

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.

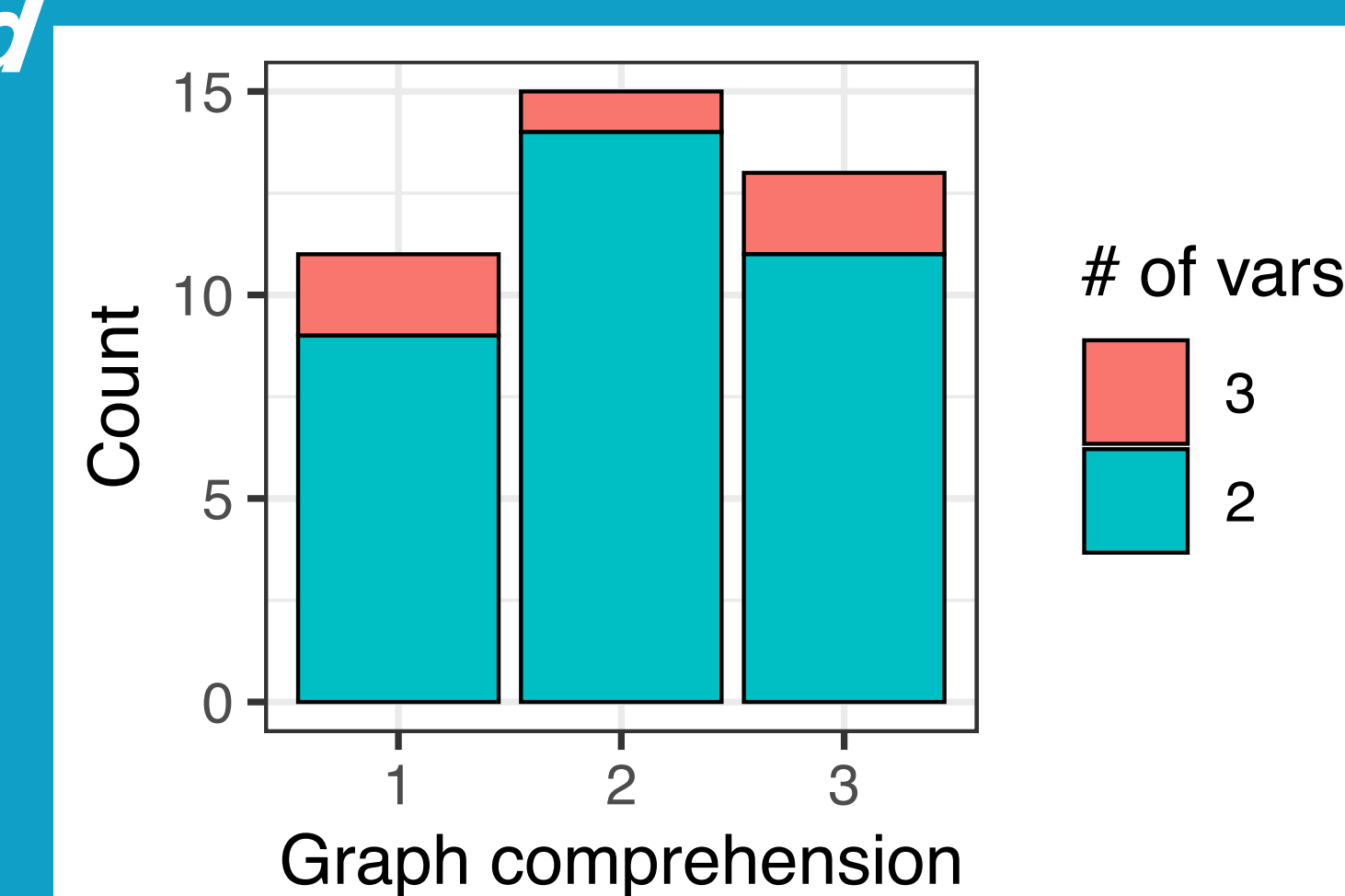


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RESULTS

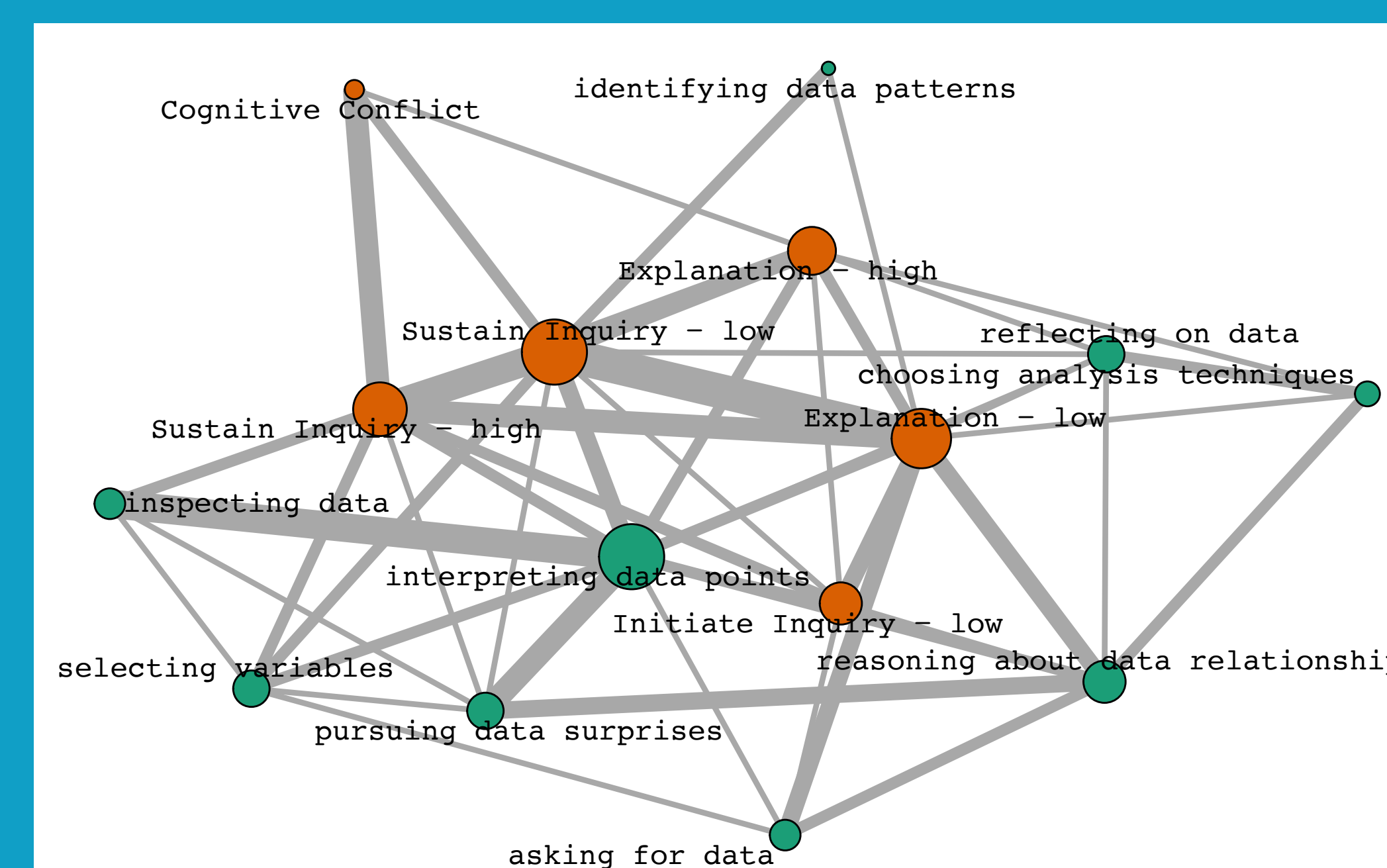
Students were able to **read the data** (1), **read *between* the data** (2), and **read *beyond* the data** (3).



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.