

End-User Programmers Repurposing End-User Programming Tools to Foster Diversity in Adult End-User Programming Education

Sean Kross and Philip Guo

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Memphis, TN, USA

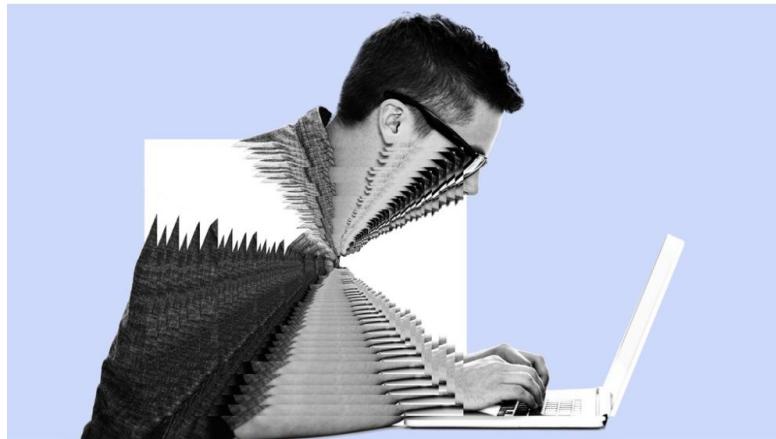
UC San Diego
The Design Lab

SARA HARRISON

BUSINESS 10.01.2019 07:00 AM

Five Years of Tech Diversity Reports—and Little Progress

In 2014, when Silicon Valley companies began disclosing the demographics of their workforces, advocates hoped for change. It hasn't worked out that way.



The screenshot shows a RStudio interface with the following components:

- Code Editor:** An R Markdown file titled "a-qq-plot-dissection-kit.Rmd" containing R code for generating plots. The code includes sections for "Actual Plots", "Plot 1: Situation Normal", and "Q-Q Plot". It uses ggplot2 and gridExtra packages.
- Console:** Displays the R session history, showing the execution of the R code to generate plots.
- Environment:** Shows the global environment with objects like "data", "h1", "h2", "model", "batch1", "batch1_seed", "batch2", "batch2_seed", "bimodal", "fat_tails", "gaussian_rv", "n", and "normal_density".
- Plots:**
 - A histogram titled "@drob" comparing two datasets: "Batch 1" (blue) and "Batch 2" (red). The x-axis is labeled "Random Variable" and ranges from 500 to 800. The y-axis ranges from 300 to 900.
 - A Q-Q Plot titled "Q-Q Plot" comparing "Batch 1" (blue points) and "Batch 2" (black points). The x-axis is "Batch 2" and the y-axis is "Batch 1", both ranging from 300 to 900. A diagonal blue line represents the identity line.

The World of an End User Programmer

Outline

- **Background: Motivations of a Team of End User Programmers**
- Repurposing End User Programming Tools to Expand Educational Opportunity
- Outcomes/Implications

ID	Gender	Field	Job Title	End-User Programming Experience	Created Course Content?	In-Person Tutor?
P1	M	Biostatistics	Research Lab P.I.	> 5 years	Yes	No
P2	F	Genetics	Postdoc	1 – 5 years	Yes	Yes
P3	M	Biostatistics	Research Scientist	> 5 years	No	No
P4	M	Biostatistics	Research Scientist	> 5 years	Yes	No
P5	F	Biostatistics	Research Scientist	> 5 years	Yes	No
P6	F	Biostatistics	Ph.D. Student	1 – 5 years	Yes	No
P7	F	Liberal Arts	Administrative Staff	none	No	Yes
P8	M	Economics	Postdoc	< 1 year	Yes	Yes
P9	F	Genetics	Ph.D. Student	< 1 year	Yes	No



Hour long semi-structured interviews focusing on motivations, cooperative work, programming work, and instruction.

The Revolution Is Not Being MOOC-ized

Students are educated, employed, and male.

By Gayle Christensen and Brandon Alcorn



Access provided by Johns Hopkins University



Correspondence

Online education: MOOCs taken by educated few

THE CHRONICLE OF HIGHER EDUCATION



Wired Campus

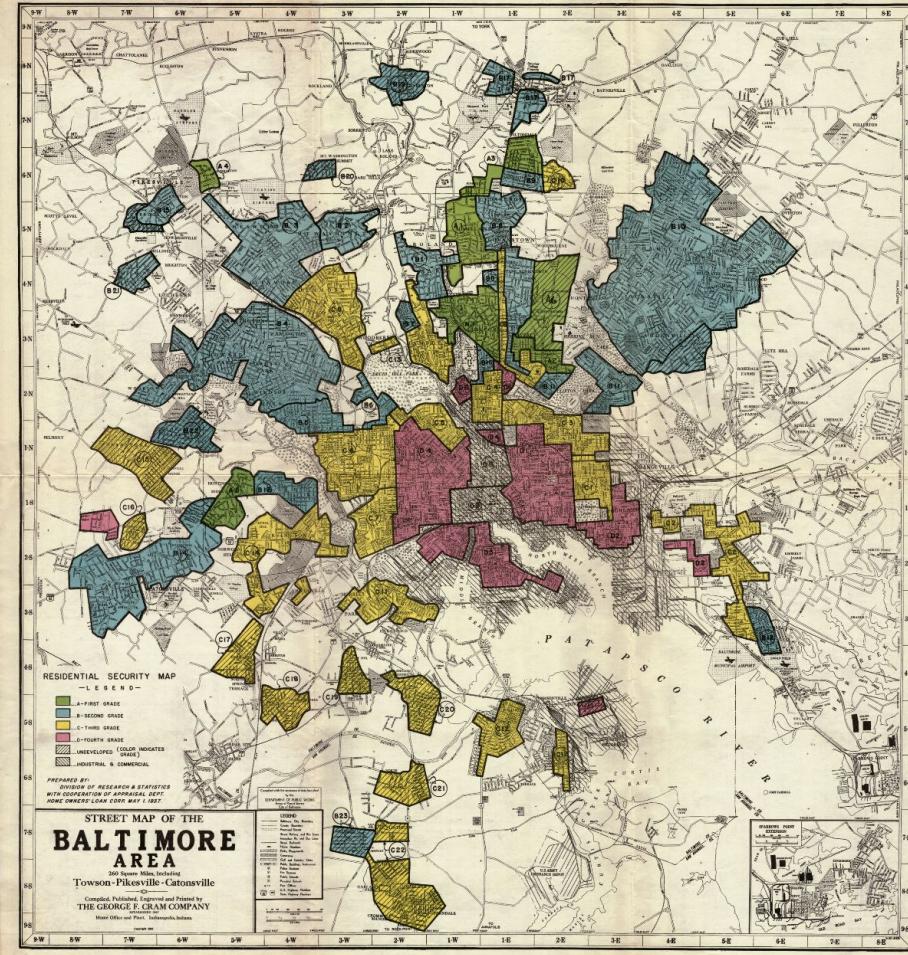
The latest on tech and education.

November 20, 2013 by Steve Kolowich

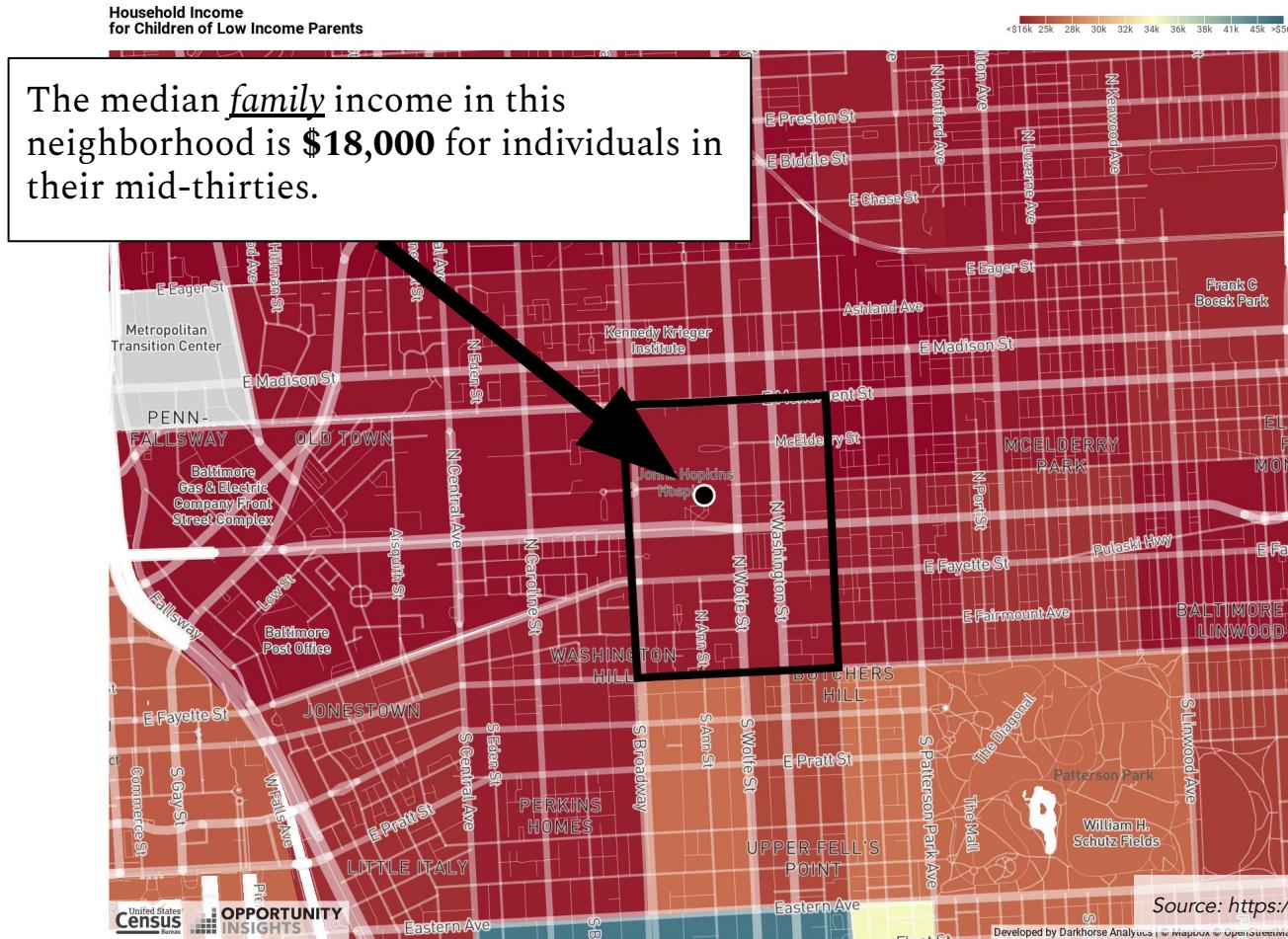


MOOCs Are Largely Reaching Privileged Learners, Survey Finds

"Why aren't certain groups of people using our existing MOOCs? Maybe they didn't have access to hardware, they lacked prerequisite knowledge, or they were just unaware that data science was a thing." - P1



Poverty is pervasive in East Baltimore



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Thriving Baltimore Communities

HEBCAC is a community-based nonprofit whose mission is to build community and provide economic opportunities that support healthy, thriving households and neighborhoods.

OUR WORK ↓



YO! Youth Opportunity

Helping Young People Get Ready

At the YO Program we believe in your future. If you are out of school and out of work, we can help you.

[READ MORE](#)

Partnering with On-the-Ground Organizations

CBDS

(Cloud Based Data Science)





Repurposing Tools and Skills



“The goal was to minimize tool setup for students.
Everything had to be done in the browser.” - P2

“The way the Coursera platform is set up, which isn’t as simple as ‘push to GitHub,’ it makes [content updates] difficult.” - P1



~/Documents/rmarkdown - gh-pages -

1-example.Rmd x

Go to file/function Addins

1 ---
2 title: "Viridis Demo"
3 output: html_document
4 ---
5
6 ```{r include = FALSE}
7 library(viridis)
8
9
10 The code below demonstrates two color palettes in the
[viridis](<https://github.com/sjmgarnier/viridis>) package. Each plot
displays a contour map of the Maunga Whau volcano in Auckland, New
Zealand.
11
12 ## Viridis colors
13
14 ```{r}
15 image(volcano, col = viridis(200))
16
17
18 ## Magma colors
19
20 ```{r}
21 image(volcano, col = viridis(200, option = "A"))
22

3:22 Viridis Demo R Markdown

Console R Markdown

~/Documents/rmarkdown/demos/ ↵

> render("1-example.Rmd", output_format = "word_document")

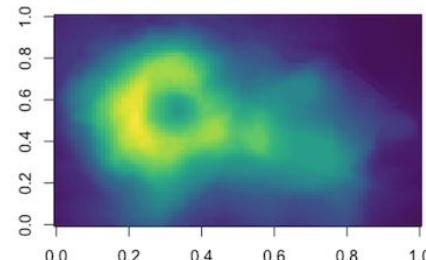
1-example.docx (1 page) Search

Viridis Demo

The code below demonstrates two color palettes in the `viridis` package. Each plot displays a contour map of the Maunga Whau volcano in Auckland, New Zealand.

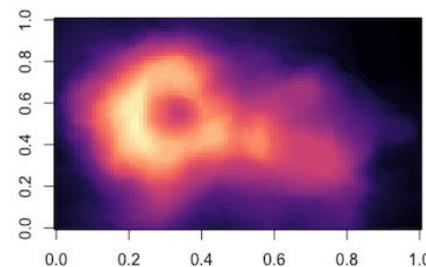
Viridis colors

`image(volcano, col = viridis(200))`



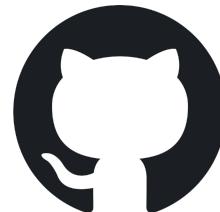
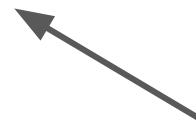
Magma colors

`image(volcano, col = viridis(200, option = "A"))`

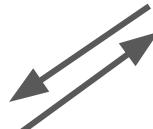




Leanpub



GitHub



“The fact that all of the content is plain text makes making those changes super easy.” - P9



Customization in ggplot2

- Customization in ggplot2 quiz
2 attempts remaining.



Saving Plots

- Saving Plots quiz
2 attempts remaining.



From Exploratory To Explanatory

- From Exploratory To Explanatory quiz
2 attempts remaining.



Data Tables

- Data Tables quiz
2 attempts remaining.



Tables in R

- Tables In R quiz
2 attempts remaining.



Multiple Plots in R

- Multiple Plots quiz
2 attempts remaining.



Advanced Data Visualization

- Advanced Data Visualization quiz
2 attempts remaining.



General Features of Plots

Good plots have a number of features. While not exhaustive, good plots have:

1. Clearly-labeled axes.
2. Text that are large enough to see.
3. Axes that are not misleading.
4. Data that are displayed appropriately considering the type of data you have.

More specifically, however, there are two general approaches to data visualization: exploratory plots and explanatory plots.

Exploratory Plots

These are **data displays to help you better understand and discover hidden patterns in the data** you're working with. These won't be the prettiest plots, but they will be incredibly helpful. Exploratory visualizations have a number of general characteristics:

- They are made quickly.
- You'll make a large number of them.
- The axes and legends are cleaned up.

Below we have a graph where the axes are labeled and general pattern can be determined. This is a



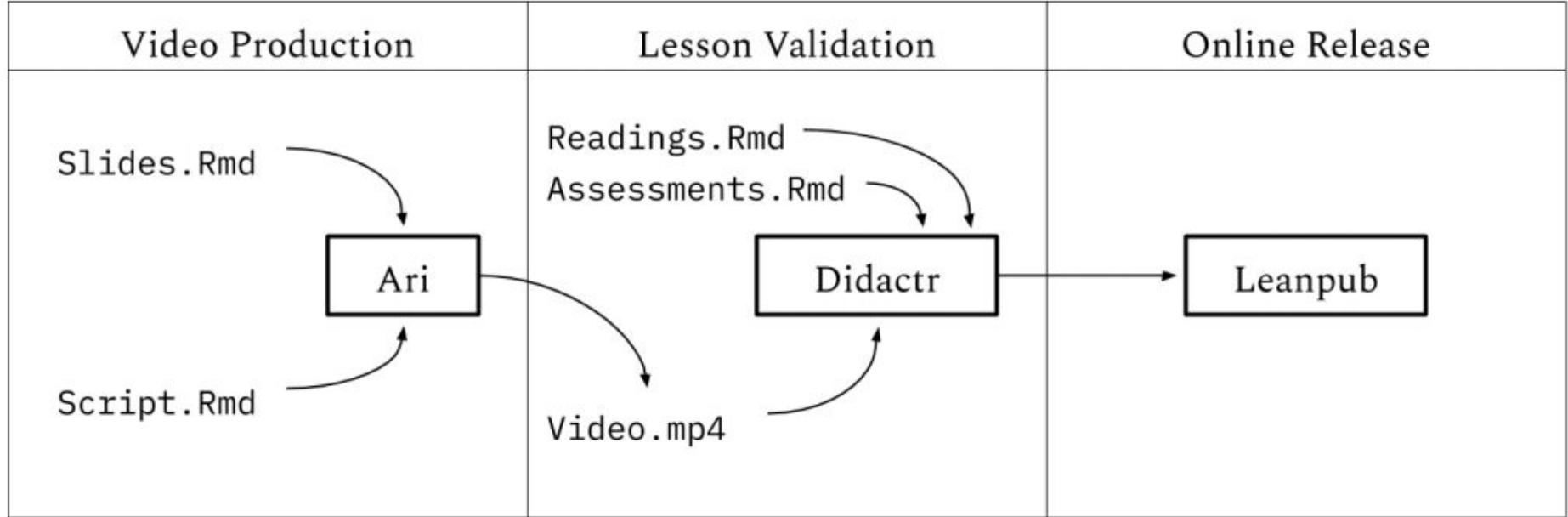
Making a MOOC Video

```
## use gather() to reshape from wide to long
gathered <- gather(airquality)

## take a look at first few rows of long data
head(gathered)
```



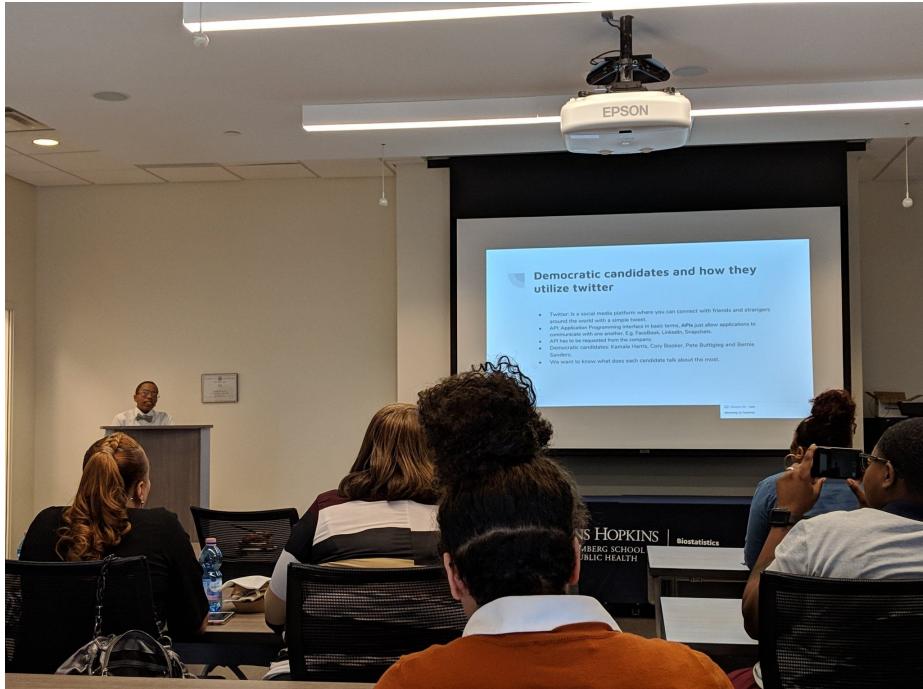
Ari Demo



Cloud Based Data Science Team Workflow

Outline

- Background: Motivations of a Team of End User Programmers
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Cloud Based Data Science Graduation

Discussion

1. Courseware Engineering
2. End User Programming for Social Good

Discussion

1. Courseware Engineering
2. End User Programming for Social Good

Thank you!

Paper: seankross.com/vlhcc-2019

Talk slides: seankross.com/vlhcc-2019-talk

Let's Talk!

Twitter: @seankross

Email: seankross@ucsd.edu

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