Exploring Preschool Data Collection and Analysis: A Formative Study

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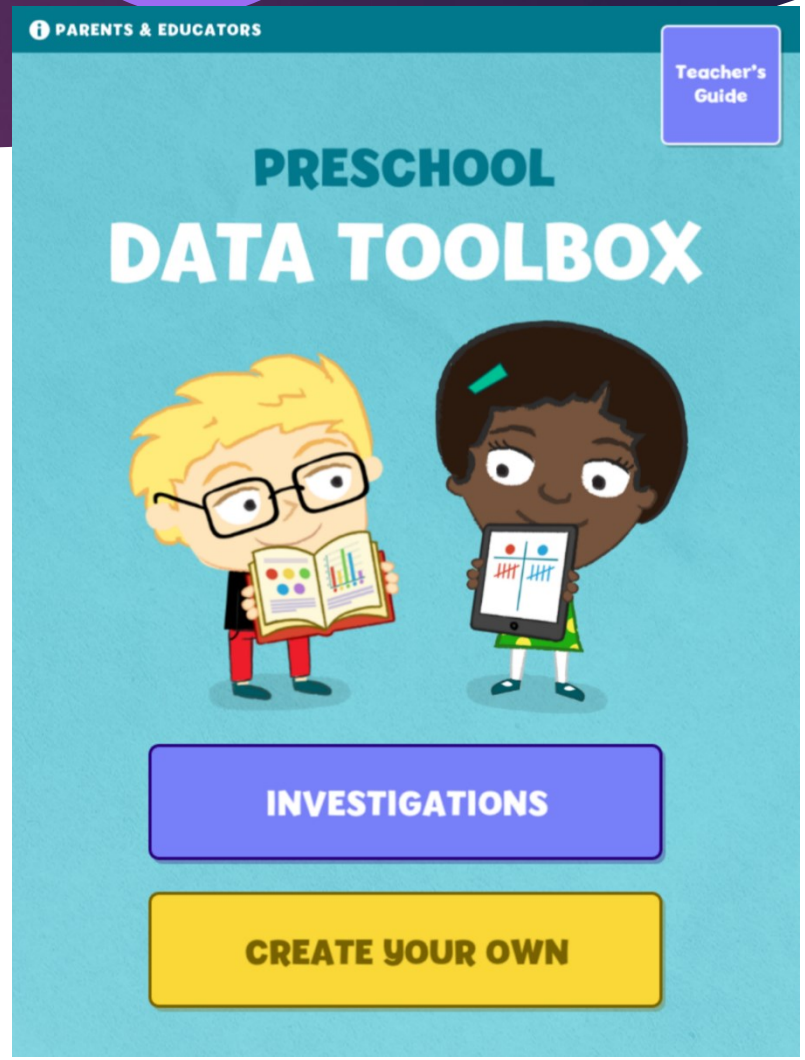
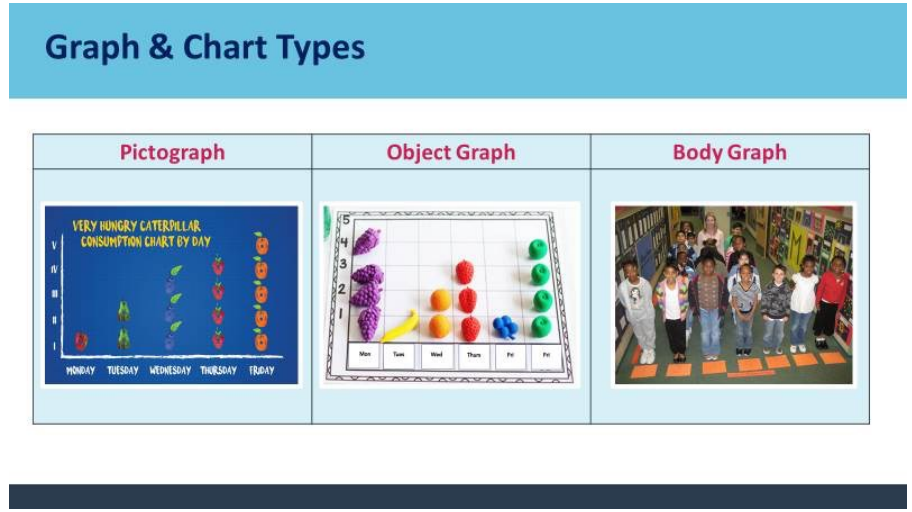


Connecting CT and DCA

- Computational Thinking (CT) is a systematic way to break down complex problems in order to answer a question or reach a goal
- Data Collection and Analysis (DCA) is at the intersection of math and CT
  - Counting, sorting, classifying, comparing, ordering
  - Creating and comparing data representations (like graphs and tally charts!) to communicate information and answer research questions

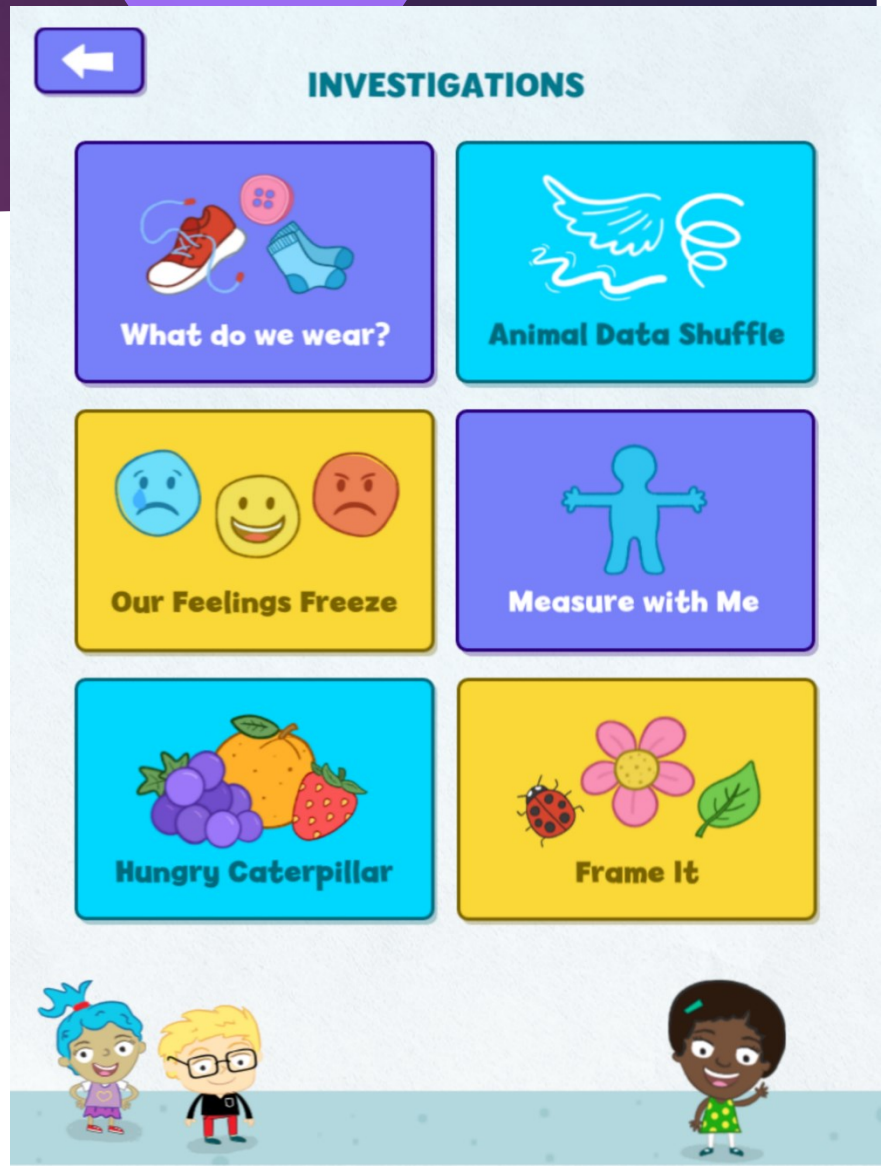
Limited Research on and Instructional Materials for DCA

- BUT research is limited as to:
  - how preschoolers should collect and analyze data to solve real-world problems
  - how to support preschool teachers' instruction around DCA
- AND there remains a lack of fun, high-quality materials that support children's DCA skills



The Preschool DCA Intervention

- Use 9 **data-focused "investigations"**
- Goal is to foster **preschool mathematics** and **computational thinking (CT) skills** in a developmentally appropriate and fun way
- Leverage teacher-facing app



Preschool DCA Intervention Parts

- 6 Existing Lessons
- 2 Create Your Own
- 1 Design a Data Story

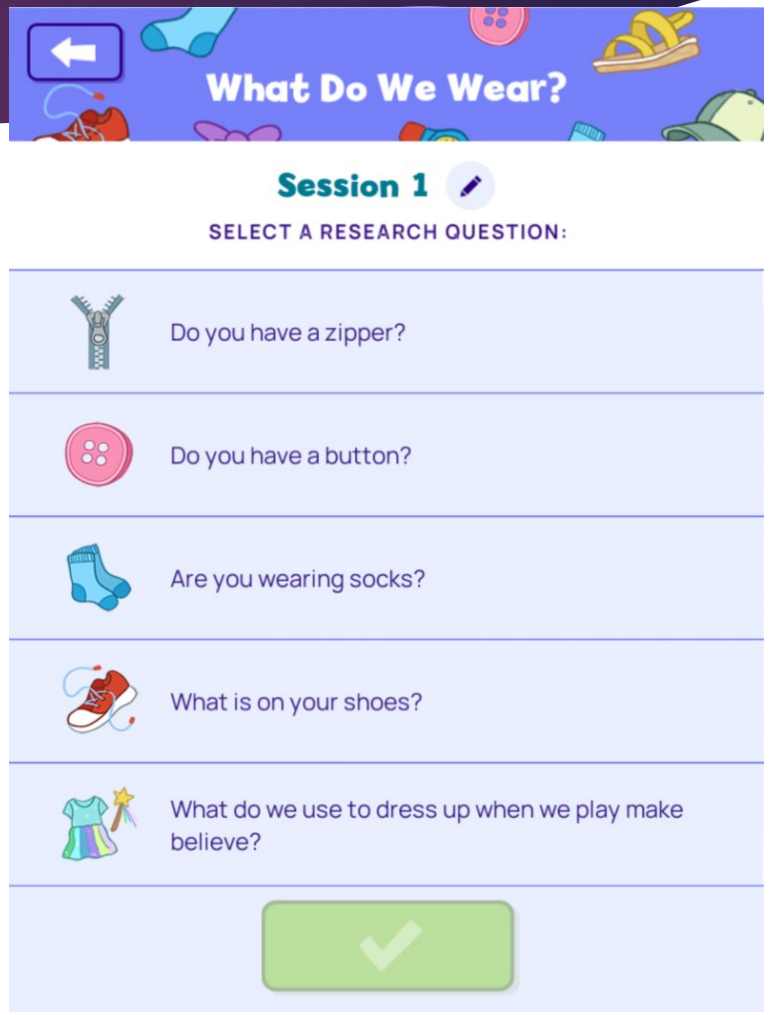
Supporting Children's DCA skills

- Our investigations help children represent data with **concrete objects** (including standing and physically representing their own data point) and **transitioning to pictures, numbers, or symbols**
- Digital tools scaffold data collection, organization, and representation

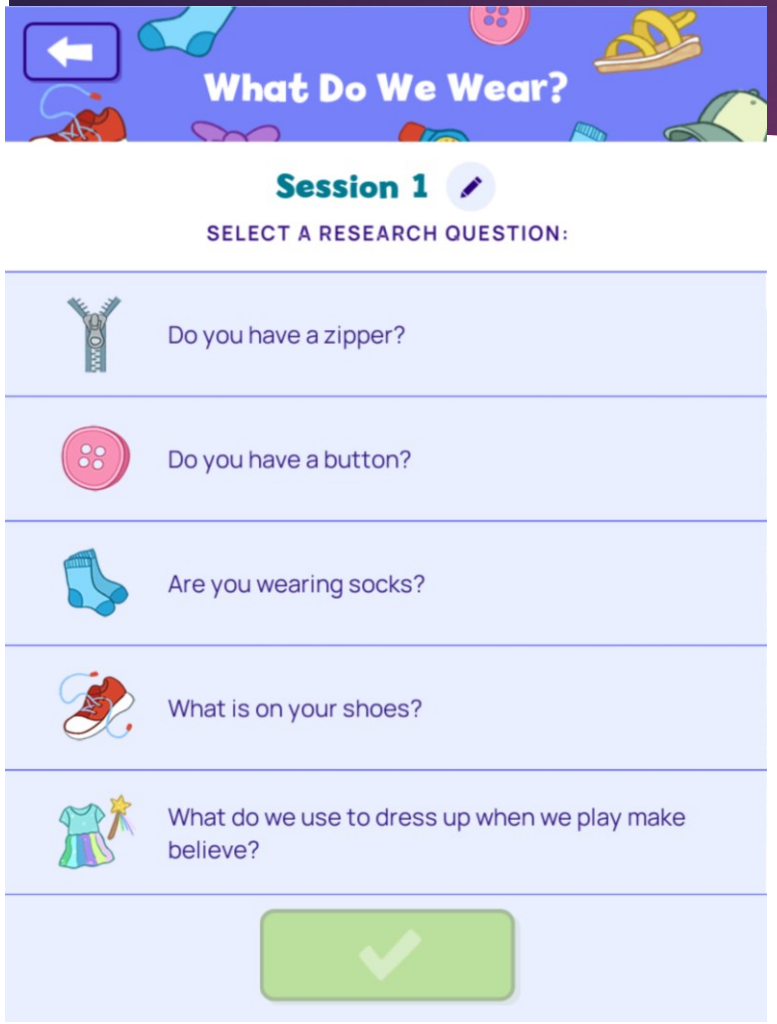
App Scaffolds Consistent Investigations Steps

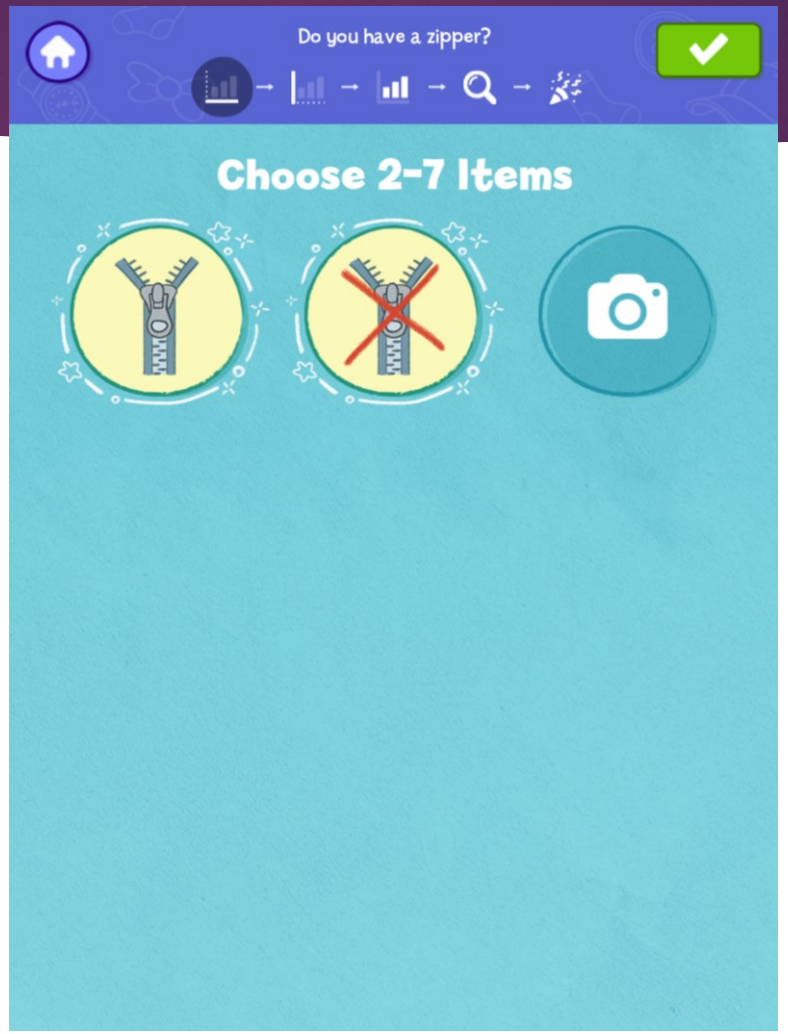
Example: What Do We Wear? Investigation

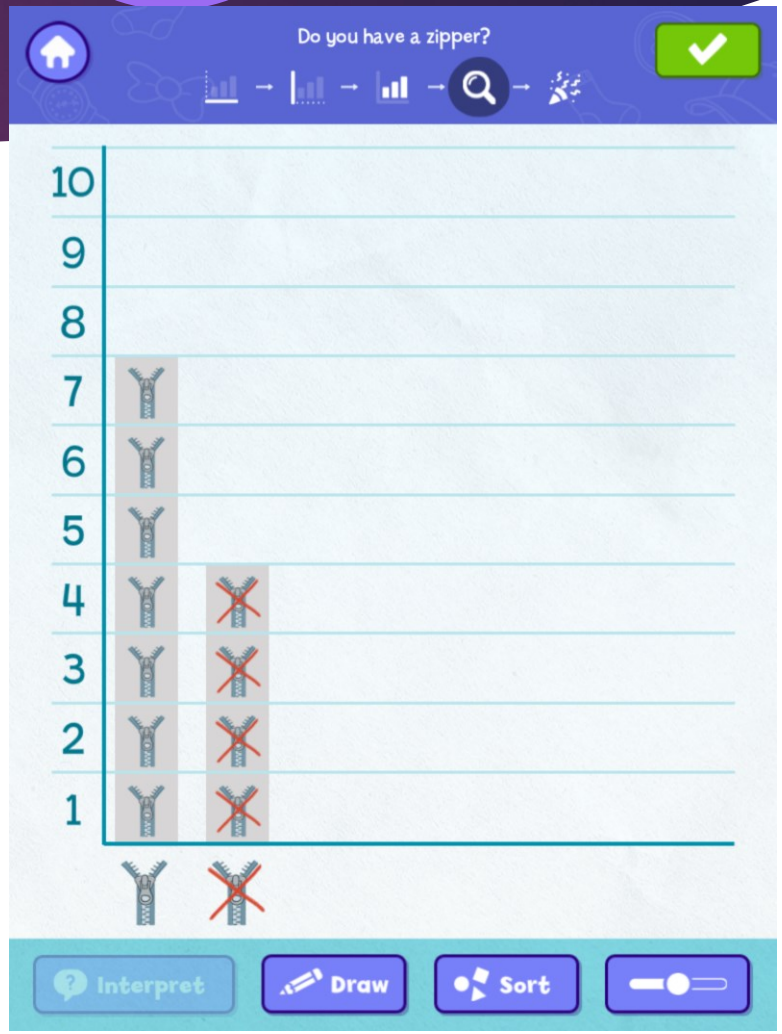
This investigation uses attributes (or characteristics) of clothing to sort groups, create a graph, and discuss data.



Example: App Screens

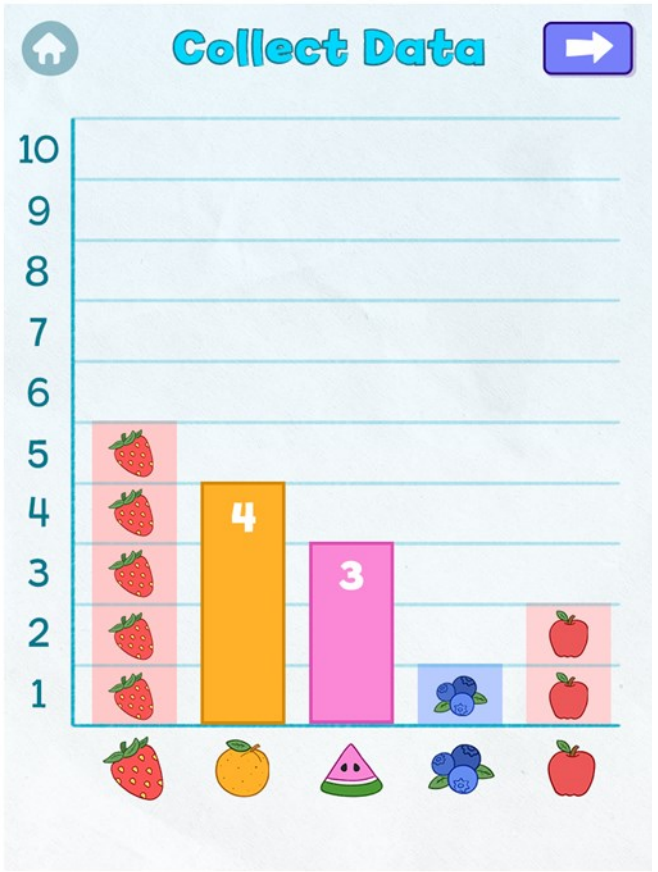


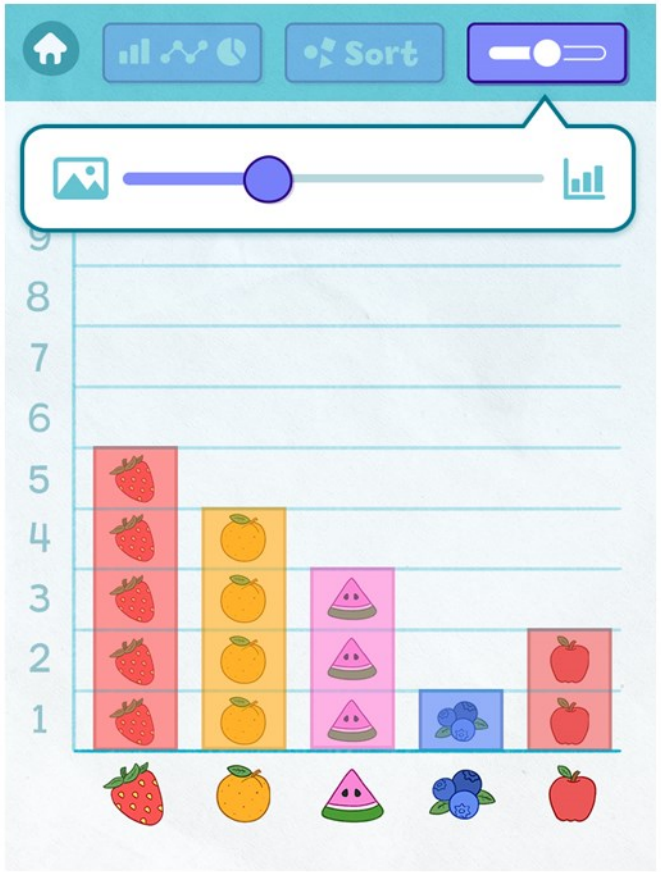




Study 1: Data Collection

- First in a series of studies.
- Using a design-based research approach.
- Preschool Teacher completed:
  - Interview (n=10)
  - Survey (n=19)
- Participants viewed a series of PowerPoint slides with short videos demonstrating each investigation.





Findings - 1

- The **integration of mathematics and DCA** are welcome additions to the preschool classroom.
- It builds on and extends what children are already learning.

Findings - 2

- Teachers positive about our suggested activities because they
  - Included many hands-on components
  - Included multiple visual representation
  - Engaging children in play-based activities with real-world characteristics

Findings – 3

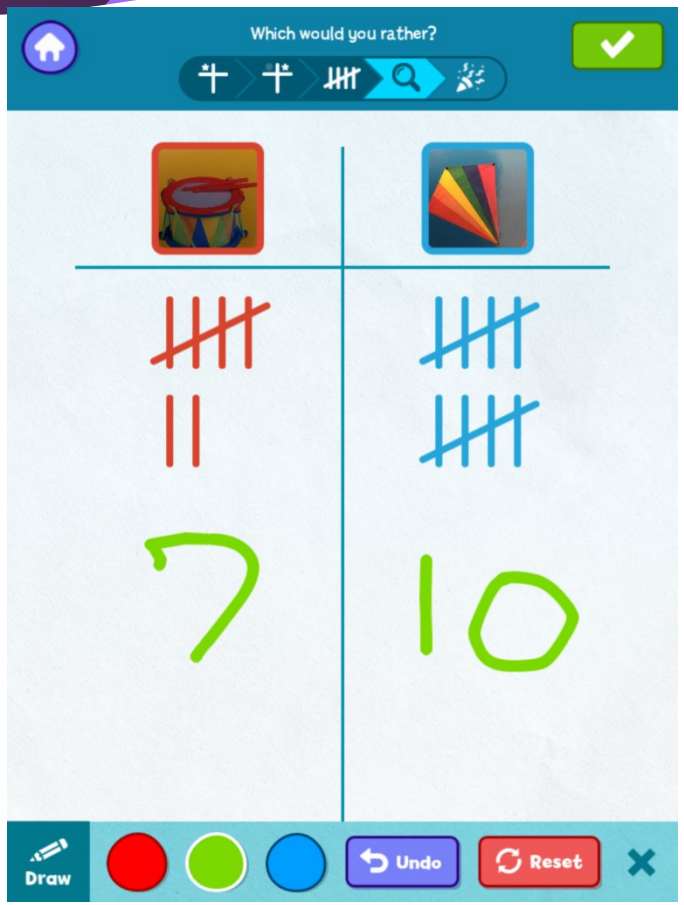
- **Developmentally appropriate.**
- **Adaptable.** Can be adapted based on the age (3-5 years) and readiness of children in the class
- **Scaffolding**. Yet, Scaffolding remains critically important!

Findings - 4

- Teachers anticipated some **DCA content** would be more challenging than other content.
  - Least Challenging: sorting, representing data
  - Moderately Challenging: making predictions
  - Most challenging: interpreting and discussing data

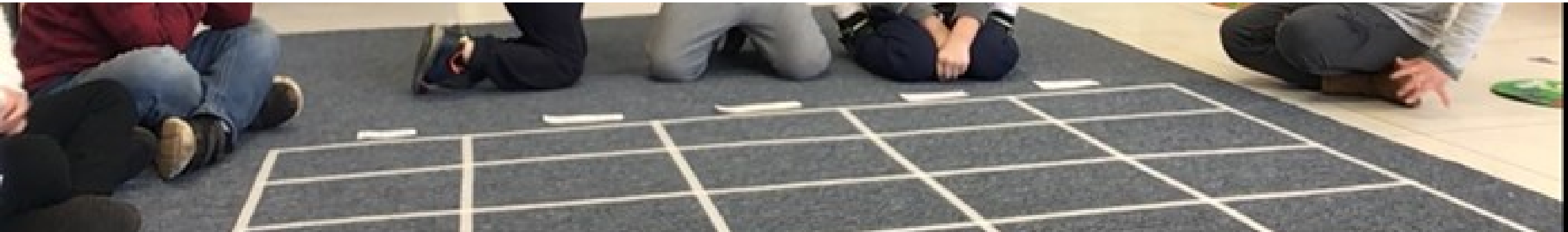
Findings – 5

- **Materials preparation and activity pacing** was reasonable in terms of space, materials, and time.
- **Technology provides unique affordances** to create meaningful learning opportunities.
  - Example affordances include features such as: Camera, Drawing, and Sorting features.



Conclusion

- DCA intervention likely to make a meaningful contribution to preschool classrooms, adding important math and CT content that is not currently included in preschool classrooms.
- Intervention supports current math learning goals and extends them.
- Content adaptable for wide range of ages (3-5) and ability levels.
- App provides unique affordances that are not typically available to preschool teachers and children.



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