Examining Artifacts from GLOBE Program Research Symposia & Using Network Analysis Techniques to Characterize Students' Authentic STEM Investigations

Ann Martin, Oak Ridge Associated Universities Inc., Buffalo, NY, United States, Katherine Miller-Bains, Oak Ridge Associated Universities Inc., Oak Ridge, United States, Lin H Chambers, NASA Langley Research Center, Hampton, VA, United States, Kevin Czajkowski, University of Toledo, Geography and Planning, Toledo, OH, United States, Julie S Malmberg, The GLOBE Program/UCAR, Boulder, CO, United States, Amy Barfield, GLOBE Program, Boulder, CO, United States, Jennifer Bourgeault, University of New Hampshire, NH GLOBE Partnership Leitzel Center, Durham, NH, United States and Haley F Wicklein

Abstract Text:

For the past several years, the GLOBE Program's International Virtual Science Symposia (IVSS) and Student Research Symposia (SRS) have provided opportunities for U.S. and international students to present their Earth science research investigations to the GLOBE community through online or in-person events. This presentation will share the techniques and findings of an evaluation study that used student posters and written reports to characterize their research investigations through multiple lenses and frameworks.

The study began with a list of characteristics drawn from a literature review, an analysis of sample projects, and several reviews by expert stakeholders and scientists, which comprehensively covered diverse relevant frameworks including citizen science, student STEM learning through authentic experiences, and The GLOBE Program model. Once applied to 207 student projects, this list of codes revealed the frequency and prevalence of various qualities and experiences represented by GLOBE student research investigations. An innovative application of social network analysis techniques to the coded dataset revealed frequently co-occurring characteristics. This networking approach identified and conceptually mapped several "clusters" of characteristics that typified student projects, empirically based on the submitted projects themselves. The basic quantitative investigation of frequencies indicates the extent to which various characteristics are present in – or absent from – GLOBE SRS and IVSS projects, while the network analysis provides a descriptive framework for typifying projects.

Ultimately, the descriptive framework fostered a suite of assessment tools to help The GLOBE Program's staff, scientists, and research project judges understand the diversity of student research projects. GLOBE can use these tools to identify and respond to areas of need; for instance, the descriptive framework illustrates the potential for further education and training resources related to data analysis, interpretation of data, and credibility of scientific claims. This presentation will share the novel utilization of network analysis techniques to holistically

assess and react to student research contributions.

First Presenting Author
Presenting Author

Ann Martin
Primary Email: ann.martin@orau.org

Affiliation(s):

Oak Ridge Associated Universities Inc.
Buffalo NY (United States)

Second Author

Katherine Miller-Bains
Primary Email: katemiller8@gmail.com

Affiliation(s):

Oak Ridge Associated Universities Inc.
Oak Ridge 37831 (United States)

Third Author

Lin H Chambers
Primary Email: lin.h.chambers@nasa.gov

Affiliation(s):

NASA Langley Research Center
Hampton VA 23681 (United States)

Fourth Author

Kevin Czajkowski
Primary Email: Kevin.Czajkowski@utoledo.edu

Affiliation(s):

University of Toledo
Geography and Planning
Toledo OH (United States)

Fifth Author

Julie S Malmberg
Primary Email: julie.malmberg@colorado.edu

Affiliation(s):

The GLOBE Program/UCAR
Boulder CO 80307 (United States)

Sixth Author

Amy Barfield
Primary Email: barfield@ucar.edu

Affiliation(s):

GLOBE Program
Boulder CO 80303 (United States)

Seventh Author

Jennifer Bourgeault
Primary Email: usglobecc@gmail.com

Affiliation(s):

University of New Hampshire
NH GLOBE Partnership Leitzel Center
Durham NH (United States)

Eighth Author

Haley F Wicklein
Primary Email: hwicklein@gmail.com

Affiliation(s):

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