

# Seeing Ourselves in the Data: Situating Data Literacy in Theory Building by Youth

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Six graders can engage in productive **data practices** to advance theories and collective understanding about world issues.

## The Study

**Data literacy** is an essential 21st century skill that spans across all subject areas. Students can engage data in personal and civic ways (Lee et al., 2021; Wilkerson & Polman, 2020).

We explored how **public datasets** and **data practices** could be integrated in **knowledge building discourse** (Scardamalia & Bereiter, 2014).

### Research questions:

1. To what extent were students able to engage in data practices?
2. How were students' data practices integrated in their knowledge building?

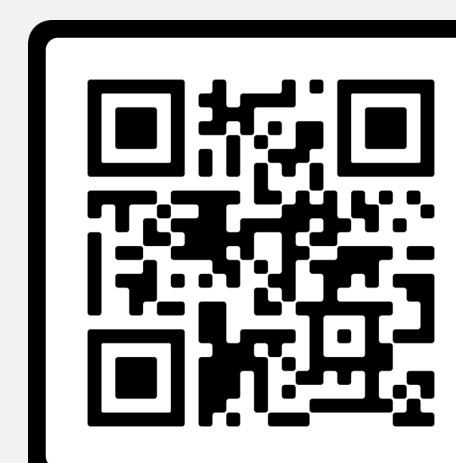
## Methods

One Grade 6 class ( $n=22$ ) examined world issues including sexism, poverty, weapons, and climate change. They analyzed public data using CODAP, posting notes/graphs on Knowledge Forum, and worked as a knowledge-building community, to unpack complexity around these issues.

### Data sources and data analyses:

- 1) 21 student CODAP notebooks (with graph and interpretation)
  - *Graph comprehension* (Friel et al., 2001)
    - 1–Reading the data
    - 2–Reading between the data
    - 3–Reading beyond the data
  - *Data practices* (Jiang & Kahn, 2020)
- 2) 158 Knowledge Forum posts
- 3) Transcripts of classroom talks
  - *Theory building moves* (Lin & Chan, 2018)
  - *Data practices* (Jiang & Kahn, 2020)

Code relations were analyzed based on their proximity in discourse data.

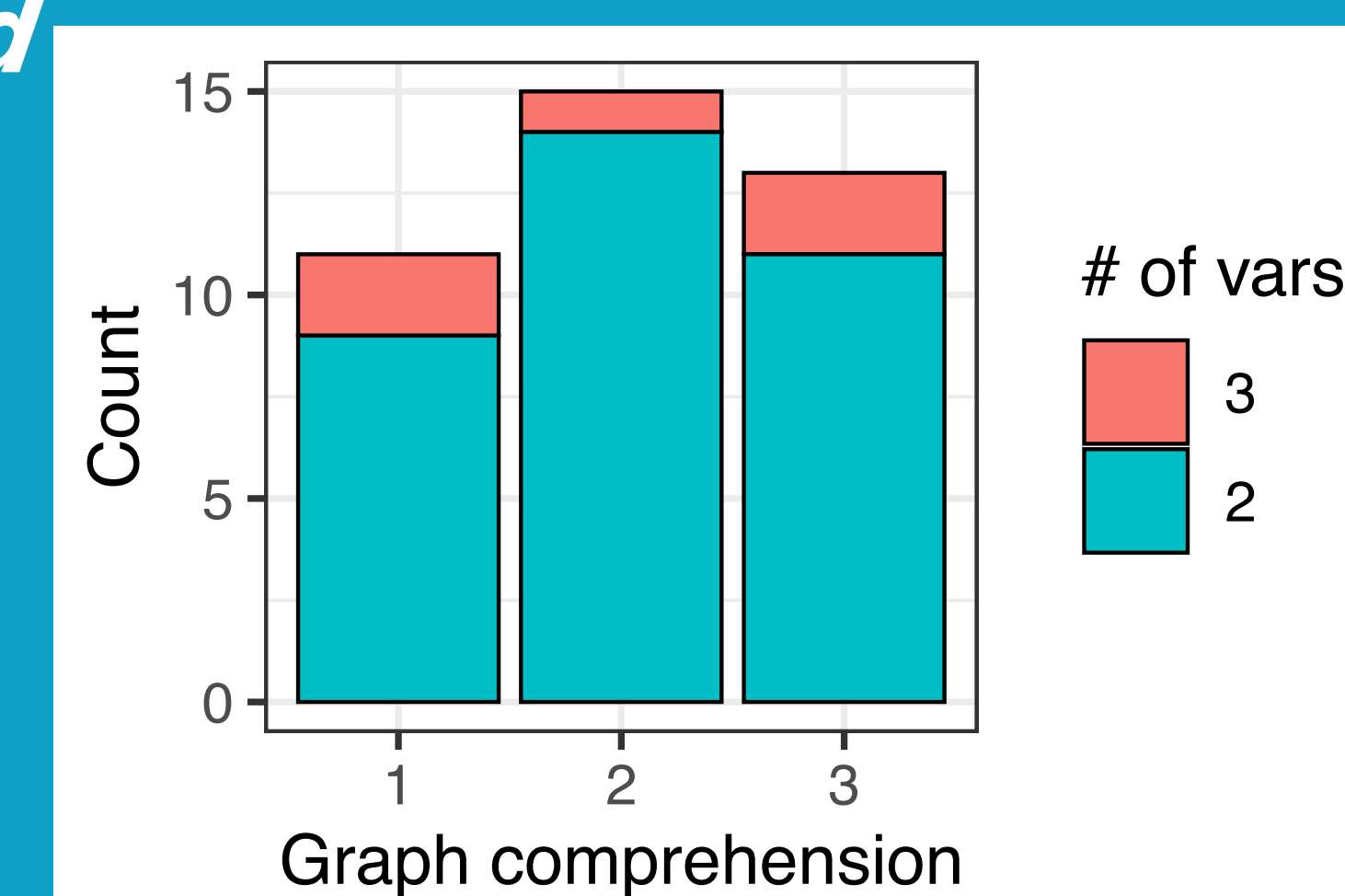


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## RESULTS

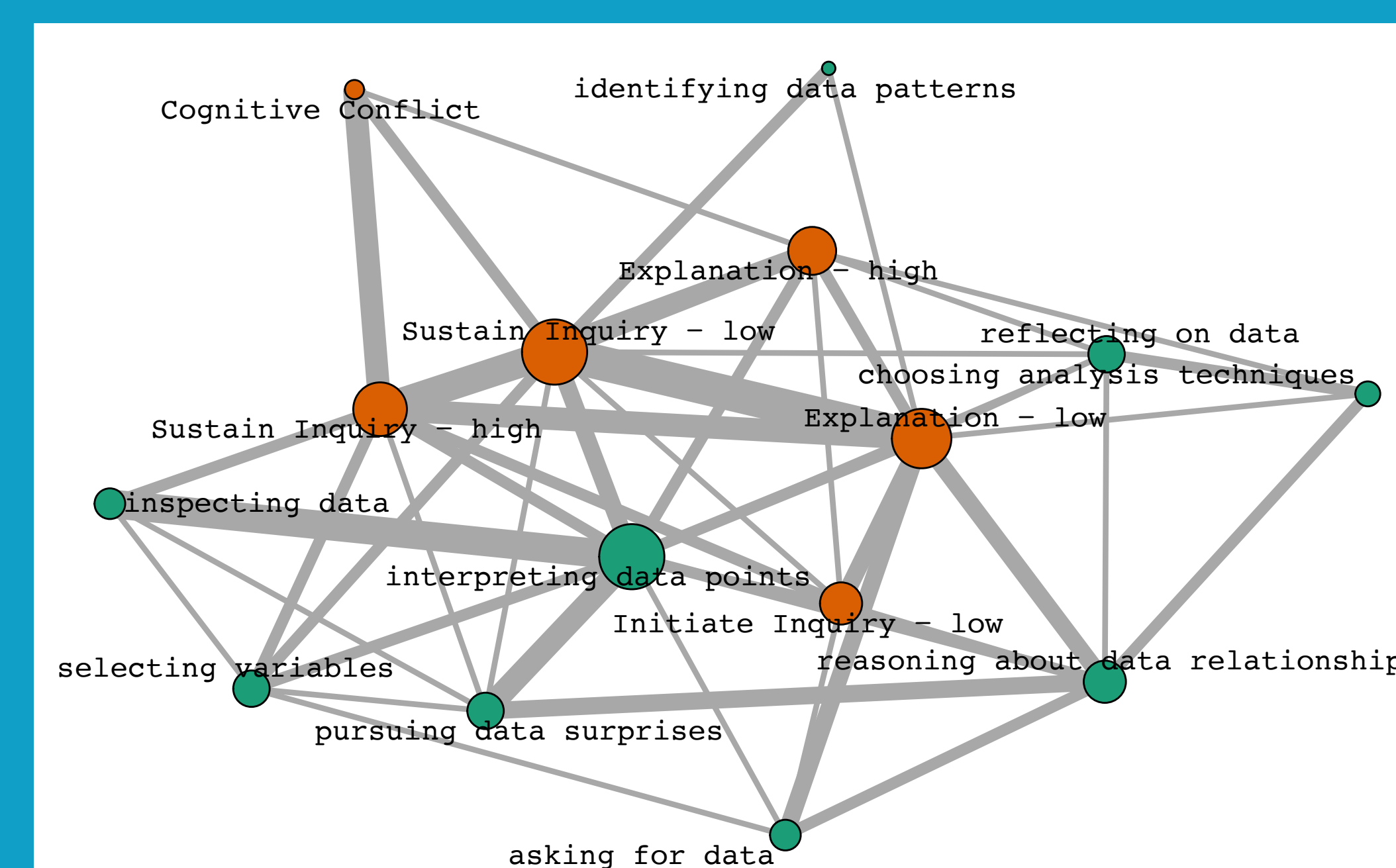
Students were able to **read the data** (1), **read *between* the data** (2), and **read *beyond* the data** (3).



reasoning about data relationships	39
interpreting data points	26
pursuing data surprises	18
inspecting data	8
selecting variables	4
asking for data	3
choosing analysis techniques	3
filtering data	2
reflecting on data	2
identifying data patterns	1

**Data practices** were reflected in CODAP notebooks, classroom discussion, and Knowledge Forum posts.

### • Data practices and theory building moves were deeply connected.



- For instance, inspecting data helped students sustain their inquiry; interpreting data points were linked with theory building (see *vignettes*).

### Vignette 1 – “What’s KT?”

- Student: What’s KT?
- Teacher: That’s kilotons, the amount of kilotons of carbon dioxide...
- S: What’s kilotons?
- T: A ton is about the weight of a car... For example, North America where we live, puts out more than 5 million kilotons every year.

### Vignette 2 – “We’re the outlier!”

- S: So lets look at that number. So they are doing 1.0 metric tons per person. In North America, we’re doing 16...
- S: I think we have the most. The poorer countries are probably less.
- T: There’s all sorts of stuff in here, like electric power consumption per person... What do you notice about this?
- S: North America is the highest by far...
- S: **We’re the outlier!** We’re the one that makes this graph go up by a thousand.