“Data Clubs” – Introducing Middle School Students to the Power of Data

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Data Clubs Overview

- Data Clubs is a collaborative project with primary partners TERC and Science Education Solutions and additional partners Gulf of Maine Research Institute, Oxford Hills School District, Malden YMCA, and Girls Inc.
  - After school/summer camp materials, 10-12 hours/module
  - Participants entering 7/8 grade (12-13 years old)
  - Three modules, focusing on 3 different topics and large publicly available data sets.

Data Clubs Pedagogical Foci

- Appreciate the ubiquity of data and the potential for learning from data
- Be aware of the complexities of measurement and view data through these complexities
- Understand the case/attribute structure of data
- Have experience with describing distributions and distributional shape
- Have experience looking at relationships within a dataset by comparing distributions and by exploring relationships between attributes.
- Understand how data representations are constructed by mapping attribute values to representational elements, both on the computer and off.

Design Criteria

- Topics
- Datasets
- Tools
- Activities

Criteria - Topics

- Working out of school means we have freedom to choose any topic – and have to keep participants interested. The relevant statistical concepts emerge from the data.
- Both a "window" and a "mirror" plus potential for social action
- Topics chosen with help of Youth Advisory Group:
  - Teens and technology
  - Tick-borne diseases such as Lyme
  - ??

Criteria – Data Sets

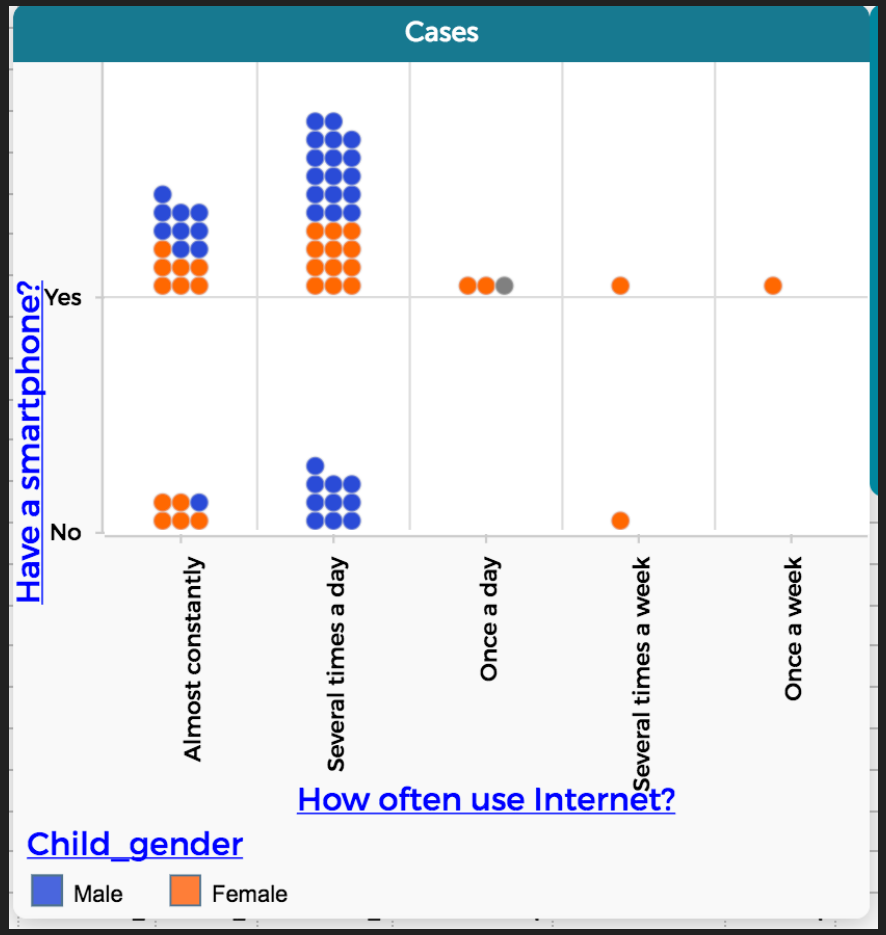
- We are looking for and constructing "just right" datasets that are small enough to be manageable, but have rich relationships

Criteria – Tools

- Accessible for middle school students
- Can deal with largish data sets
- Makes the difference between cases and attributes clear
- Dynamically links multiple representations of the same data
- Makes filtering and looking at subsets of the data (data moves) accessible
- Free, accessible online

Tool: CODAP (Common Online Data Analysis Platform)

- CODAP, designed and implemented by Concord Consortium with many user-partners.
- Representations are case-based and linked.
- Codap.concord.org



Criteria - Activities

- Tim Erickson's criteria for "smelling like data science": "awash in data" and using "data moves"
- Participants should both analyze a large data set and have some experience collecting data.
- Participants should have experience representing data with computer tools and by hand in order to understand how data representation involves mapping attribute values to representational forms.

Teens and Technology module

- "Hook" – the lead article in the Boston newspaper last year
  - Forty-five percent of teens say they are online "almost constantly," according to a new Pew Research Center study on teens and social media use.

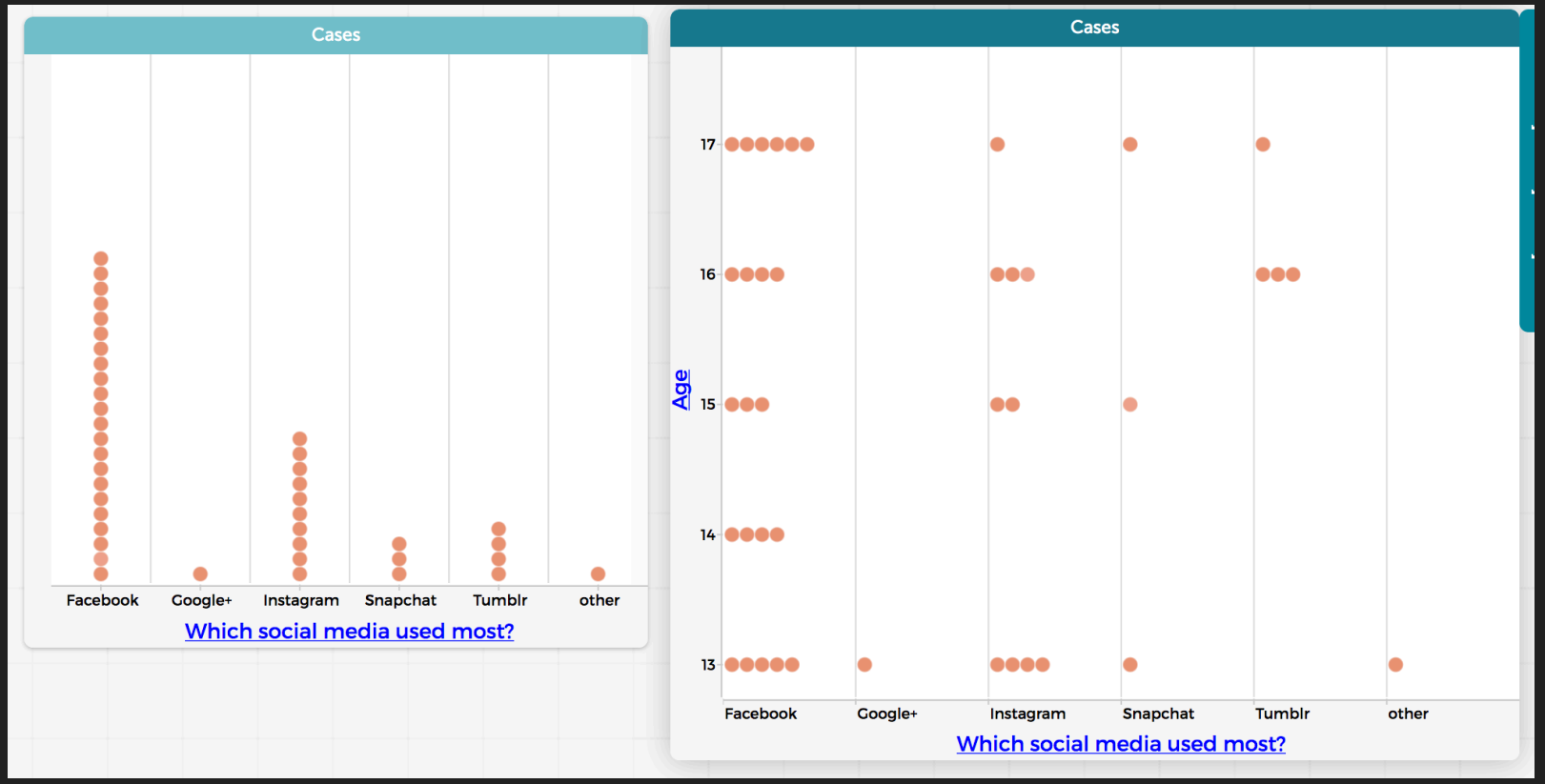
Teens and Technology dataset

- Pew Research Center Technology and Internet Use 2014 survey
- 37 page interview administered online to a parent/child combination
- About 1200 cases
- 300+ variables
- Introductory dataset: 50 cases, 10 variables, followed by a dataset of 200 cases.

The Key Pew Question

- Which of the following social media do you use MOST often?
  - Facebook
  - Twitter
  - Instagram
  - Google+
  - Snapchat
  - Vine
  - Tumblr

Social Media Used Most – and by age



A final presentation from one girl

Text

I noticed that a very few amount of the interviewees refused the question, or chose the 'something else' option. This probably means that the other options; game site, phone call, social media, and text; are the most common online communication methods for people who have the internet or a phone.

Text

There were no female interviewees that used video games as their primary communication method. While it is simply a stereotype that video games are more for boys than girls, I think people tend to follow these stereotypes subconsciously, nervous about stepping out from the crowd or standing out. However, this is simply a theory, not meant to offend anybody.

Text

We certainly have to acknowledge the fact that the Pew interviewees outnumber the Malden ones 191 to 12, so we can't really assume a lot about Malden.

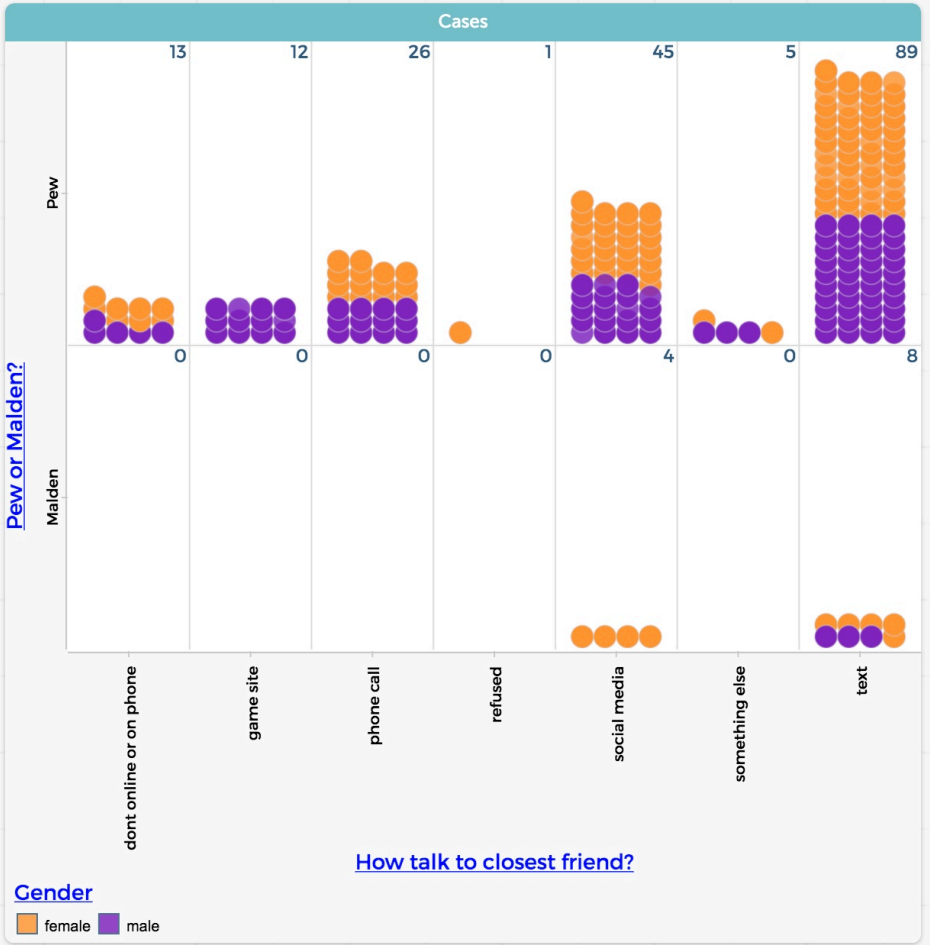
Text

Definitely, texting is the most popular way of communicating, I assume just because of how easy it is, and how quickly and simply the receiver will get the message.
Social media is the second most popular way of communicating, which I assume is because of how big and trendy social media has become, especially Instagram, Snapchat, Twitter, and Tumblr. Most people own these apps/social medias, and the ones that are addicted, or just use it constantly would definitely use social media as their primary communication method.

Teens and Technology database from Pew

Cases (216 cases, 329 set aside)

index	CaseID	Pew or Malden?	Age	Gender	Use social media?	How talk to closest friend?	Ha
1	1488	Pew	16	female	yes	social media	ye
2	57	Pew	17	female	yes	phone call	nc
3	119	Pew	13	male	no	text	nc
4	819	Pew	17	female	yes	phone call	nc
5	2072	Pew	16	female	yes		ye
6	649	Pew	13	female	yes	phone call	nc
7	710	Pew	15	female	no	social media	nc
8	556	Pew	16	female	yes	text	re



Thank you and contact info

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