



Broadening Participation Research Project

2021 Virtual HBCU-UP/CREST PI-PD Meeting



NC Central
UNIVERSITY

Discover what's Central to you.



CYNOSURE
CONSULTING

Evaluation, Analytics, & Strategic Guidance

Research for Social Justice – Broadening Participation through Data Science

R. N. Uma (NC Central University)

Alade Tokuta (NC Central University)

Rebecca Zulli Lowe (Cynosure Consulting)

Adrienne Smith (Cynosure Consulting)

This project is supported by the National Science Foundation grant **NSF HRD-1912408**.

All findings and opinions are those of the authors, not necessarily of the funding agency or AAAS.

Project Overview

- Increase participation of underrepresented minorities in STEM
 - by infusing social justice issues into STEM learning through data science
- Sample of Social Justice Projects incorporated into a freshman seminar course:
 - COVID-19
 - Environmental Justice
 - Police Killings
 - Gun Violence
- We aim to address:
 - the extent to which this model influences STEM enrollment and retention
 - this model's impact on the socio-cognitive factors that affect STEM enrollment, persistence, and success
 - the identification of key features to enable replication of this model

Successes

- Piloted, refined, and expanded Data Science for Social Justice problem-based learning (PBL) units through an existing freshman seminar course – Fall 2019 and Fall 2020
- Engaged and learned from 85+ NC Central University freshman students in their exploration of social justice issues with real-world datasets
- Adopted CODAP webtool (as a precursor to R) in Fall 2020 to make data exploration more accessible for students
- *Some planned project activities during Fall 2020 have been delayed due to the pandemic*

Implications

- **10 curated datasets** that are publicly accessible:
 - <https://figshare.com/> and
 - <https://datascience-hbcu.weebly.com/projects.html>.
- Supplemental resources available to guide social justice inquiry around these datasets
 - Research questions
 - Guiding questions that accommodates differentiated learning
- Tutorials and code that can be modified for data exploration within these datasets
 - CODAP webtool tutorial for easy exploration of data
 - Template R code for deeper dive into the data

Future Enhancements

- Continue refinement of data science PBL units in freshman seminar course
- Adapt the data science PBL units for seamless delivery for online, face-to-face, or hybrid classes
- Pilot and study data science PBL activities with Early College High School students enrolled in courses on NC Central University's campus
- Add curated datasets to the repository
- Build resources for the data repository to enable replication by faculty from any discipline anywhere globally
- Strengthen the evidence base for the efficacy of units