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Ingenieros Ingeniosos (Ingenious Engineers): Connecting Latinx Youths' Workplace Practices with Engineering through Out-of-School Time Programs

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Data Management Plan

This plan describes data, metadata, and secondary products that will be generated, and outlines how these products will be managed during the project.

1. Expected Data

Several types of **data** from research participants will be generated in relation to this project:

- audio-recordings of testimonios and interviews with research participants (digital MPEG HD format);
- audio-recordings of program observations (digital MPEG HD format);
- video-recordings of program observations (digital MPEG HD format);
- written transcriptions of interviews and observations (digital DOCX format);
- copies of participant-generated artifacts (digital PDF or JPEG format).

Several types of **metadata** will be produced in relation to this project:

- qualitative codes of data entered into NVIVO or other qualitative analysis package;
- files in which research participant names correspond with pseudonyms and/or numbers to protect their confidentiality;
- organizational file explaining the content and organization of the data repository.

Several **secondary products** will be generated from this project

- transferable model of OST programs;
- accompanying resources for OST programs;
- curricular materials;
- research- and practitioner-oriented articles in peer-reviewed journals.

2. Standards for Data Format and Content

Data: Antes et al. (Antes, Walsh, Strait, Hudson-Vitale, & DuBois, 2018) recently analyzed data repository guidelines for qualitative data sharing; they found that the Qualitative Data Repository (QDR) at Syracuse shared commonalities with most other comparable guidelines. Given that we intend to share anonymized data with this repository, we will follow the QDR's at Syracuse's guidelines for data format and content. Additionally, Betty Rozum, Associate Librarian and Data Services Coordinator at Utah State University's Merrill-Cazier Library, will provide feedback on the dataset to ensure it complies with relevant guidelines and is easy to use. QDR complies with ISO Standard 16363. Participant data will be uploaded and indexed on USU's private online repository, USU Box. This repository is secure, requiring VPN access and a password to log in. It is also globally accessible.

All identifying information will be removed from copies of artifacts and transcriptions before they are scanned and uploaded to USU's secure repository. Each participant will be given an identifying pseudonym. All documents will be kept in the folder in the repository that corresponds with the pseudonym. These data will be kept on the secure online repository as well on a password-protected hard drive in a secure location.

We will consult with the advisory board, IRB, the USU Data Services Coordinator, and (where necessary) the youth participants regarding data sharing. If the data includes any sensitive information that might be harmful to participants (e.g., disclosure of undocumented status), then we will delete those sensitive parts from the data prior to uploading them to the repository.

Metadata: Metadata will be kept in the secure online repository (in a separate folder not accessible to external researchers) as well as on a password-protected hard drive in a locked, secure location. The metadata will meet QDR's guidelines for metadata.

Secondary Products: Secondary products will be widely disseminated to a broad audience via public and popular digital and print platforms. All materials will be published so that the public can access them free of charge (e.g., we will pay journal fees for ensuring open access articles).

3. Policies for Access and Sharing

Data: We will delete any information about documentation status prior to transcribing or retaining materials, in recognition that research materials can be requisitioned. We will also confer with the advisory board regarding how to best protect the research participants in our data handling.

We will provide a link to the secure repository hosted by USU, upon request, to any researcher who wants to view it and whose research request is approved by USU's IRB. This USU secure repository will include all anonymized data and the organizational file explaining the content and organization of the data. This link will not be provided until three years after the project is over in order to give the research team time to analyze and publish based on the data.

Additionally, three years after the project is over, we plan to submit the corpus of anonymized artifacts and interview transcripts to the open access Qualitative Data Repository, hosted by Syracuse University, so other researchers can use the data (as permitted by USU's Institutional Review Board). Throughout the project, Dr. Hartman will consult with USU Data Librarian, Betty Rozum, as well as with Syracuse University's Qualitative Data Repository Curator to ensure that the data will be organized and in a format that will be easy to upload, share, and use with the Repository.

Other researchers will be able to use and publish from the data for non-commercial purposes if they provide a citation for the dataset, which will acknowledge NSF funding.

If journal editors request access to dataset, the link to the anonymized dataset will also be provided.

Metadata: Project metadata (e.g., files linking participant names to pseudonyms) will not be shared with external parties, except for the file that explains the organizational/naming system for the data.

Secondary Products: All secondary products will be widely and freely shared on public platforms (e.g., Teach Engineering).

4. Policies for Re-Use, Re-Distribution, and the Production of Derivatives

Data: Researchers will be expected to adhere to relevant policies regarding re-use of data. We plan to submit the data to the Syracuse repository under the Standard Download Agreement, which posits that users cannot try to identify individuals whom the depositor sought to keep confidential; cannot republish the data without written permission from QDR; and cannot use the data for commercial purposes.

Metadata: Researchers are free to re-use and re-distribute metadata that are shared (e.g., organizational system).

Secondary Products: Researchers and practitioners should adhere to the policies of each platform through which the materials are published (e.g., the *Journal of Engineering Education's* policies for re-use; *Teach Engineering's* policies for re-use).

5. Plans for Archiving Data

All anonymized data will remain on the USU Repository, hard drive, and QDR Syracuse indefinitely to enable the project research team and others to advance knowledge via further analysis.