

Discovery metadata

(EI)2: Exploring Inclusive Engineering Identities through Freshman Engineering Curriculum Change

Rebecca Atadero, Principal Investigator, Department of Civil and Environmental Engineering, Colorado State University

Karen Rambo-Hernandez, co-Principal Investigator, Department of Learning Sciences and Human Development, West Virginia University

Christina Paguyo, Post-Doctoral Researcher on the Project, Current Affiliation: Director of Academic Assessment, University of Denver Office of Teaching and Learning

Jeremy Schwartz, graduate student researcher, West Virginia University

College, School, Department, Lab, or Center* –

Data were collected from Colorado State University classes as part of research conducted by investigators at Colorado State University, West Virginia University, and the University of Denver.

Description* - This collection of files includes data sets, conference papers and posters, and descriptions of curriculum materials from the Exploring Inclusive Engineering Identities project. The collection was created during the period from September 2014 through September 2017.

Abstract** - The engineering workforce needs to better represent the diversity of the society it serves by attracting and retaining students from diverse backgrounds. The process students experience to become engineers requires them to acquire technical knowledge but also to identify with the profession. This project is designing a new curriculum for freshman engineering courses to help shape students' emerging engineering identities and expose students to the important role diversity plays in engineering.

The curriculum is created to help students recognize the value that diversity brings to engineering in terms of (a) designing better and innovative solutions, and (b) expanding students' conceptions of who can be an engineer. The project is evaluating the effect of the curriculum on students in two different freshman engineering classes. The research questions include the following: How did the intervention change students' attitudes toward diversity in engineering? How did the intervention change students' ability to recognize themselves and others as an engineer? Both quantitative and qualitative methods are being used in this evaluation. The intellectual merit of the project is its transformational approach to retaining diverse students. In particular, the project seeks to change the culture in the educational and

work contexts for engineers rather than simply trying to support students from underrepresented groups in engineering. Furthermore, the project contributes to our understanding of how students form engineering identities. The broader impacts of the project include helping to broaden participation in engineering, preparing students for a global work environment, and improving STEM education.

- **Subject/Keywords**** - Engineering education; diversity and inclusion; curriculum, first-year students
- **Sponsorship** – National Science Foundation, Grant # 1432601
- **Name of contact person** – Rebecca Atadero
- **Email and phone number for contact person** – Rebecca.Atadero@colostate.edu 970-491-3584
- **Format of data files** CSV, PDF
- **Location where data were collected** – Colorado State University
- **Time period during which data were collected** – 2014-09 through 2017-09
- **File Information** - File names, directory structure, and brief description of each file or file type, including where in the research process each data file lies (e.g. raw/unanalyzed data, processed/analyzed data, rendered/visualized data). Also indicate the number of data files, including the README file.

There are five (5) files, including three (3) data files, one (1) codebook to accompany data files, and one (1) README file:

 - **MasterMerged_2014.csv**: Raw/Unanalyzed data
 - **MasterMerged_2015.csv**: Raw/Unanalyzed data
 - **MasterMerged_2016.csv**: Raw/Unanalyzed data
 - **Engineering_Survey_Codebook_5_23_2017**
 - **README.pdf**
- **Definitions of acronyms, site abbreviations, or other project-specific designations used in the data file names or documentation files** See Codebook “Engineering Codebook 5_23_2017”
- **Variable information** - Description of the parameters/variables (column headings in the data files) and units of measure for each parameter/variable, including special codes, variable classes, GIS coverage attributes, etc. used in the data files themselves, including codes for missing data values. See **Engineering_Survey_Codebook_5_23_2017 for detailed information**

- **Uncertainty, precision, and accuracy of measurements** Reliability and validity information for select survey instruments are provided in the published articles.
- **Environmental or experimental conditions** data was collected using online surveys outside of class. In most cases students had a small course incentive (participation points) to take surveys. Students had the option of taking the surveys for credit, but not sharing their responses with the research team.
- **Method(s)** –Describe the methods for collecting, creating, or compiling the submitted data, as well as the methods for processing data, if data other than raw data are being contributed
 - The raw data files contain de-identified student data separated by each of the three years of data collection. Each student has a unique identifier. We also indicated which section the student took and whether those sections were a comparison section (i.e., no intervention activities) or an intervention section. All data were included but in their raw form (e.g., items have not been reverse coded when necessary, mean scores are not included).
 - Processed data only appear in the published conference and journal articles, and each article describes the techniques used to analyze the data.
- **Standards or calibrations that were used** NA
- **Software** – List any software (including version number) used to produce, prepare, render, compress, analyze and/or needed to read the dataset, if applicable
 - Data were collected using Qualtrics, and processed in Microsoft Excel. They have been saved in .csv format.
 - Statistical software used for data analysis are as indicated in the conference and journal papers.
- **Quality assurance and quality control that have been applied** After downloading from Qualtrics, data were manually checked and compiled into the datasets provided here.
- **Limitations to reuse** nothing to report
- **Date dataset was last modified** Saved in .csv format 2017-12-6
- **Data source** – All data were collected via student surveys

Related Articles:

Atadero, R.A., Paguyo, C.H., Rambo-Hernandez, K.E., and Henderson, H.L. (2018). Building Inclusive Engineering Identities: Implications for Changing Engineering Culture. *European Journal of Engineering Education*; 43 (3). <https://doi.org/10.1080/03043797.2017.1396287>

Conferences:

Paguyo, Christina. H., Rebecca A. Atadero, Karen E. Rambo-Hernandez, and Jennifer Francis, 2015. "Creating Inclusive Environments in First-Year Engineering Classes to Support Student Retention and Learning." In *ASEE Annual Conference and Exposition, Conference Proceedings, Seattle, WA, June 14-17, 2015*. American Society for Engineering Education.

Atadero, Rebecca A., Christina H. Paguyo, Karen E. Rambo-Hernandez, and Heather Henderson. 2016. "Promoting Inclusive Engineering Identities in First-Year Engineering Courses," In *ASEE Annual Conference and Exposition, Conference Proceedings, New Orleans, LA, USA. June 26-28, 2016*. American Society for Engineering Education.

Rambo-Hernandez, Karen, E., Rebecca, A. Atadero, Christina H. Paguyo, and Jeremy Schwartz. 2017. "Inclusive Engineering Identities: Two New Surveys to Assess Engineering Students' Inclusive Values and Behaviors," In *ASEE Annual Conference and Exposition, Conference Proceedings, Columbus, OH, USA. June 25-28, 2017*. American Society for Engineering Education.

Henderson, Heather L., Karen E. Rambo-Hernandez, Christina H. Paguyo, Rebecca A. Atadero. 2017. "What is the Relationship between Mindset and Engineering Identity for First Year Male and Female Students? An Exploratory Longitudinal Study," In *ASEE Annual Conference and Exposition, Conference Proceedings, Columbus, OH, USA. June 25-28, 2017*. American Society for Engineering Education.