



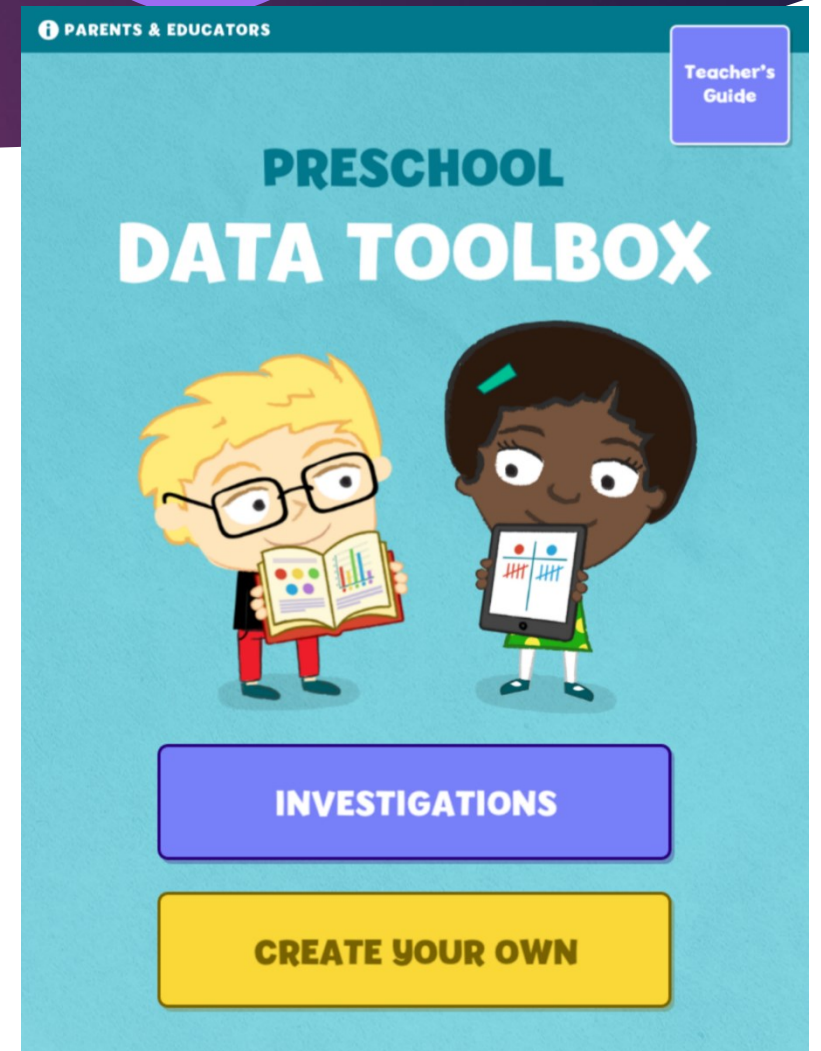
Exploring Preschool Data Collection and Analysis: A Formative Study

This research was funded by the National Science Foundation (DRL - 1933698). Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. We thank our advisors who have provided valuable feedback on these projects.

Presenters

Ashley Lewis Presser,
Jessica Young,
Michelle Cerrone,
Lindsay Clements, &
Heather Sherwood

Education Development Center



Connecting CT and DCA

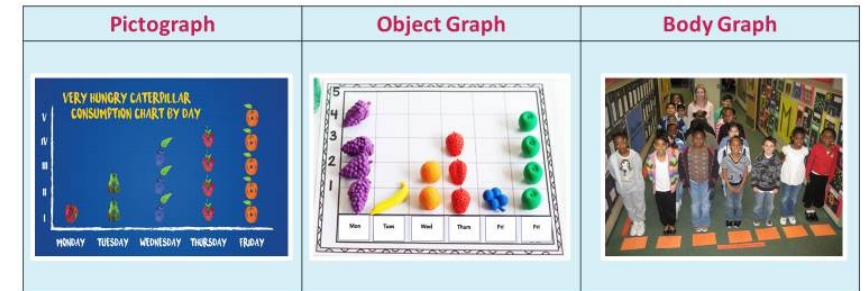
- Computational Thinking (CT) is a systematic way to break down complex problems in order to answer a question or reach a goal
- Data Collection and Analysis (DCA) is at the intersection of math and CT
 - Counting, sorting, classifying, comparing, ordering
 - Creating and comparing data representations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

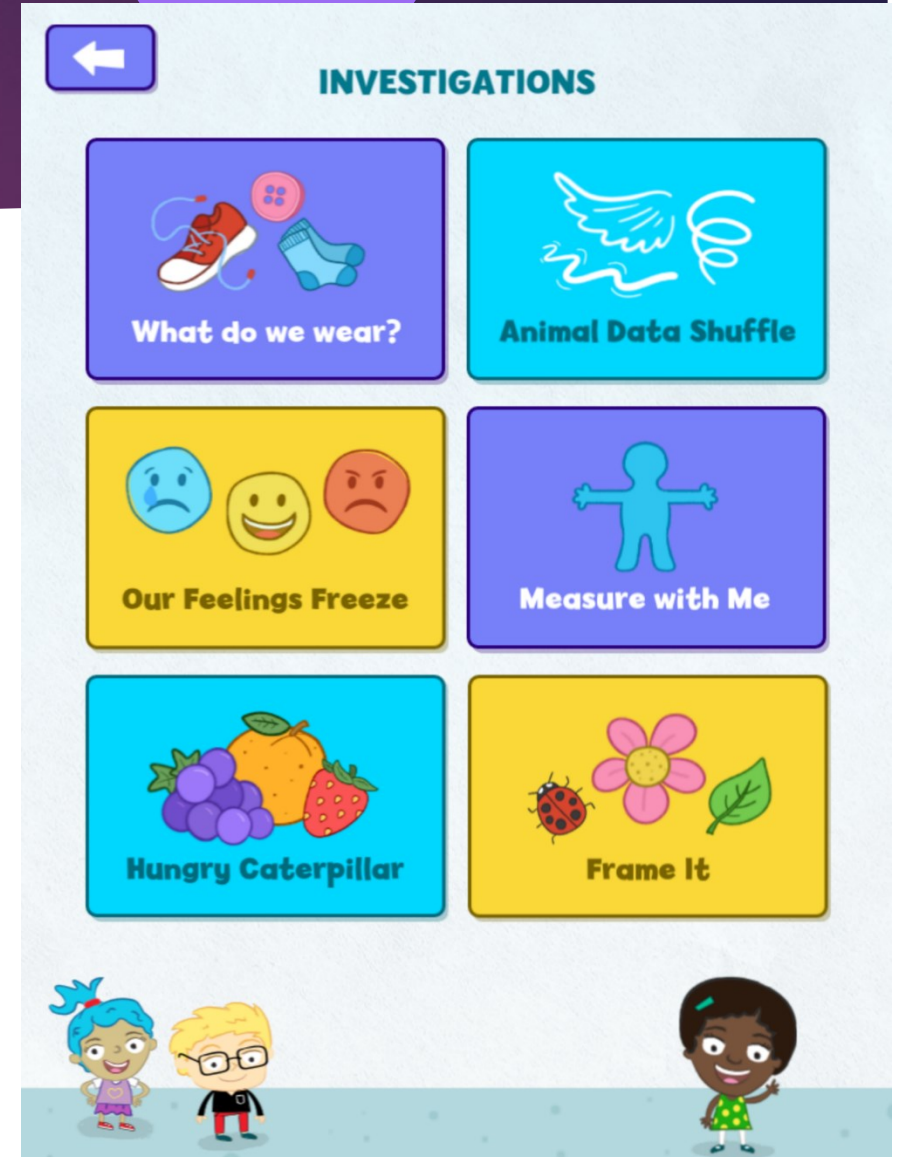
- AND there remains a lack of fun, high-quality materials that support children's DCA skills

Graph & Chart Types



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

Ask or Think
about
Research
Question

Collect &
Organize
Data

Analyze Data

Interpret
Data (i.e.
Data Talks)

Example: What Do We Wear? Investigation






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


The screenshot shows a digital interface for a clothing investigation. At the top, a blue banner with a white arrow icon and the title 'What Do We Wear?' is decorated with various clothing items like socks, buttons, sandals, and a hat. Below the banner, the text 'Session 1' is displayed next to a pencil icon. Underneath, it says 'SELECT A RESEARCH QUESTION:'. There are five light blue rectangular buttons, each containing an icon and a question. The first button has a zipper icon and asks 'Do you have a zipper?'. The second has a button icon and asks 'Do you have a button?'. The third has a sock icon and asks 'Are you wearing socks?'. The fourth has a shoe icon and asks 'What is on your shoes?'. The fifth has a dress and star icon and asks 'What do we use to dress up when we play make believe?'. At the bottom of the interface is a large green button with a white checkmark icon.

What Do We Wear?

Session 1

SELECT A RESEARCH QUESTION:

-  Do you have a zipper?
-  Do you have a button?
-  Are you wearing socks?
-  What is on your shoes?
-  What do we use to dress up when we play make believe?



Example: App Screens

What Do We Wear?

Session 1

SELECT A RESEARCH QUESTION:

Do you have a zipper?

Do you have a button?

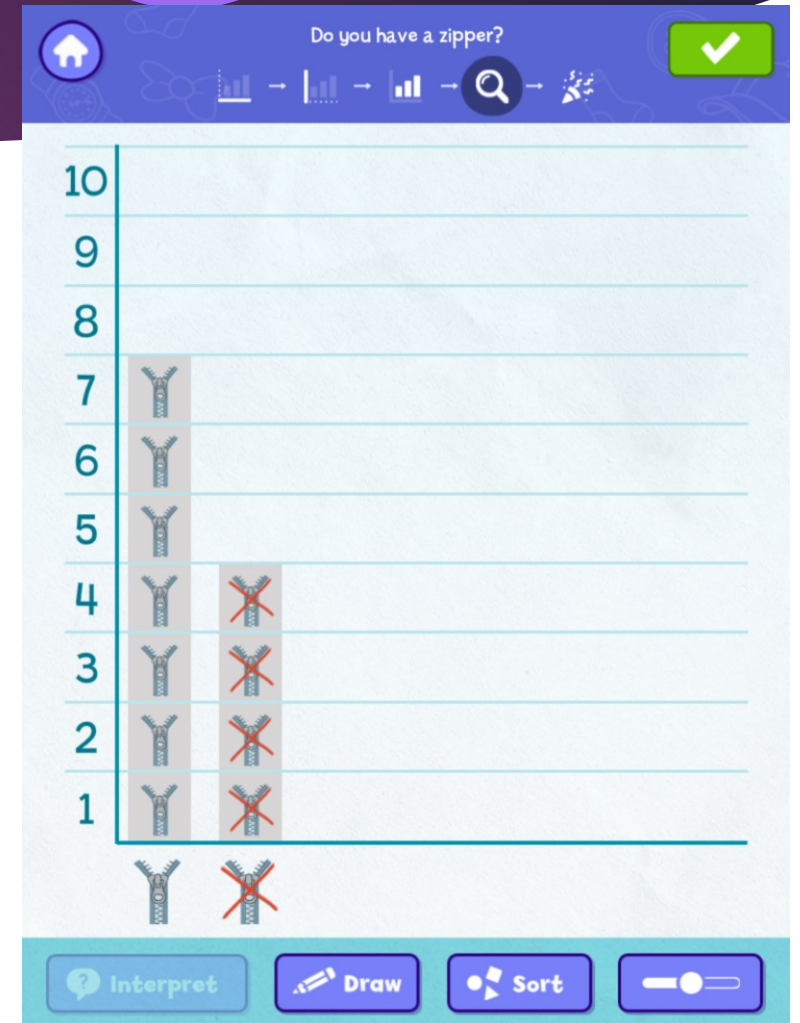
Are you wearing socks?

What is on your shoes?

What do we use to dress up when we play make believe?

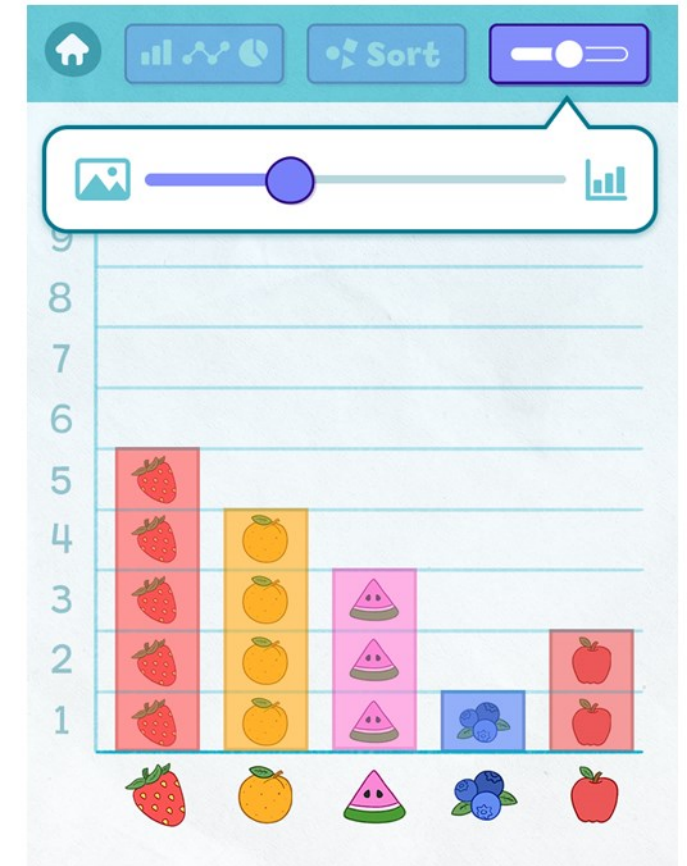
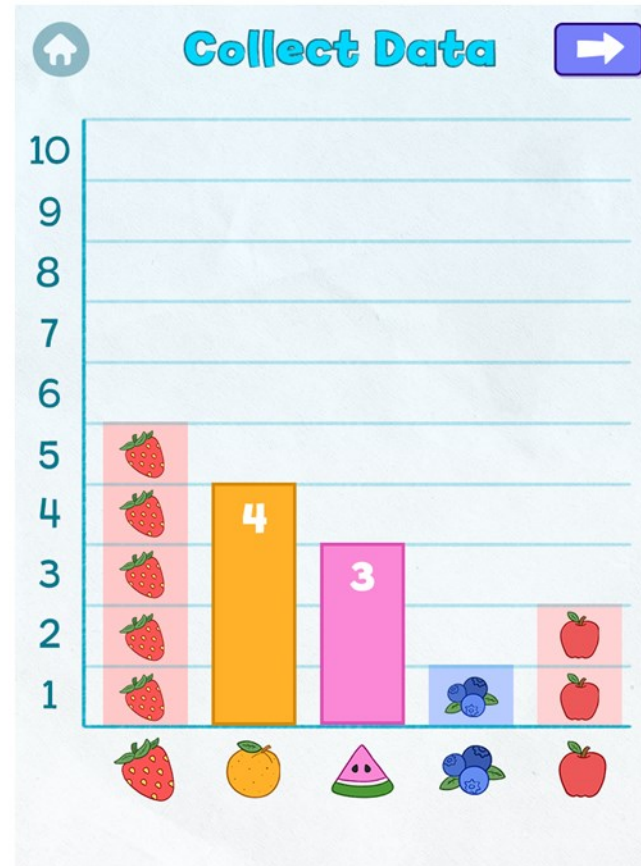
Do you have a zipper?

Choose 2-7 Items



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!



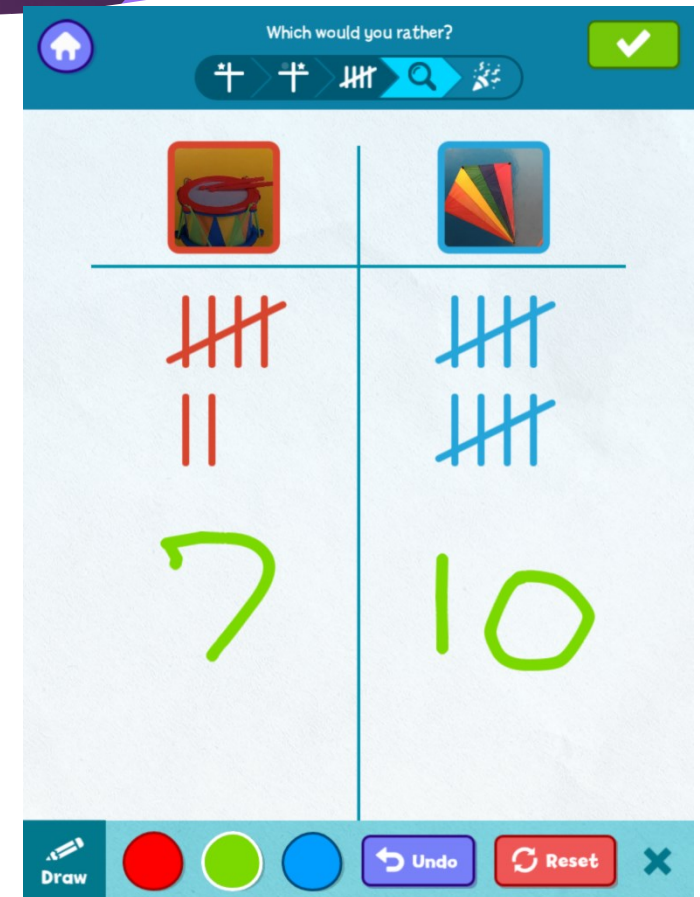
Findings - 4

- ▶ 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



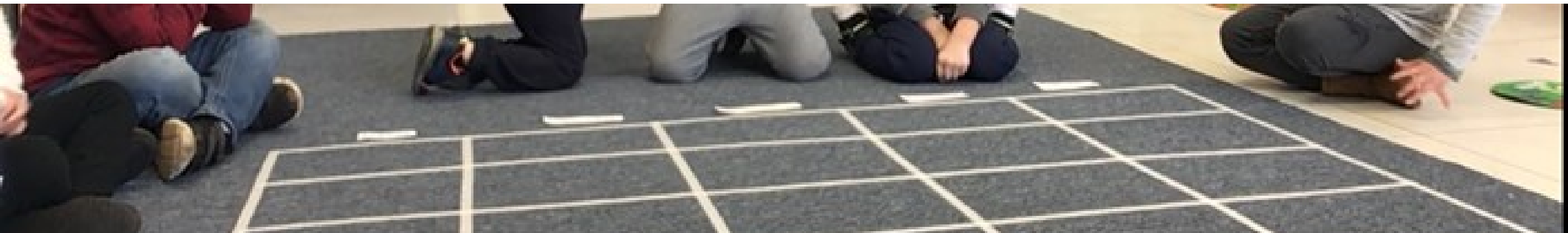
Findings – 5

- ▶ **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.



Contact us



▶ Ashley Lewis Presser
alewis@edc.org

▶ Jessica Young
jyoung@edc.org

<https://go.edc.org/DCAContactMe>