

Individual Paper: Towards Inquiry into Data Identity in Interdisciplinary Project-based Learning

Trang C. Tran, University of Colorado Boulder, Trang.Tran@colorado.edu
Joseph L. Polman, University of Colorado Boulder, joseph.polman@colorado.edu
Katherine M. Miller, Concord Consortium, kmiller@concord.org

Session Description

Learning is an identity project (Wortham, 2006), and learners' understanding and connection with disciplinary knowledge depends greatly on the relationships, emotions, purposes, and values that they form within such discipline (Polman & Miller, 2010; Rahm, 2010). This paper reports emergent themes on students' perspectives and characteristics of data identity and contextualizes how engaging students in personally meaningful data-infused interdisciplinary project-based learning shows promise in advancing their data identities. Data can offer insights into various real-world problems and situations (Rubin, 2019), and its importance is increasingly recognized across different contexts (Gebre, 2022; Wilkerson & Polman, 2020).

Framing

Data literacy research has highlighted both technical skills and understanding personal, social, cultural, and political dimensions of data (Lee et al., 2021; Louie, 2022). However, more robust frameworks could better support educators in recognizing students' perspectives and agency in interpreting and using data (see Bhargava et al., 2015; Philip et al., 2013).

We draw on the literature on STEM identity (e.g., Dou & Cian, 2022), which explores identity within and across four disciplines and offers productive perspectives on supporting learners in viewing themselves and being recognized as interested and capable. This research articulates necessary alignments as well as existing tensions between learners' everyday participations and disciplinary identifications (Calabrese Barton & Tan, 2020; Nasir & Hand, 2008; Ryoo et al., 2022). This literature, alongside growing interest and enthusiasm for data literacy in education and society (Wise, 2019), provides strong rationale for developing curricula and pedagogies that foster and motivate students' identifications—encompassing interest, fluency, and relationships—with data.

Situated within an effort to integrate data into middle school curricula, this study explores aspects of data identity in the context of data-infused interdisciplinary project-based learning (referred to as DIIPBL). We ask how have 8th grade students perceived and characterized their data identification process? We analyze student responses to surveys and end-of-module interviews and present their perspectives on data identity grounded in their own experiences of learning with data.

Methods

Our team co-designed and implemented DIIPBL curricula with two 8th grade teachers, adapting English Language Arts (ELA) curriculum to incorporate social studies, science, and mathematics. The teachers both taught at urban public middle schools. R. Atinu taught a “Humanities” class in the U.S. midwest, combining social studies and ELA in a block schedule. Eileen taught a social studies class in the northeast.

The teachers developed data lessons into existing EL Education modules on Lessons from Japanese American Internment and Food Choices, utilizing CODAP to integrate data inquiry. To support the learning of Lessons from Japanese American Internment, students in both teachers' classes read and discussed the memoir *Farewell to Manzanar* (Wakatsuki Houston & Houston, 1973). R. Atinu's curriculum focused on the stories of Japanese Americans before, during, and after incarceration, and taking action on representation and authorship of stories that are told. Eileen's curriculum focused on immigration. Her students studied the history of immigration to the US in the 20th century, the role immigration and citizenship played in the Japanese incarceration, and current trends in migration and detention. During the Food Choices module, students read *Omnivores' Dilemma* (Pollan, 2015). The two teachers collaboratively developed two curricula that both delved into legislative impacts on agriculture workers, inequalities within the U.S. food industry, and using legislation to address food injustice.

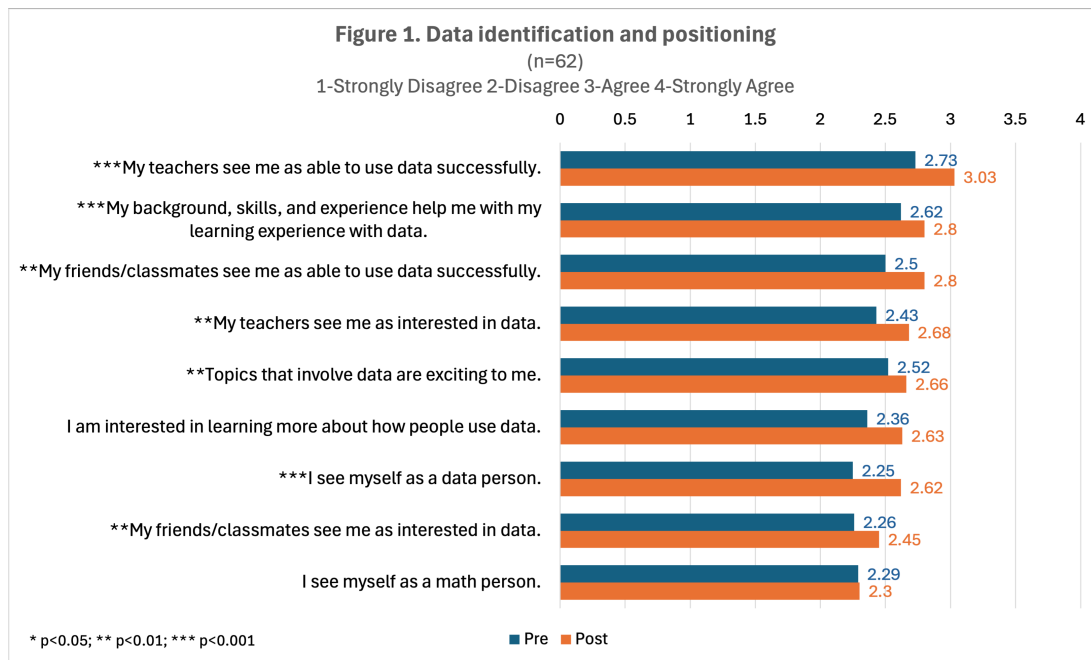
Data sources included student responses to pre- post retrospective surveys and interviews. Sixty-two students completed surveys comprised of 25 questions asking students to self-report levels of agreement in three areas: Data identification and positioning, Confidence and efficacy with data, and Data agency and relationship, and 5

demographic questions. End of project interviews with 34 focal students probed students' perceptions and experiences learning with data.

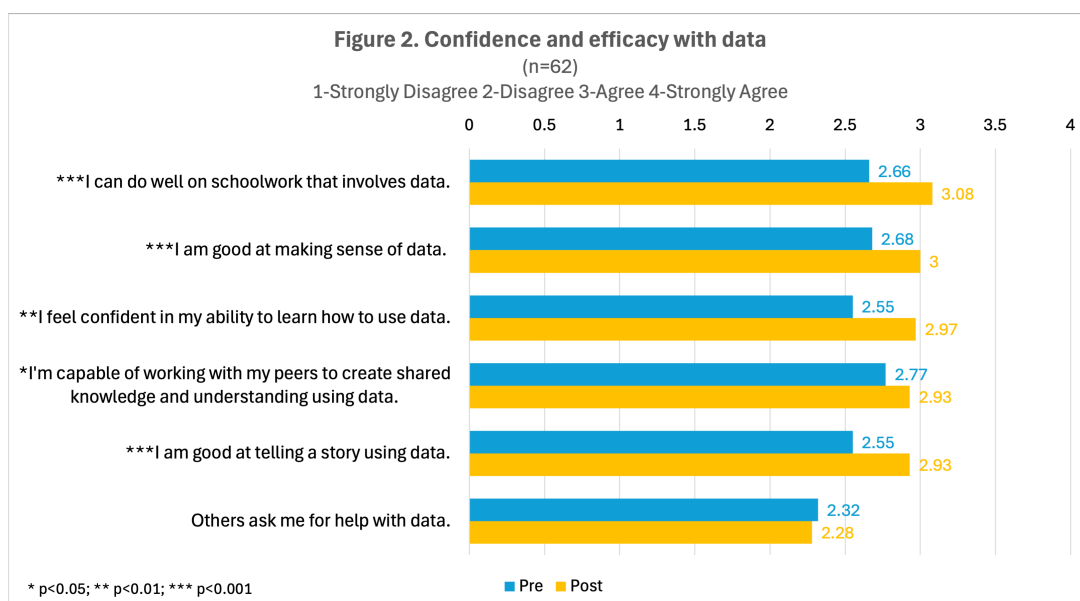
Findings

Analysis of survey responses indicated that students' ratings improved across all but one question. A nonparametric hypothesis test showed that pre-post increases were statistically significant in 22 of 25 questions.

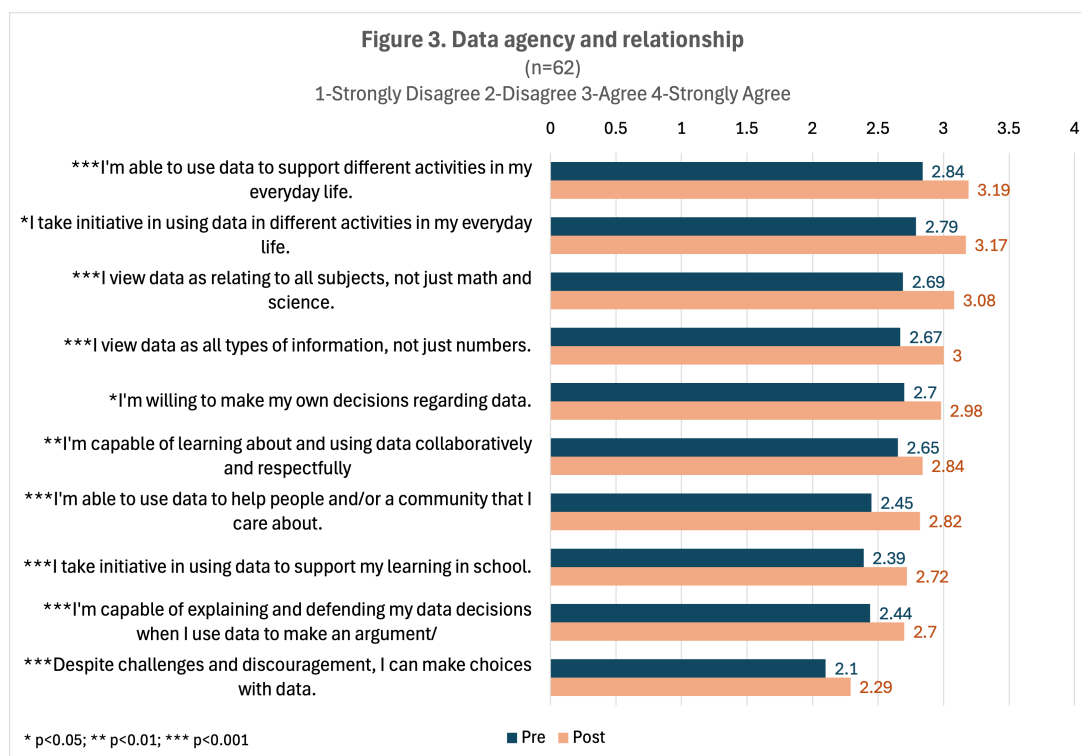
Regarding **Data identification and positioning** (see Figure 1), students' highest post-project ratings were for "My teachers see me as able to use data successfully" and "My backgrounds, skills, and experience help me with my learning experiences with data". They rated lowest on "I see myself as a math person."



For **Confidence and efficacy with data** (Figure 2), students rated highest for "I can do well on schoolwork that involves data" and "I am good at making sense of data" post project. The lowest rating was for "Others ask me for help with data".



With **Data agency and relationship** (Figure 3), students gave the highest rating for being able to and taking initiatives in using data to support different activities in everyday life. They rated lowest for “Despite challenges and discouragement, I can make choices with data.”



Across three categories, the largest increases between pre- and post-project were in seeing oneself as being able to do well on schoolwork that involves data, being good at making sense of data, and being capable of explaining and defending data decisions in an argument.

While these initial findings suggest promising outcomes for fostering data identification through the DIIPBL approach, further analysis is warranted. We plan to conduct a more detailed analysis, exploring potential relationships across the subcategories outlined in Figures 1, 2, and 3 and incorporating demographic data. Furthermore, we will review and thematically code the student interview transcripts to identify factors and processes contributing to students' data identity development. We will share examples that illuminate student engagement with DIIPBL and their data identity negotiation.

Significance

How people's identities relate to data is one of the most potentially consequential aspects of the human dimensions of data (the conference theme). This study contributes insights into the measurement of data identification and describes a promising approach to fostering its positive development within interdisciplinary project-based learning environments.

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