Data Science For Social Good

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National Science Foundation

• DSFSG
• The Promise
• Challenges
• Conclusions

Data Science for poverty alleviation

- Approximately 70% of the global population in poverty in rural areas
  - International Fund for Agricultural Development
- Shocks
  - disease
  - war or conflict
  - failed crops or natural disasters.
- Unconditional cash transfer programs
  - Can allow people to take advantage of opportunities that require some investment but can then lift the household or village back out of poverty

GiveDirectly

Send money directly to the extreme poor.

Operating Model

We manage transfers end-to-end using electronic monitoring and payment technology.

We first locate extremely poor communities using publicly available data. We then send field staff door-to-door to digitally collect data on poverty and enroll recipients. We typically target those living in homes made out of organic materials, and are also assessing alternative poverty targeting methods.

We use a set of independent checks to verify that recipients are eligible and did not pay bribes, such as physical back-checks, image verification, phone checks, and data consistency checks. For example, we use GPS coordinates, satellite imagery, and crowdsourced labor to detect irregularities.

We transfer recipient households roughly $1,000, or around one year's budget for a typical household. We use electronic payment systems; typically, recipients receive an SMS alert and then collect cash from a mobile money agent in their village or nearest town.

Key stats

$0.65

The average recipient in Kenya lives on just 65 cents (nominal) per day.

3%

3% of households are removed from our lists after multiple checks of their eligibility. Verify this [csv]

31 min

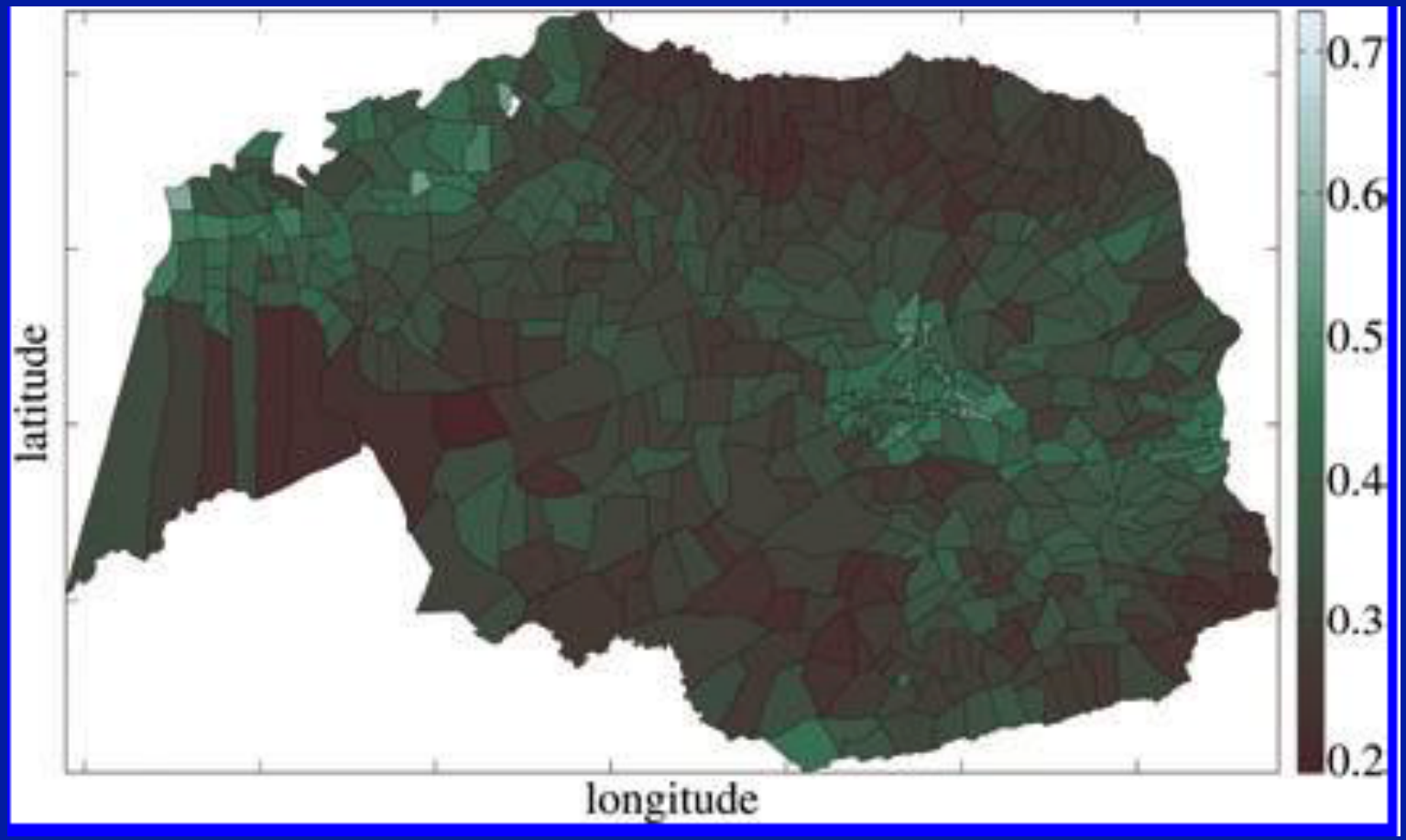
On average it takes recipients 31 minutes round-trip to collect their transfers from the closest agent.

Verify this [csv]

Satellite image patches (a) thatched roofs (b) metal roof

Varshney et al., 2015

Estimated proportion metal roofs per village



Varshney et al., 2015

yelp

Find tacos, cheap dinner, Max's | Near Washington, DC

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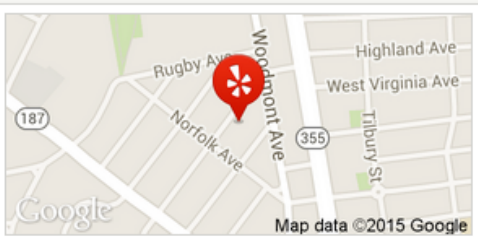
South Street Steaks

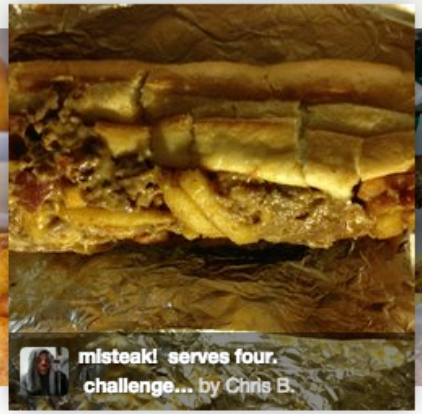
132 reviews | Details

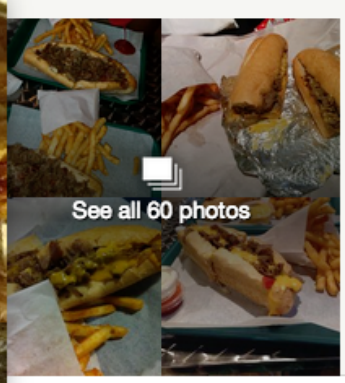
Write a Review | Add Photo | Share | Bookmark

$ · Sandwiches, Cheesesteaks, American (New) | Edit



4856 Cordell Ave
Bethesda, MD 20814 | Edit
Get Directions
Bethesda Metro More info
(301) 215-8333
Message the business
southstreetsteaks.com





"The steaks are juicy, the whiz is solid, the onion amount is perfect and the **Amoroso rolls** are, well, Amoroso rolls." in 11 reviews

"I recommend their **Steel City**, The Works, and Chicken cheese steak." in 5 reviews

"The **cheez whiz** is a good condiment -- whether it's on the fries or in the subs!" in 6 reviews

Ad **Angie's Pizza** 27 reviews

Rachel E. said "Such good food. Like insanely good food. The pizza is good. The subs are good. Fresh quality ingredients. I just tried the chicken pesto pizza and it was heavenly. My husband and I order from here quite..." read more

Order delivery or pickup

This business opens **Saturday at 11:00 am**

- ○ Pickup
- ◉ Enter your delivery address

1 Yelp St., San Francisco, CA 94105

Start Order

Today **11:00 am - 3:00 am**
Closed now

Full menu

$$$$ Price range **Under $10**

Cases

- Data collection is thin
- Data collection is unobtrusive
  - Discover what could be very personal information from non-personal data
- Approach
  - narrow down using Big Data methods
  - follow up with human eyes

Promising Efforts in Education

- Personalized Learning
- No More Tests
- Access to Learning Opportunities

Personalized Learning

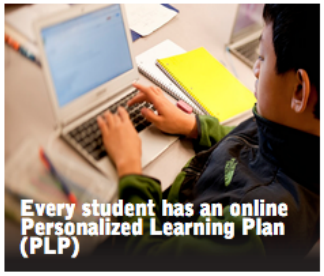
summit public schools

Explore a day in the life of a Summit student.

Each Summit school has its own daily schedule, but all share the same core learning experiences focused on college and career readiness.

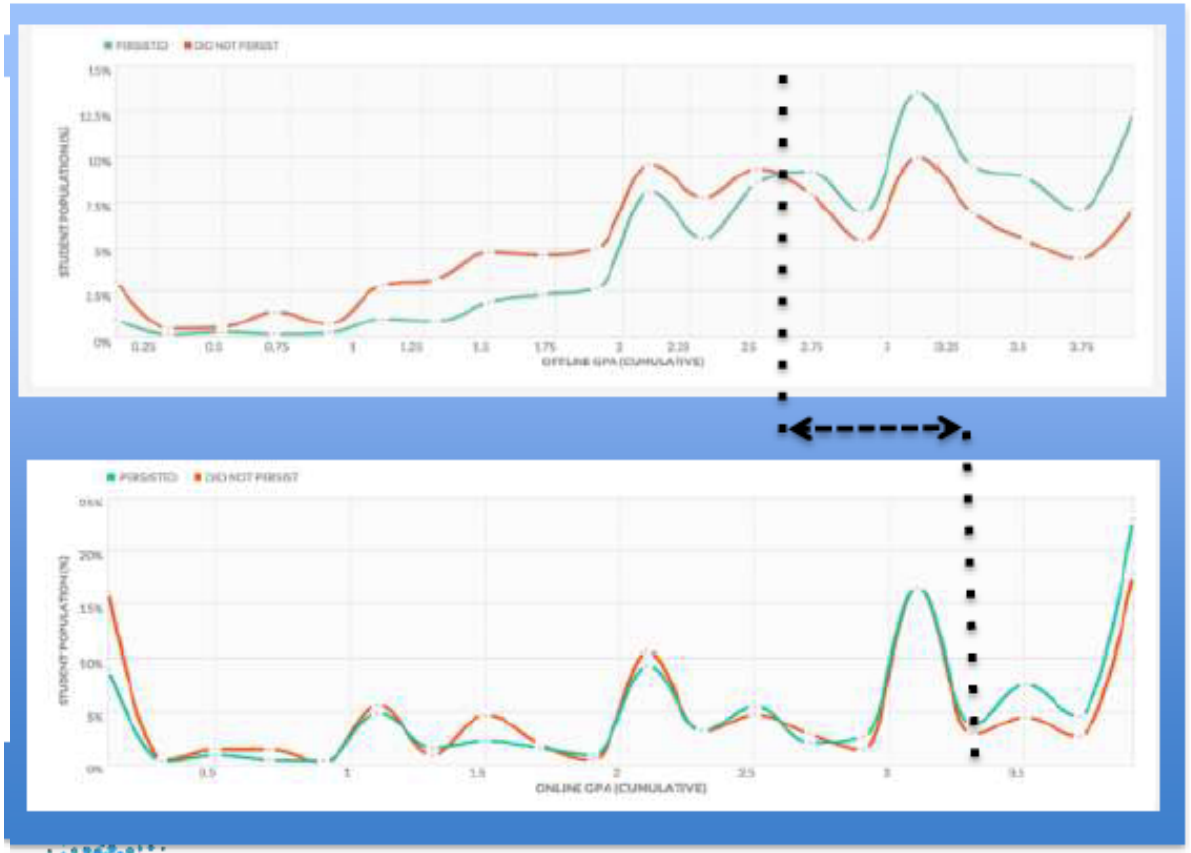
School Day Begins ····· Mid-Day ····· School Day Ends ··· Four 2-Week Sessions ···

Project Time | Summit Reads | Personalized Learning Time | Summit Solves | Mentor Time | Community Time | After School | OR | Expeditions All Day Electives



illume™

Institution Insight: When looking at **GPA by modality** we see that the tipping point moves significantly higher for online courses



On Ground = 2.6

Online = 3.4

No More Tests

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Data Specification

Fork on GitHub

The base of the ADAGE platform is the data specification. The specification provides base structures for how ADAGE client games should log data to an ADAGE server. This gives a common structure to the data that allows generic analysis tools and cross game comparison of data. ADAGE client games can extend this base specification to record data that is entirely specific to the game.

ADAGE Unity Client

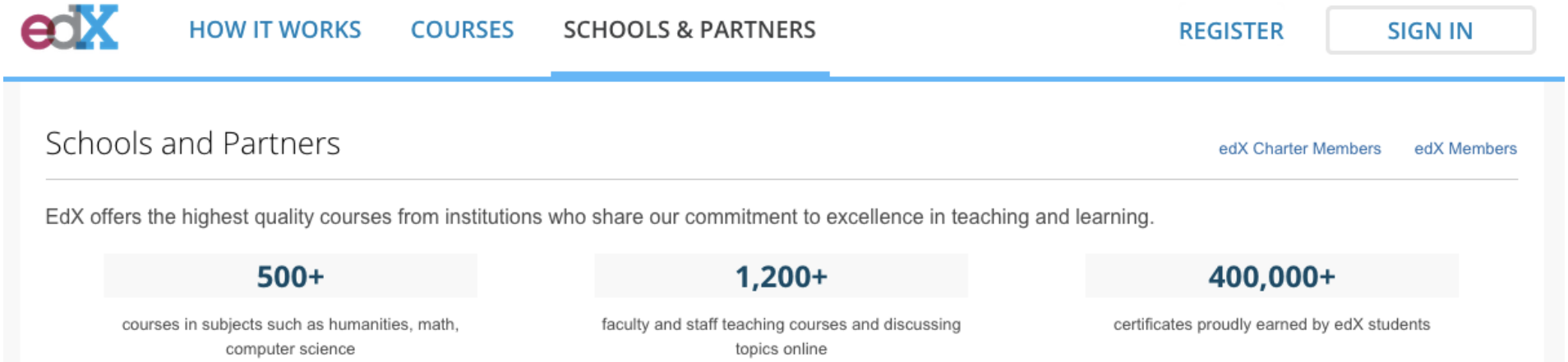
Documentation Fork on GitHub

The ADAGE client for Unity 3D is a package that can be dropped into your Unity projects to quickly start logging data to an ADAGE server. The current ADAGE Unity client is downloadable from GitHub. To be notified about new releases of the ADAGE Unity Client please join our mailing list or follow the repo on GitHub.

Server

Documentation Fork on GitHub

The ADAGE server is a Ruby on Rails application that provides support for logging, retrieving and analyzing data from ADAGE clients.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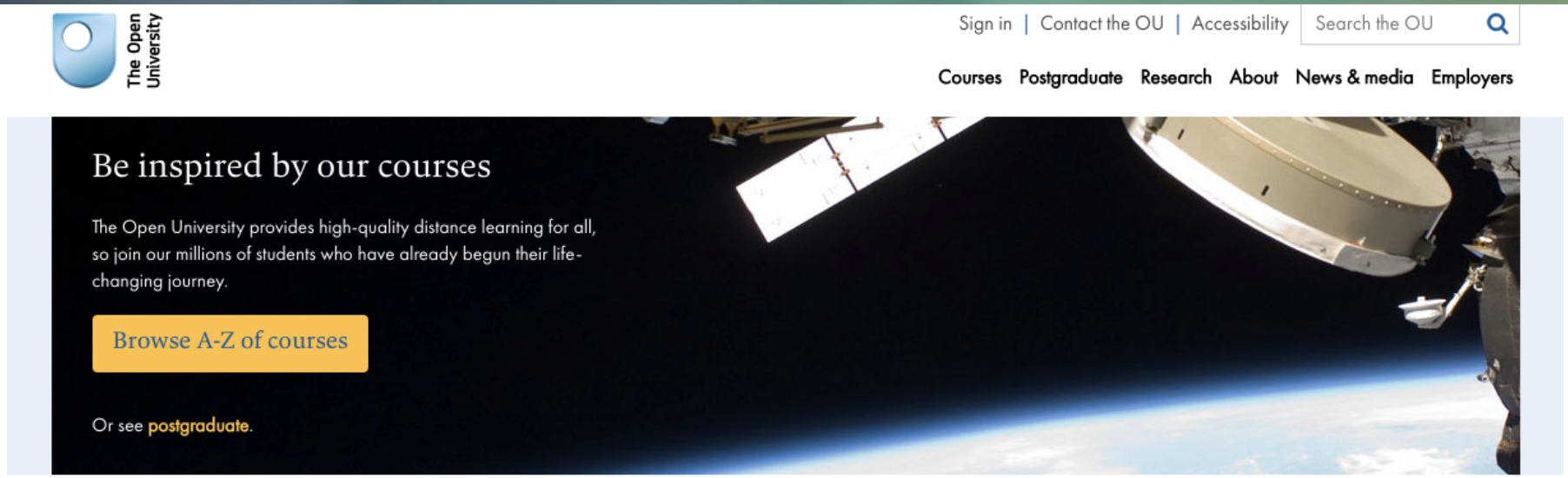
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Open Learning Opportunities

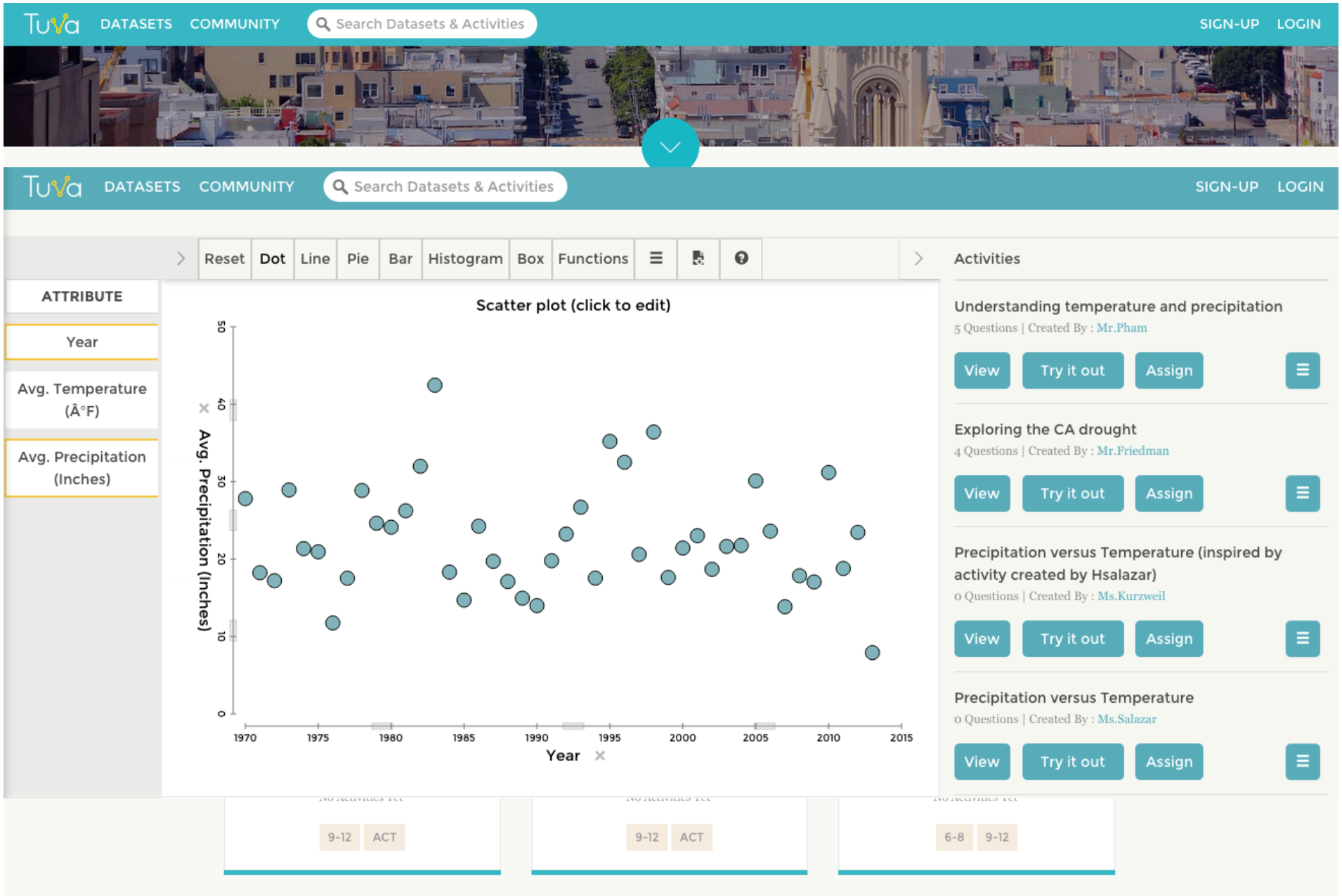
- More inquiry or collaborative learning practices
- More adaptivity
- More recommendation in real time and feedback to learners

Challenges

- D3M
- Data Privacy and Security
- Building Human Capacity

D3M

- D3M increasingly important in nearly all fields
- In education, challenges:
  - few integrated data sources
  - not enough knowledge sharing about the data that are available.
- Need tools to build human capacity for
  - teachers
  - administrators
  - Students
- Great things going on in building data literacy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Activities
Understanding temperature and precipitation
5 Questions | Created By : Mr.Pham
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Exploring the CA drought
4 Questions | Created By : Mr.Friedman
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Precipitation versus Temperature (inspired by activity created by Hsalazar)
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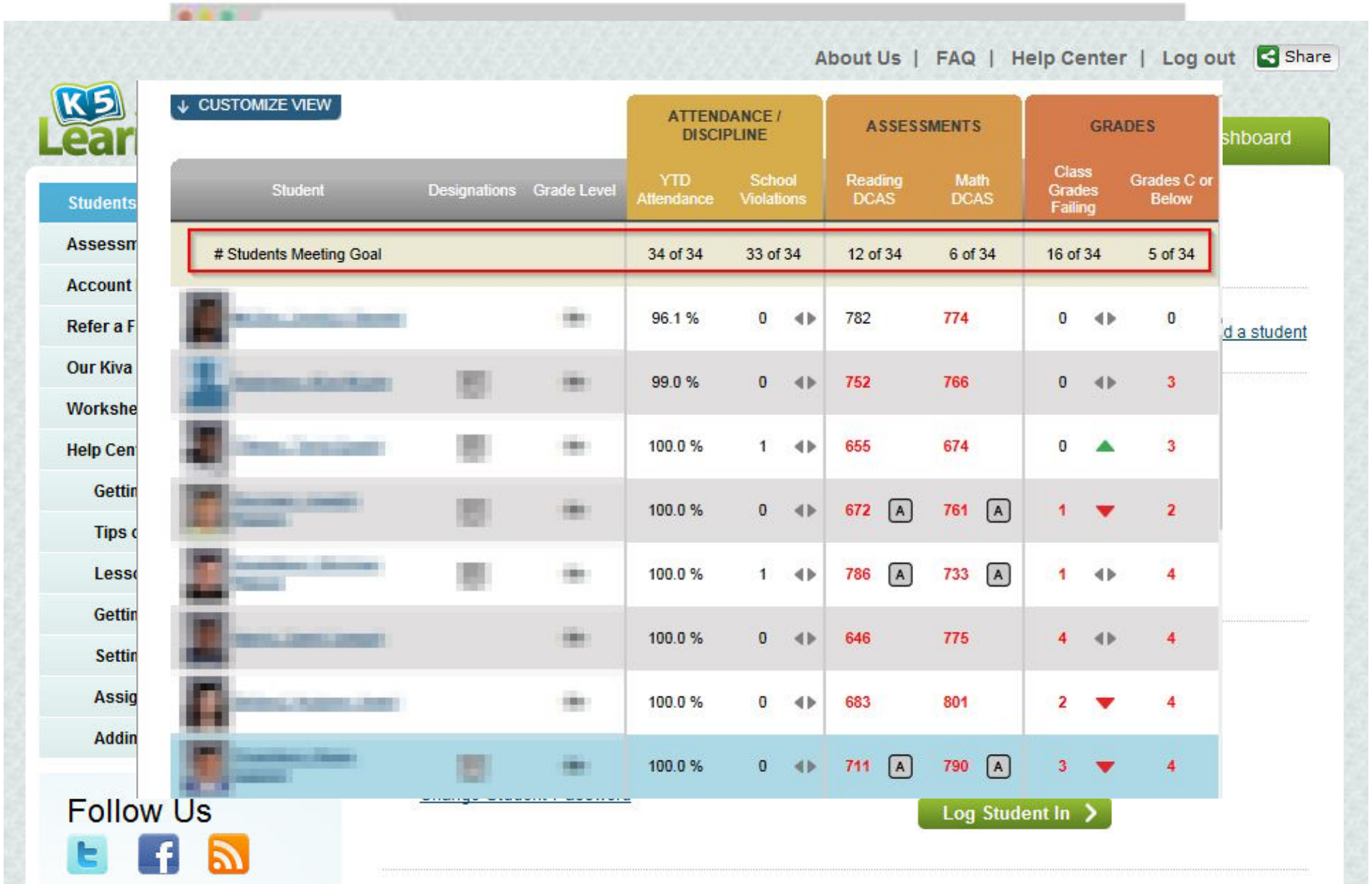
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Class Grades Failing
Grades C or Below
Students Meeting Goal
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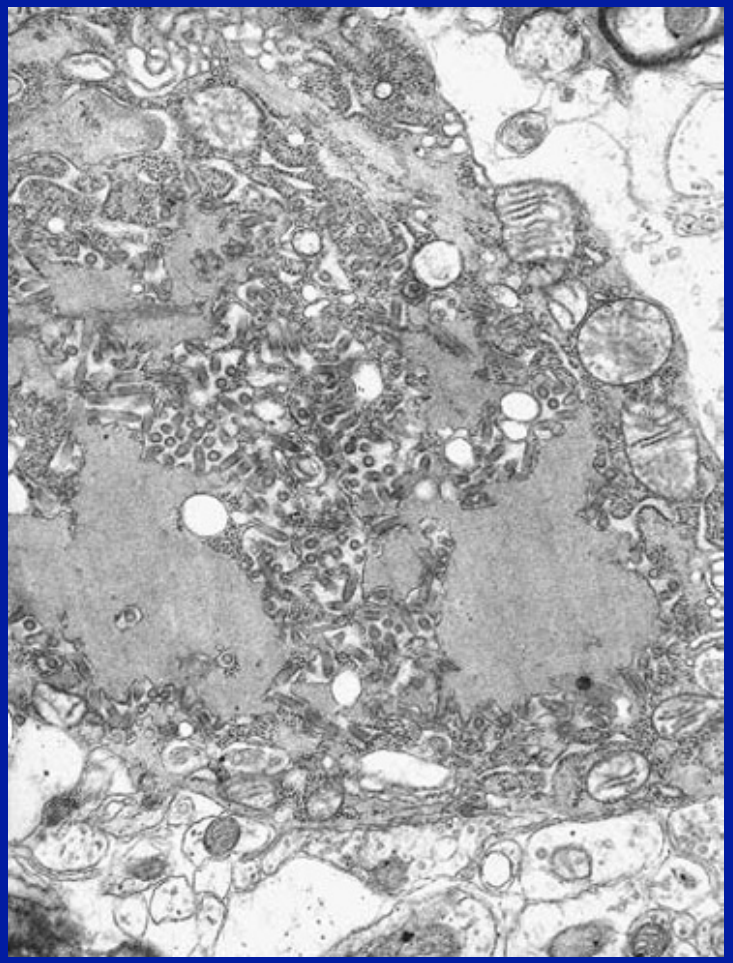
76
Quartes
Quartes
ORCHESTRA

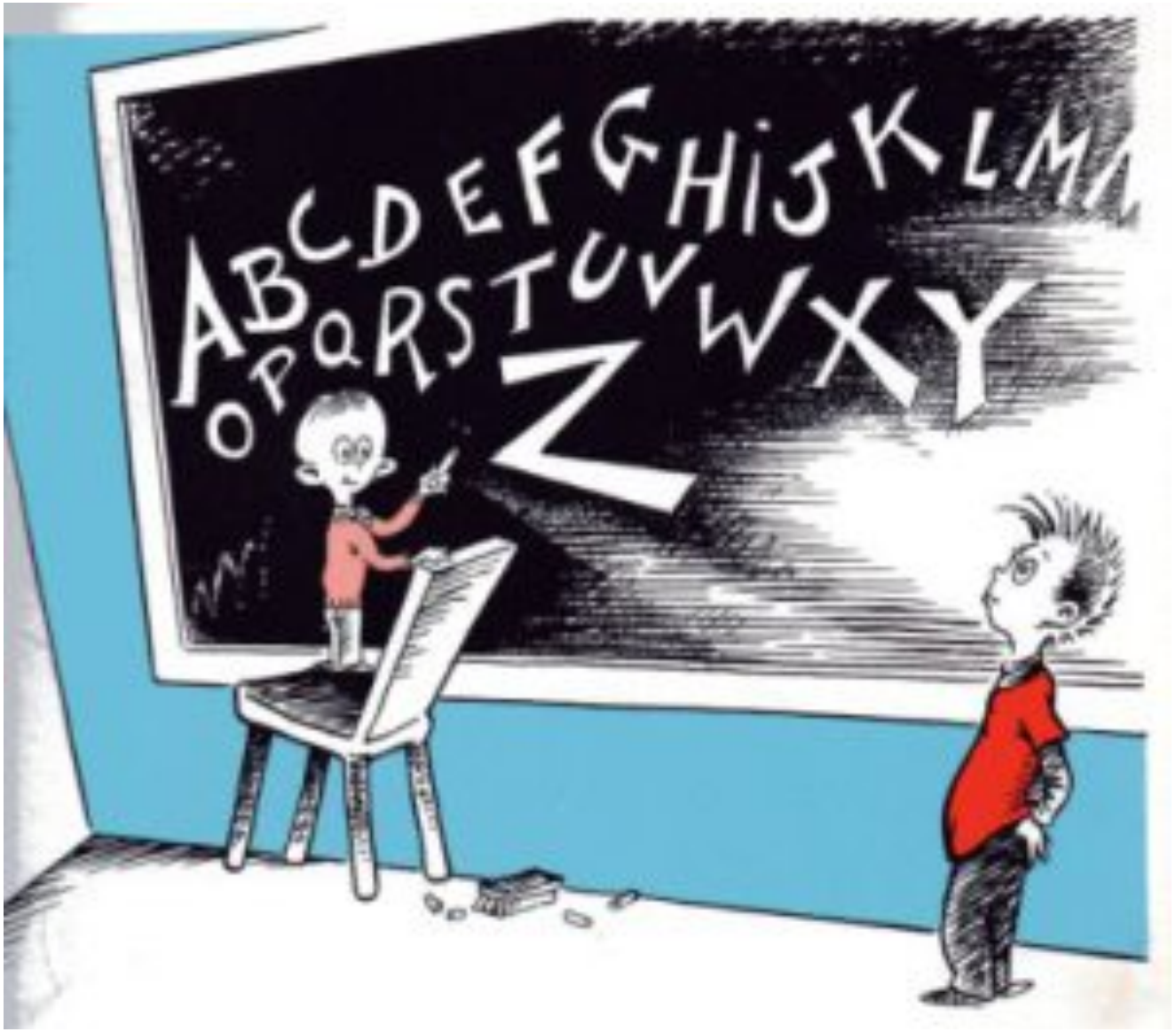
Building Big Data Human Capacity

- The End of Theory: The Data Deluge Makes the Scientific Method Obsolete
  - Anderson
- The Unreasonable effectiveness of data
  - Halevy, Norvig, & Pereira
- Machine Learning for Hackers
  - "You don't need a degree in statistics to know that we human beings will easily find shapes in clouds after looking at them for only a few seconds."

11 Microscope composé, forme Passemant, vers 1750
Compound microscope, Passemant form, circa 1750
14 Microscope composé, vers 1751
Compound microscope, circa 1751
12 Microscope composé type Culpeper, milieu XVIIIe siècle
Calpeper-type compound microscope, mid-18th century
119



Conclusions

- Hurry Up!
- Do it right

Because most people stop at the Z…