

## DATA MANAGEMENT PLAN

### Project Information

This Data Management Plan (DMP) covers the data that will be collected by a team at Montclair State University and [REDACTED] on the design, development, and analysis of a set of animated contrasting cases designed to transform the learning that occurs in middle school (grades 6-8) geometry classrooms. The proposed study would be conducted between August 1, 2018 and July 31, 2021.

This DMP was created on October 17, 2017 for submission to the National Science Foundation as required by NSF guidelines in the interest of securing funding for this work. The aim and purpose of this DMP is to detail and guarantee the preservation of the data and documents collected during the proposed study, as well as any results derived from the associated project.

Proper data management, including the accurate recording of collected data, the documenting of metadata, and the safe, reliable storage and dissemination of the results, is important to ensure data collected for this project is safely secured in a reliable manner. This project will generate a variety of data over its five years, and as such, the DMP includes multiple ways to responsibly manage that data. Before any data are collected, all project faculty and graduate students will complete the standard Montclair State University training on the responsible conduct of research on human participants, using the Collaborative Institutional Training Initiative (CITI) training platform.

### I. Types of Data

The primary data that will be collected under this proposal involves data collected from middle school students and their teachers. Specifically, pre- and post-assessment data, students' written work on our supplemental curriculum materials, classroom audio data, field-notes, and student demographic data. Student demographic data will include a measure of free and reduced lunch, gender, ethnicity, and age. Additional research into understanding how students' geometric thinking can be characterized after instruction with our materials will also lead to the collection audio recordings of classroom instruction, audio files of interviews with teachers and students, transcripts of these interviews, and electronic copies of work generated by students while engaging with our materials. All original data (test scores, observation notes, worksheets, interview files, or any other materials) that might contain participants' real names will be kept secure in Dr. Krupa or [REDACTED] locked offices. Access to the files and materials will be limited to the project researchers. Inventories of each type of data will be kept with the data.

### II. Data Standards

All data will be saved as excel files, doc files, text files and in other file formats, depending on required analysis. Electronic data will be organized in folders with appropriate identifying file names with readme files describing the generation/collection of the data set.

### III. Policies for Access and Sharing and Provisions for Protection/Privacy

All data sets will be archived with any identifiable teacher or student data removed from the stored version. All data and documents will be stored on an external hard drive that will be locked in a filing cabinet in Dr. Krupa's [REDACTED] office. IRB approval has been obtained to address any ethical or privacy issues related to the educational evaluation.

The data will be published in peer-reviewed articles and presented at professional conferences. All methods for analysis will be published in full detail in peer-reviewed publications. The research team will continue to consult with the IRB office to ensure ethical and privacy issues are handled properly.

#### **IV. Policies for Re-use, Re-distribution**

The researchers associated with this study are not aware of any reasons, which might prohibit the sharing and reuse of the data being submitted. No personal identifiers will be recorded or retained by the researchers in any form. There are no copyright or licensing issues associated with the data being submitted. The researchers are not required to make this data available publicly and have elected to only share it with individuals that submit a request in writing to the project PI. Published data within articles can be accessed from publishers or the library, subject to the privacy, confidentiality, security, and intellectual property right policy of individual publishers.

All materials and products generated from this project will be stored on Montclair State University's existing content management program, Digital Commons, hosted and supported by bepress and managed by Karen Ramsden, Research and Projects Specialist at MSU's Sprague Library. Digital Commons is the leading hosted institutional repository software for universities, colleges, law schools, and research centers. Digital Commons is a suite of tools and services that enables institutions to manage, display, and publish scholarship to the web in a highly visible showcase. Scholarly material and special collections in Digital Commons repositories are highly discoverable in Google, Google Scholar, and other search engines. Additionally, articles in Digital Commons repositories are indexed in the Digital Commons Network, a free discovery tool for full text scholarly articles used by researchers worldwide. The content is owned by the institution, while bepress provides the platform and support.

#### **V. Data Retention**

The long-term strategy for maintaining these data is to keep all original data on the hard drive dedicated solely to the project. All of the data files that are archived will be in "clean" form and will be maintained for at least 10 years following the completion of the project. The long-term data storage consists of the dedicated project hard drive. Should the MSU project PI leave the project, upon their departure the College of Science and Mathematics Dean's office, Dr. Kight and Dr. Billings, would become the keepers of the data and provide it to others as appropriate.