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Data Management Plan for Investigating Effective Methods that Adults Use to Improve Children's Math Achievement in Informal Learning Environments: A Meta Analysis

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DATA MANAGEMENT PLAN

TYPES OF DATA

Project data will consist of a bibliography of selected published studies, a coding protocol defining study variables, and resulting meta-analysis files created using Excel, which will then be uploaded into R software (R Core Team, 2019) for data analyses. The project will not generate any human subject or sensitive data.

DATA AND METADATA STANDARDS

The bibliography and drafts of the coding protocol will be created using Microsoft Word. Once a finalized version of the coding protocol is completed, the PIs will transfer the coding protocol to Excel for ease of input of data by multiple project personnel. The Excel files will be stored as .csv files for input into R software for analysis. The. .csv files allow for long-term storage of the data and downloading to different platforms.

In consultation with Albertsons Library's Scholarly Communications and Data Management unit, the PI will oversee the organization and management of the project files including establishing and maintaining a consistent file naming and organizational structure. In addition to the coding protocol, the PIs will create a study-level ReadMe.txt file that will be stored with the data and include: description of the data and file structure, information on access policies or other conditions of use, and data collection methods used. If needed, the PIs will also work with library staff to capture additional variable-level metadata for the research materials.

POLICIES FOR ACCESS AND SHARING

PIs Carter and Nelson will have primary responsible for implementing this data management plan and for ensuring that shared data will comply with federal, state, and university policies. Access to stored project files will be overseen by Dr. Nelson, which will be limited to the project's PIs and authorized project personnel, including Graduate Assistants. Any student involved in the project or granted access to the files will receive training on data management best practices and be briefed on the project's organizational system. All files will be stored in a shared Boise State Google Drive folder. Google Drive is a licensed, private instance of the Google service which provides unlimited cloud-based storage with managed back-ups.

To allow for full review and analysis of the data, the PIs and Senior Personnel will retain exclusive use of the project data and analysis materials during the active project period and no longer than the following three years after the grant ends. If another researcher not affiliated with the project wishes to use the data, they may submit a request following the process described in the *Policies for Re-use and Re-distribution* section of this plan.

POLICIES FOR RE-USE AND RE-DISTRIBUTION

Whether based at Boise State or external to the university, any researcher wishing to access or use the project data will be required to submit to the PI a permission request via email or printed letter. Researchers will need to note which files they would like to use, how they would like to use them, and if there will be any derivative materials created or published works generated based on the data.

Results of the data analysis will also be distributed through journal articles, conference presentations, a project website, and brochures for parents. Use of the distributed materials will be limited by copyright law restrictions.

PLANS FOR ARCHIVING

All raw data and related research materials will be retained by the PI for three years past the completion of the grant. At the end of the post-grant three-year period, the PI will work with the Albertsons Library's Scholarly Communications and Data Management unit to archive the files or determine if further data management support is needed.

Once released, copies of the project data, including the coding protocol, will be permanently archived in ScholarWorks, Boise State's institutional research repository. Managed by Boise State's Albertsons Library, ScholarWorks utilizes a hosted platform, optimized for open access and discovery. For each item published through ScholarWorks, descriptive records are created using a modified Dublin Core Metadata schema. Since the platform uses the OAI-PMH protocol, these records can be easily and accurately harvested by other research repositories and search engines. Prior to publishing, the PIs will work with Albertsons Library's data management librarians to ensure that any proprietary file formats are converted into accessible versions such as .txt and .csv. To ensure proper citation and ongoing retrieval of the materials, permanent DOIs (Digital Object Identifier) will be issued. Additionally, the materials will be made available using a Creative Commons license allowing for re-use, redistribution, and derivatives.

In addition to permanently archiving through Boise State's repository, the PIs will submit their research outputs to the U.S. Department of Education's ERIC (Education Resources Information Center). Established in 1964, ERIC is one of the largest, long standing research databases in the area of education. Additionally, the Senior Personnel Boedeker will publish the materials through his OSF (Open Science Framework) account. Developed by the Center for Open Science, OSF enables researchers to provide open access to their research data and supports the reproducibility of the original work.