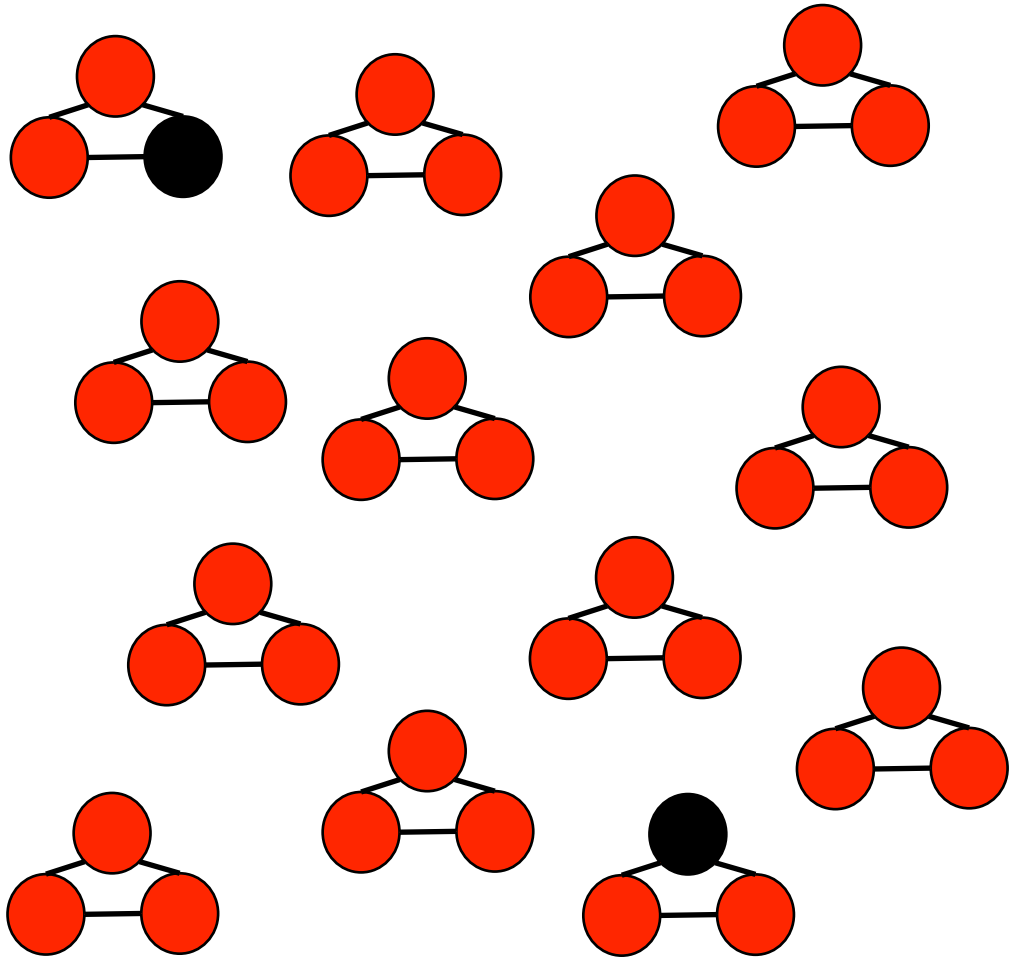
- Let students repeat problems until they get them right.
- Make failing fast, fun, easy to recover from.
- Provide as many practice problems as needed
- Create dynamic difficulty levels that can be personalized based on how students are doing.
- Focus on the feedback rather than the grades.

Peer Learning: Students talk with Peers

Discussion forum / Large lecture



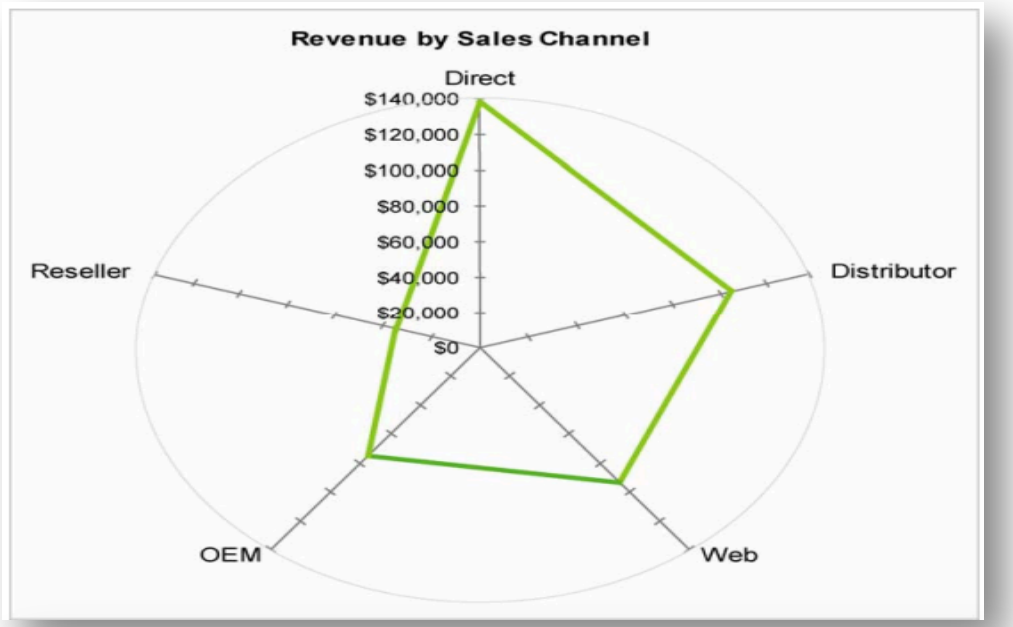
Small group discussion

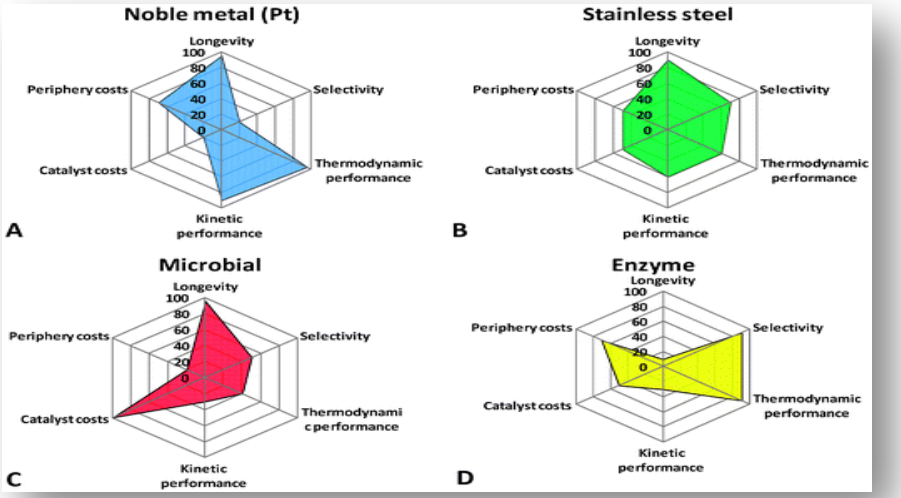


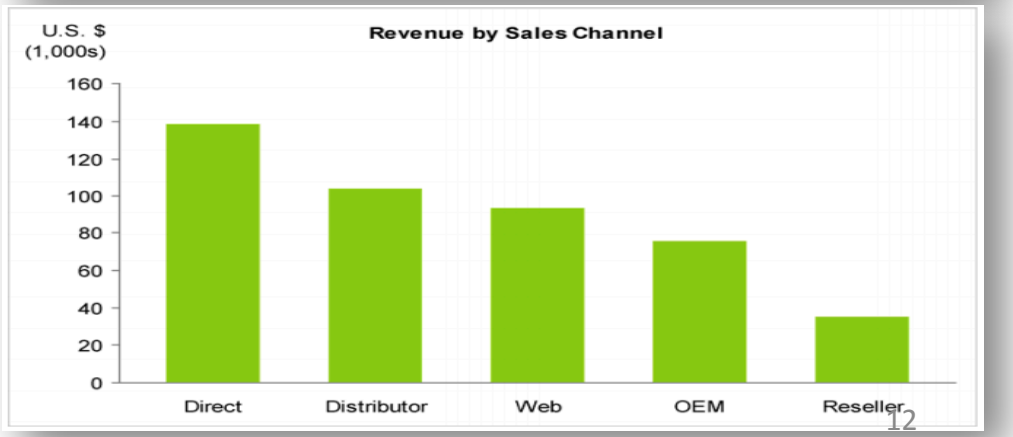
Coetzee, Lim, Hartmann, Fox, Hearst, "Structuring interactions for large-scale synchronous peer learning, CSCW 2015

Exercise: Rate Bar Charts and Radar Plots for the Following Visual Tasks:

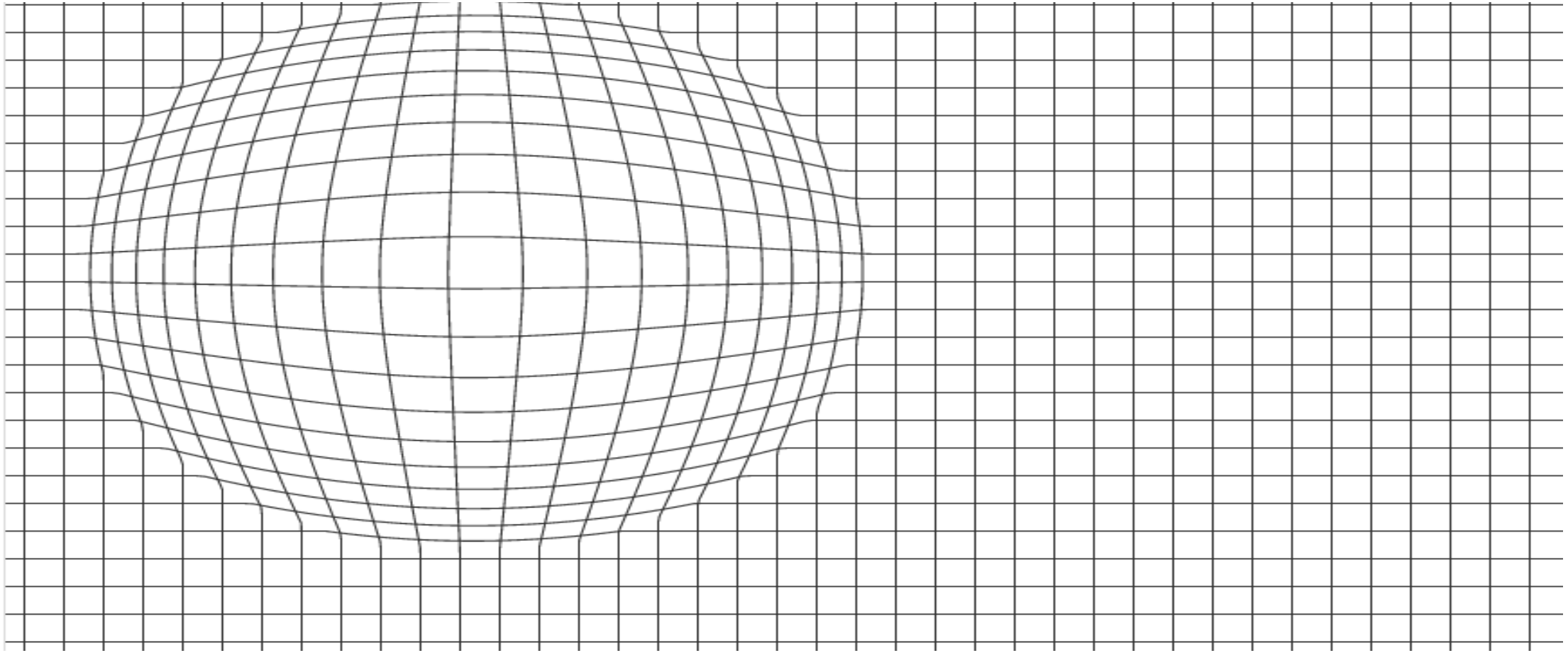
- Presenting Information
- Comparisons
- Organizing/Ordering
- Relationships/Correlations/Trends
- Showing Exceptions







D3 Fisheye Grid:
Exercise: what is going on here?



http://bl.ocks.org/mbostock/2962761/

4 Units of Conceptual Material

4 Larger Assignments & Software Tools

Perceptual / Cognitive principles

Charting basics

Data types

Narrative

Salience

Gestalt Properties

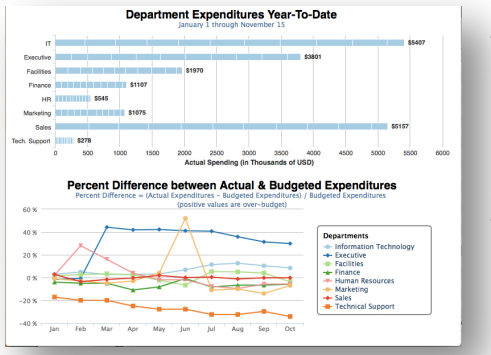
Data Wrangling

Exploratory Data Analysis

Multidimensional Vis

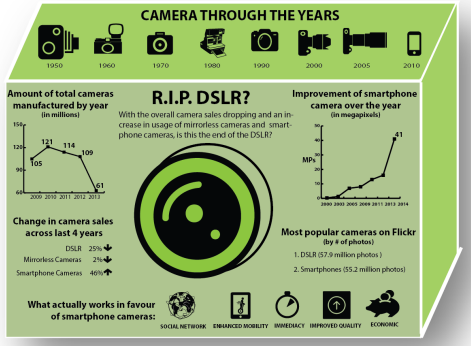
Animation

Advanced Topics



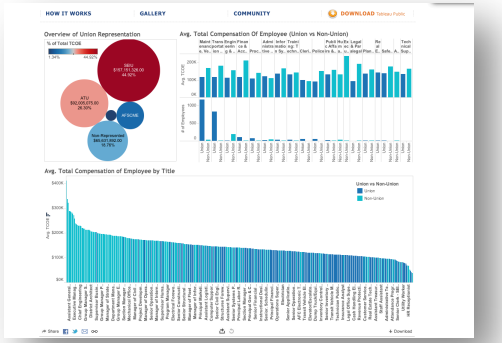
Faye Ip and Cameron Reed

Highcharts.js



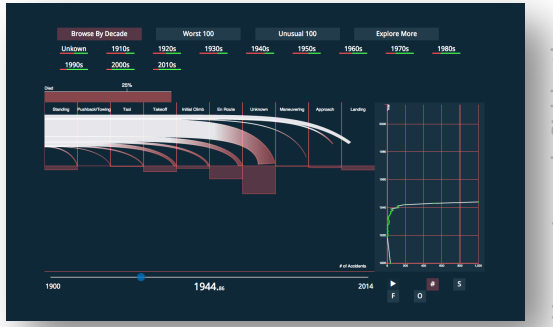
Anand Rajagopal

Illustrator



Faye Ip

Tableau



Hassan Jannah,Siddarth Agrawal, Sufia Sidiqi

d3.js

“Objectively Evaluated Viz” Assignment

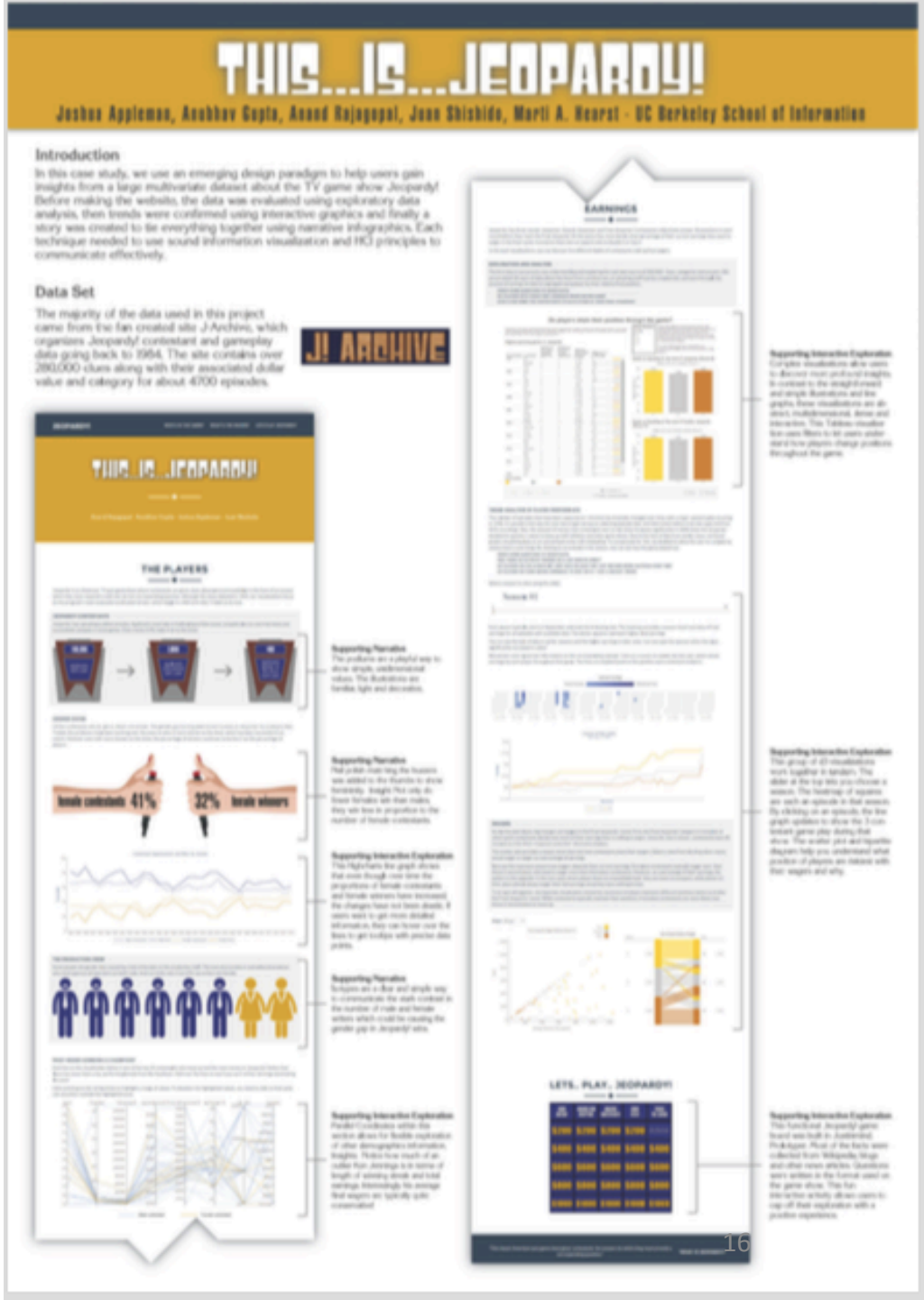
- Idea: have outsiders answer questions about data based on students’ designs, rather than instructors’ or students “subjective” judgements.
- Method:
  - Give students one dataset
  - Make up a set of questions about that data
  - Put students’ designs on a crowdsourcing platform
  - See how many questions answered correctly
- Also
  - (Based on study by Dow et al. 2011, that students read)
  - Have students first design individually
  - Give instructor feedback
  - Then pair up students
  - Have them create new designs together

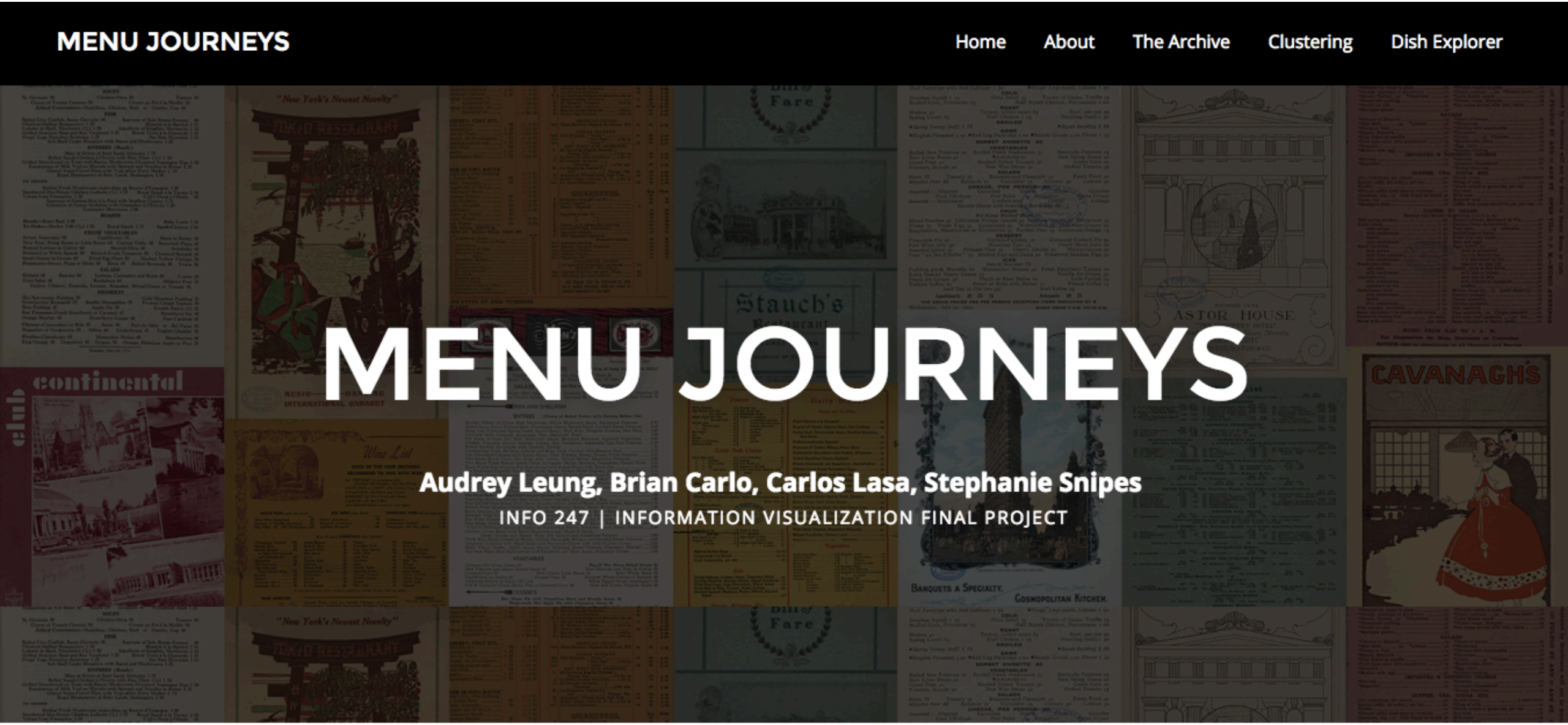
Final Projects Unite These Concepts and Skills

Jeopardy! (Poster By Appleman et al. in IEEE Infoviz 2015)

Menu Journeys (Following Slides)

Turn out to be similar to the narratives described by Segel and Heer 2010




MENU JOURNEYS
Home
About
The Archive
Clustering
Dish Explorer
MENU JOURNEYS
Audrey Leung, Brian Carlo, Carlos Lasa, Stephanie Snipes
INFO 247 | INFORMATION VISUALIZATION FINAL PROJECT

MENU JOURNEYS

Home About The Archive Clustering Dish Explorer

WHAT'S IN THE ARCHIVE

In total, here were the number of menus, dishes, and years that the NYPL collection contained.

17,544
Menus

1,331,458
Dishes

1851
2008

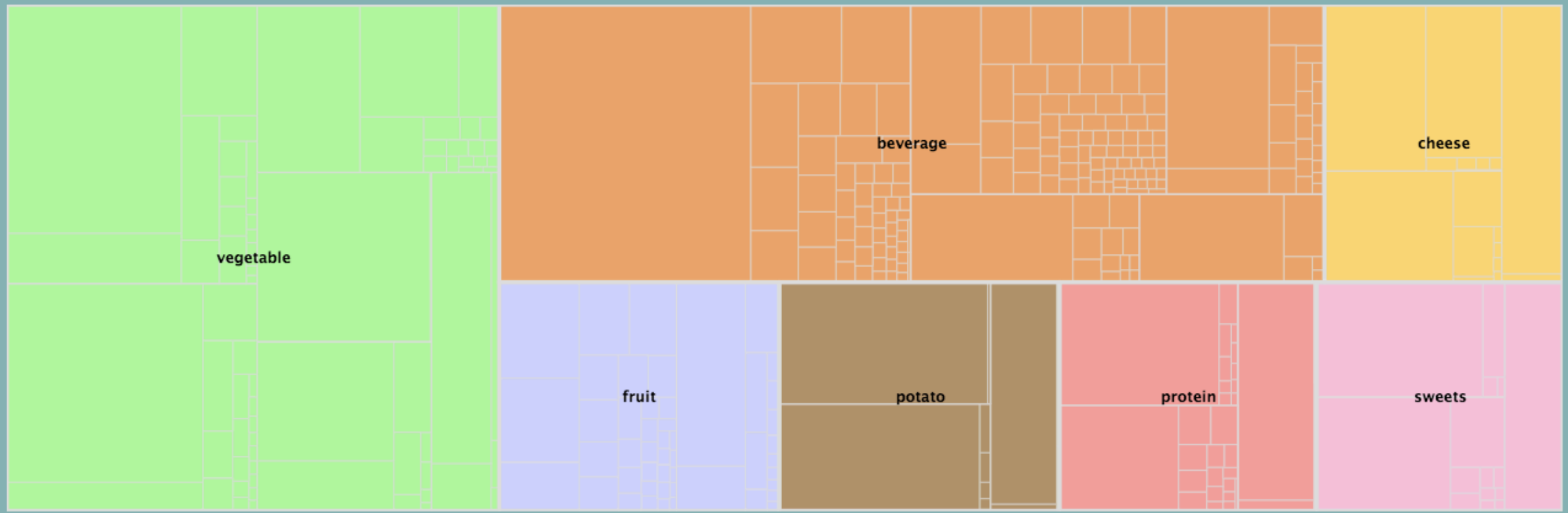
157
Years

MENU JOURNEYS

Home About The Archive Clustering Dish Explorer

Menu Item Clustering into Food Groups

Click points to drill down. Source: NYPL.



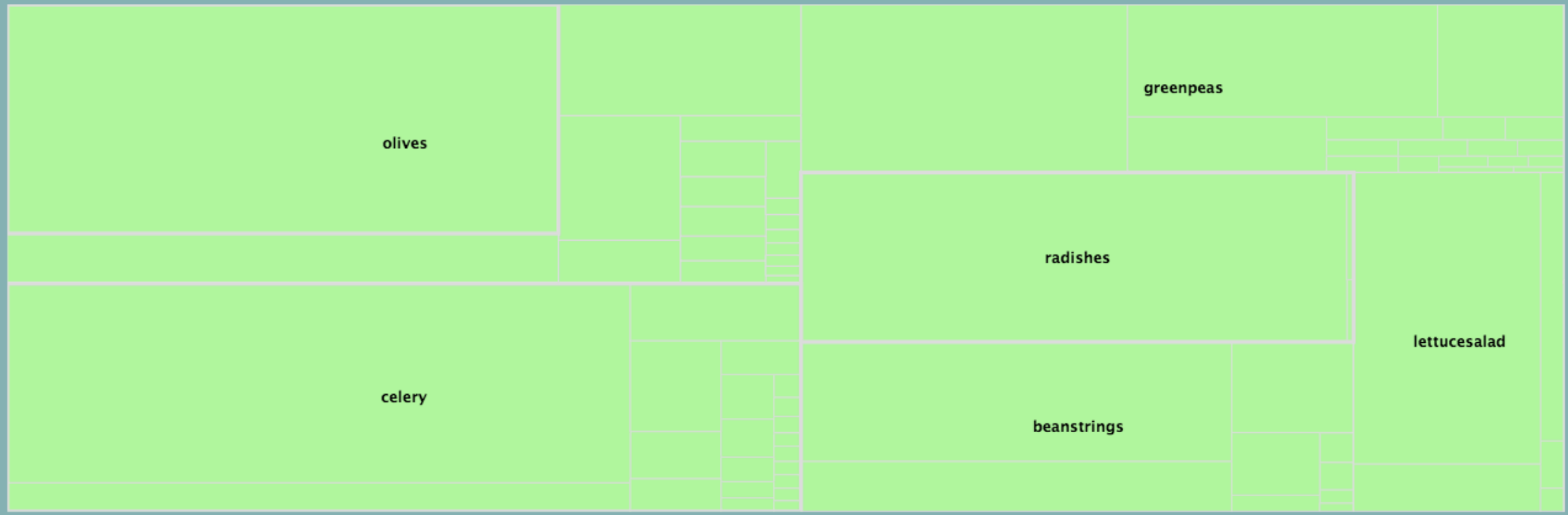
MENU JOURNEYS

Home About The Archive Clustering Dish Explorer

< Back

Menu Item Clustering into Food Groups

Click points to drill down. Source: NYPL.



MENU JOURNEYS

Home About The Archive Clustering Dish Explorer

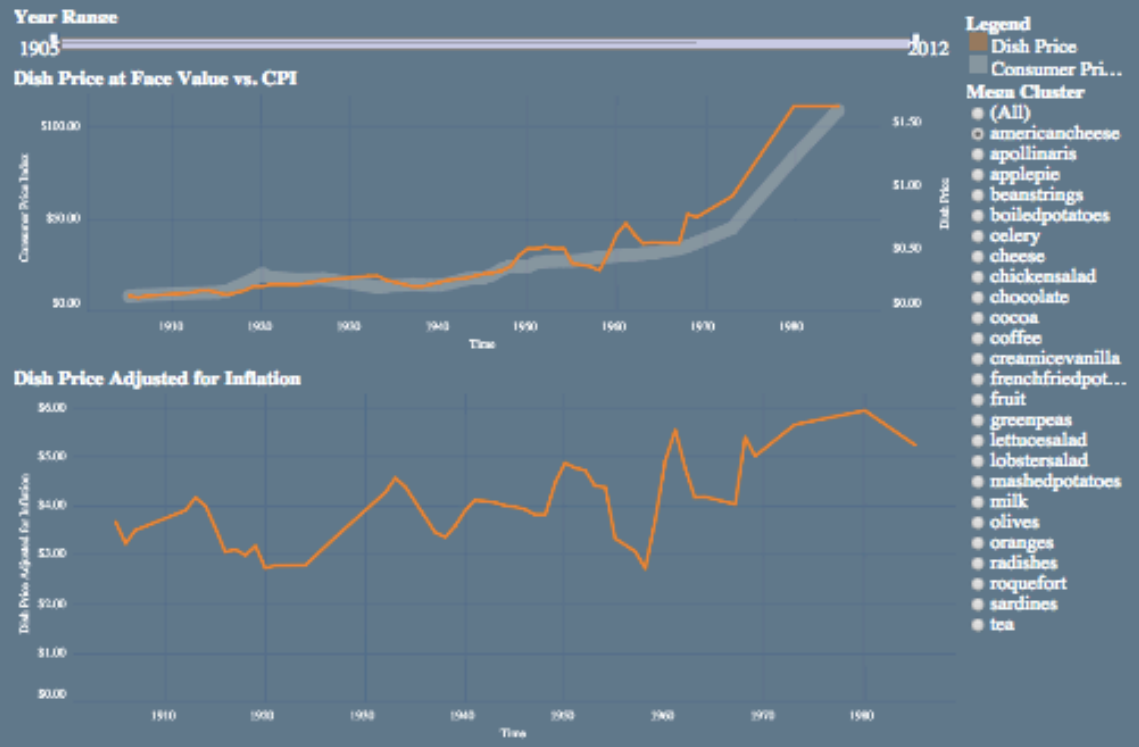
Price of Dishes over Time

How did the average prices for each dish cluster change over time?

The graphs below chart the average price of dishes in each cluster (looking at the 50th percentile, disregarding outliers) over time. This data is contrasted with the inflation of the Consumer Price Index over time, from 1904 to the present day. It can be generally noted that dish prices have increased with inflation, but there is volatility during certain time periods and variation across the clusters.

Mapping Dish Price Against Inflation

You can filter the dish price



MENU JOURNEYS

Home About The Archive Clustering Dish Explorer

A closer look at the Y position in the (X,Y) coordinates of dishes

Fruit vs. Oranges: Not just a dessert anymore?

The rise of an American classic: the French Fry

Cheese through a bust

Fruit rose steadily over time, from a bottom-of-the-menu staple to a dish that could appear anywhere. Oranges keep pace until the postwar period, when they fall back down to the bottom of the menu.

Fruit rose steadily over time, from a bottom-of-the-menu staple to a dish that could appear anywhere. Oranges keep pace until the postwar period, when they fall back down to the bottom of the menu.

Fruit vs. Oranges

MENU JOURNEYS

Home About The Archive Clustering Dish Explorer

Modern Menu Comparisons

How do the NYPL's top dishes stack up against modern menus?

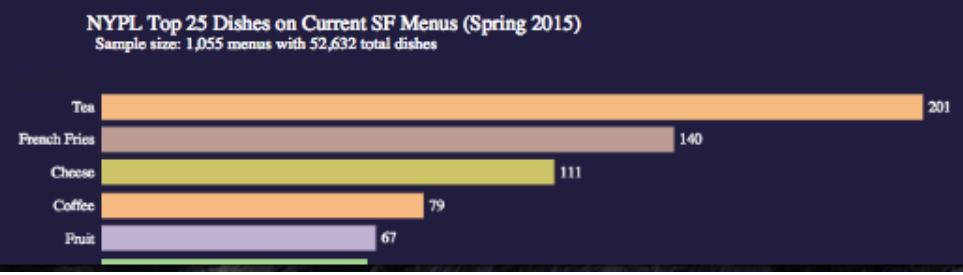
Finally, we wondered how the historical menu data might match up with today's cuisine. So we scraped menu data from more than 1,000 restaurants in San Francisco from spring 2015, ranging from top spots like Gary Danko all the way down to corner sandwich shops. We then used the same criteria to group dish names as we did for the NYPL dataset to see how prevalent its Top 25 dishes are on a modern set of menus.

How SF stacks up

A modern twist: How do present-day menus match up?

Let's find some grub. Who's with me? Celery, anyone?

Tea, fries, and cheese plates remain strong on San Francisco menus, but good luck finding a plate of radishes, celery, or olives in 2015.



Summary

- Active + peer learning has hundreds of papers of pedagogical support.
- Incorporated it into my graduate infoviz course.
- Combine concepts from research with ideas and tools from practice.
- This is influencing my research too.
- Think of teaching as coaching is better for students … and for **me**!