

Diversity of topology-related DAs and choice of DA representation (MM1)

Mix of abstract representations (icons, symbols D1) and concrete (sketches of physical objects, like power stations from neighborhood) (mm6)

e.g. hierarchy (DA) was represented as a node-link hierarchy, nested hierarchy using enclosure, hierarchy/set, hierarchy/tree, network

Abstractions sometimes were a laziness choice, sometimes were a deliberate icon choice (e.g. squiggles for text--shorthand for words)

Mental Model Elicitation

Ambiguity among trees, hierarchies, sets, and the terms used to describe visual representations of these DAs (MM3, C2)

Describe sketch: levels of description from literal (i.e. restate the DS) to abstract/overview (i.e. "I drew a bar graph") (C3)

Mental Model Formation

MM stayed the same or very close for 17/28 participants, had significant changes for 4 due to change in DA representation (MM2)

Data beliefs: tables (BD1), science (BD2.5), questioning if these DSs are data (BD2)

In response to "gut-reaction", participants either described what they would draw, created a purpose/context for DS, or invented tasks (e.g. organize) (MM2)

Participants inferred bigger picture (context or source, PS3) or tasks (PS2), or requested more data (PS1)

Revisit Walny's F statements (statements w/analytic potential)

This has implications for designers to elicit corner cases, tasks, alternative contexts from their users

Mental Model Content

Qualities of Data MM (MM4, MM5, MM6, MM7)

Participants revised, clarified, and added details during sketching (MM4, MM2 "Small change while talking")

Participants included interactions to their sketches, indicating affordances in their MM (MM5)

Sketches had origin in reality (e.g. physical objects) or had connection to prior experiences or work (MM7)

Mental models are representations of internal phenomena and thus are imperfect (this is highly supported by literature)

Used icons/abstract shapes (e.g. squiggles) (D1). Also elided details (D6)

Couldn't capture MM due to space constraints (D2)

Modified the depiction for communication (C1)

Recognized the communication/sharing element of the sketch, so they added text (D3)/detail (D4)/legend (D5) to clarify the MM representation.

Variety of groupings may imply personal priorities or preferences about the data (OG3), but also read-order was prevalent (OG2). Diverse and personal (OG1)

Math literacy code since it has 2 participants, which is less of a connection than the computing/non-computing. We encourage future work, noticed these populations