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## Research Initiation: Collaborative Research: Understanding Pedagogically Motivating Factors for Under-represented and Non-traditional Students in an Engineering Classroom

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## **Data Management Plan**

The following data management plan describes the manner by which expected data, metadata, and secondary products will be generated and how these products will be managed. The data will be collected by Dr. Cook-Chenault and any graduate students hired for this project. Although the advisory board will be involved in important aspects of the project, they will not be collecting data although discussions about results and data analysis may take place. Intellectual property and data generated under this project will be administered in accordance with the Rutgers University and Utah State University, and NSF Data Management Guidelines.

The objective of the data management plan is to maximize data access for researchers, collaborators, and the public; now and in the future. Human subjects' data will be stored in an encrypted BOX database in a server on the Rutgers University campus and the Utah State University campus, and will be made available upon request in formats that safeguard the anonymity of the participants.

### ***Roles and responsibilities.***

The PI ensures the implementation of the data management plan at each reporting period and that the Co-PI's are fulfilling their responsibility. The PI is also the public contact for providing access to data upon request via email.

### ***Expected data***

The expected data from the proposed research originates from physiological data (e.g., eye tracking) and self-reported emotional data acquired from the student participants. All data will be reported as aggregate data and anonymity will be ensured in all forms for presentation or publication. All human subject data will be handled in accordance with the Internal Review board requirements and recommendations. All eye tracking data will be processed and stored Rutgers University in a Box encrypted folder. Any sharing of data between Rutgers and Utah State will occur via the approved Institutional Review Board protocols of both institutions. All eye tracking samples will double-coded and anonymized before processing. All self-report data will be de-identified and aggregated. Results will be sent to the PI via encrypted email.

### ***Data Formats and Metadata***

Secondary products from this work can be in the form of video recordings of the students (.MP4) as they undergo the gaming experience, observational protocols (.DOCX) and annotations from the research team (.DOCX), timed event Excel sheets regarding the sequences of events in the game program (.XLS), the game program itself (.MOV), and any additional supportive materials during the experimental design and execution of the study (.DOCX). All information will be stored in an BOX database, unique study IDs will be created for each participant, personally identifying information will not be maintained in this database

### ***Policies for Access and Sharing***

The PIs/co-PIs will share the results of the activity with other researchers within a reasonable timeframe in order to conform to the NSF policy on dissemination and sharing of research results. The public release of data will be at the earliest reasonable time. The main venues for data dissemination will be the disclosure of results to the scientific community through presentations in disciplinary scientific meetings, with subsequent long-term standard publication of scientific results in: (a) peer reviewed publications and (b) academic theses both of which will be accessible to the public. To ensure the quality of the data, the PI's plan to release any and all data only after the peer review process. Journals increasingly allow the upload of supplementary information and where ever possible the data used to generate graphs and tables in publications will be uploaded to the publisher's website so that it is immediately available to the reader.

To the best of the PIs/co-PIs ability, all journals will be published as open-access for wider dissemination of the research findings.

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

Data is stored on a virtual server managed by USU technical services who are responsible for maintaining the multiple redundant backups. Secondary products generated by this proposal will be made widely available for all engineering educators and student support personnel. Any data collected to draft manuscripts and conference proceedings will be shared at annual conferences including but not limited to the American Educational Research Association, Frontiers in Education, and the American Society of Engineering Education.

***Commercial Sensitivity***

Any research that produces data that may produce security or privacy concerns will be reviewed by the Rutgers and Utah State research offices to ensure proper safety. With regard to intellectual property issues, Rutgers and Utah State will follow the guidance of their respective Intellectual Property offices.

***Plans for Archiving Data***

No specific limit is set at this time for the length of data retention. The data will be kept for at least the duration of the project plus at least an additional three years. However, the database is extensible and there is sufficient storage space for many decades' worth of data. The raw experimental and statistical data are saved on BOX database and on a virtual server. The backup of the data repositories are managed by the Rutgers IT department, which incorporates multiple levels of redundancy.