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1-1-2022

Investigating the Strategies of Tactile Graphicacy by Individuals with Visual Impairments and Blindness

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Project Title: Investigating the Strategies of Tactile Graphicacy by Individuals with Visual Impairments and Blindness

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RCEU21-CI-DWS-01

Project Summary

For this project, you will analyze video data to determine the most efficient and effective strategies to read tactile graphics by individuals with visual impairments and blindness. You will learn how to code video data, determine overall themes across data, and synthesize the data. This project is open to students from all academic ranks and disciplines.

Project Description

This purpose of this project is to determine what strategies are used by individuals with visual impairments and blindness (VIB) to most effectively and efficiently "read" graphics that are provide in a tactile format. The most common way to make graphics accessible are to transform the graphic to a tactile format, called a "tactile graphic" which are intended to be read principally by touch (**haptically**). They are created using a variety of materials and methods and may be augmented with extra information to support understanding (extra text, alt-text, audio input, etc.). While there has been substantial work on determining the best materials and techniques to create tactile graphics, there is limited research on how individuals with VIB actually engage with tactile graphics. Notably, there is dearth of research on how individuals with VIB interact with tactile graphics. For instance, there is no standardized method for teaching students "tactile graphicacy" (i.e. skills of reading and interpreting the meaning of the graphical information). It is this issue that is the primary focus of this project.

The goal of this project is to review video data of individuals with VIB interacting with various science and mathematics (STEM) tactile graphics and determine themes of tactile graphicacy. Then based upon that data, the project will set out to develop a set of "essential strategies" that appear to lead to the most efficient ways of interpreting tactile graphics. This data can be used by the field to continue the work on determining the best strategies for tactile graphicacy and begin the work on a possible teaching intervention to support more effective tactile graphicacy strategies.

Student Duties, Contributions, and Outcomes

Specific Duties. Over the past five years, I have been able to collect a large collection of videos of individuals with VIB interacting with various types of STEM-related tactile graphics. At this point, all of the videos need to be reviewed and coded to determine how the students interact with the tactile graphics. The RCEU student will support the project by collaborating with the faculty member in reviewing and coding the videos. The faculty will provide training and a framework to guide the review of all videos. At least 25% of the videos will be reviewed by both the RCEU student and the faculty member in order to ensure inter-rater reliability. Upon completion of the video analysis, the faculty and RCEU student will collaborate to write an article for submission to the *Journal of Visual Impairments & Blindness*. The faculty member

and student will meet weekly to review at least two videos together and discuss the analysis of the data. The goal would be for the video analysis to be completed in 6-7 weeks and then writing of the findings in the final weeks of the summer.

Tangible Contributions. Beyond support of the project and the RCEU requirements, the RCEU student will provide direct support for the creation of at least one article to be submitted to the *Journal of Visual Impairments & Blindness.* The data from the project may also be used to support the creating of a presentation submission for Summer 2021.

Specific Outcome. As part of this project, the RCEU student will be engaged in learning multiple new research skills. First, students will be intimately engaged in all aspects of this qualitative study. As part of the study, students will learn how to develop a coding framework for analysis of video data, how to determine inter-rater reliability, how to use grounded-theory to determine themes across data, how to organize complex non-numerical data, and how to write a report of that data for publication. The RCEU still will also be engaged in the creation of a summative literature review as part of the article development.

Student Selection Criteria

This project is open to students from all academic ranks and from all academic disciplines. However, candidates should be interested in learning how to conduct research on human subjects and willing to learn new methods of data analysis.

Project Mentorship

The RCEU student will be intimately mentored throughout the entire program. At first, I will meet directly with the student (face-to-face or via Zoom) to go over the project's background and goals. Since this is such a niche area, I will need to spend some time during the first week explaining the context of the study, the unique nomenclature, and other aspects of the field. Then we will develop a basic framework (process) for reviewing the videos and watch a selection of videos together to establish a baseline for coding. Once a stable baseline has been established, the student and faculty member will work independently reviewing videos. The student will be provided a laptop to view the video if needed. The student and faculty member will meet at least twice a week to discuss the project. During one of those meetings, they will view a minimum of two videos together to maintain inter-rater reliability.

Safety and Contingency Plan

The data for the entire project has already been collected, therefore the student will only be engaged with the faculty member. Face-to-face meetings will occur twice a week if at all possible, throughout the summer. However, as a contingency plan, the entire project can also be complete remotely as well. Since the primary goals of the meetings would be to review videos together, discuss findings from those videos, and discuss outcomes of the project, all of this could be accomplished via Zoom. The project will also utilize a shared Google Drive Folder to share all videos and documentation throughout the project.