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NATIONAL CENTER FOR RESEARCH ON EVALUATION, STANDARDS, AND STUDENT TESTING

# Learning with Measure Up!

## An Efficacy Study of PBS KIDS' Measure Up! and Super Vision Apps

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# Ready to Learn (RTL) Grant

- Department of Education funded, 5-year, $100M
- CPB, PBS KIDS, producers, local public media stations, researchers
- Advancing Children's Learning Through Personalized Media Experiences (3rd grant cycle)
  - Funds new media content, multiplatform properties
- Focuses on low-income and underserved populations
- Measure Up! was created as part of the previous RTL cycle

# Measure Up! App


- Measurement concepts
  - height/length, weight, capacity
- Preschool-aged children (3-to-5-year-olds)

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# “Measure Up!” App

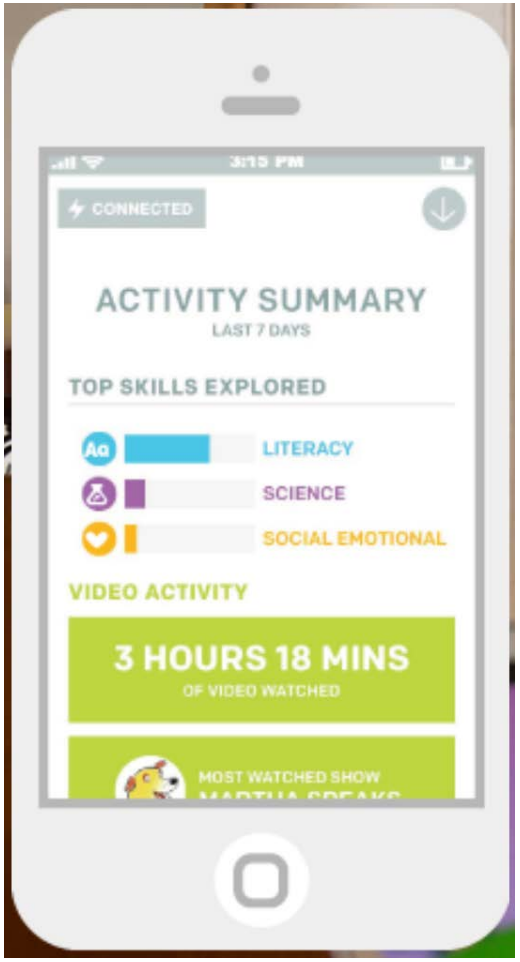
- 3 “worlds,” one for each measurement domain
  - Videos
  - Games
  - Challenges
  - Toys
  - Interstitial content






# “Super Vision” App

- Summary of games played, videos watched, content covered
- Suggestions for activities to build on media experiences



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# Research Questions

- RQ1: To what extent does playing Measure Up (MU), with parents provided (or not provided) the Super Vision (SV) app, impact children's learning of measurement concepts?
- RQ2: Does parents' use of the SV app lead to increases in parents' awareness and support of their children's learning of measurement concepts?
- RQ3: What is the gameplay behavior of children playing MU?

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# Design

- Pretest-posttest randomized design
  - Randomization within site
- Intervention took place at school
- Parents of children in the MUP+SV condition received loaner phones to use at home
- Intervention
  - 3 weeks, 4 days/week, 20-30 minutes of game play per occasion

| Condition | *n* |
|---|---|
| Control (Super Why) | 33 |
| MU | 33 |
| MU + SV | 33 |
| Total | 99 |

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# Sample and Setting

Sample criteria

- Attending low SES schools
- Aged 4 to 5 years
- Have parents who read English

Setting

- 4 school sites
  - 3 public Title I schools (3 preschool classes, 2 transitional kindergarten classes)
  - 1 childcare center at community college (two classes)

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# Measurement Assessment Development

- Child Math Assessment (CMA) (4 items)
- KeyMath-3 (3 items)
- CRESST developed (13 items)
  - 3 rounds of usability trials
  - Consultation with Alice Klein (CMA creator, early math expert)
- Concepts, practices came directly from the PBS KIDS math framework, reflected those found in the games and videos in the app

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# Measurement Assessment Design

- One-on-one administration (with observer)
- 10 minutes
- 20 items
  - Manipulables (10 items)
  - Pictures (6 items)
  - iPad Pan Balance app (4 items)
- Pre and post intervention

# Measurement Assessment: Length/ Height

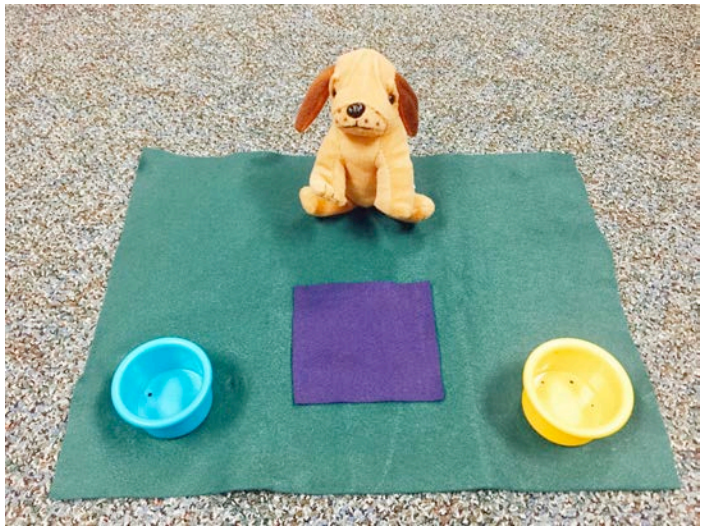
11 Items

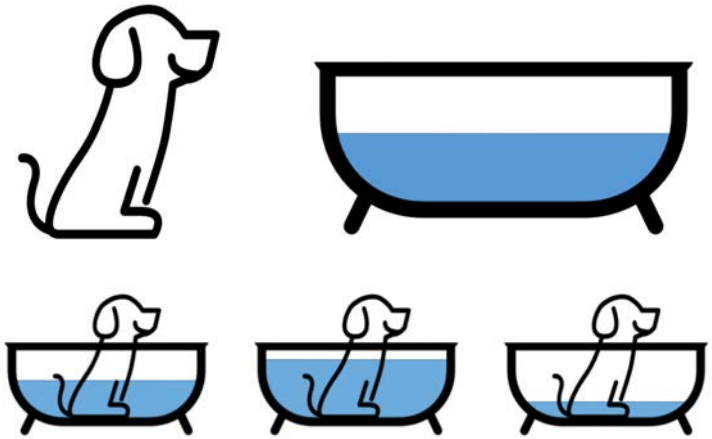
- Direct comparison
- Seriation
- Nonstandard measurement

# Measurement Assessment: Capacity

3 Items

- Direct comparison
- Displacement





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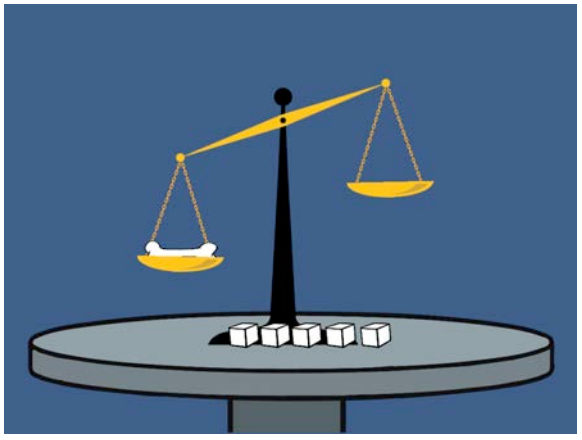
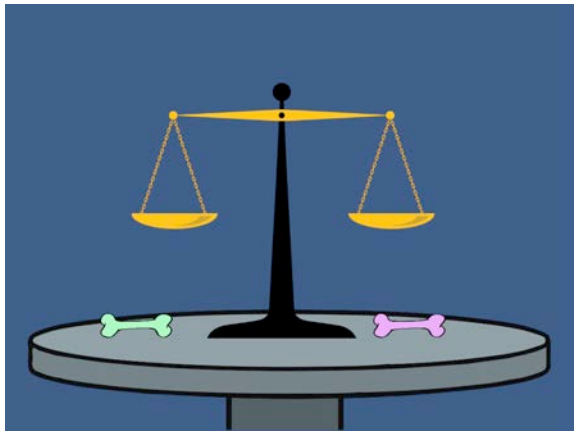
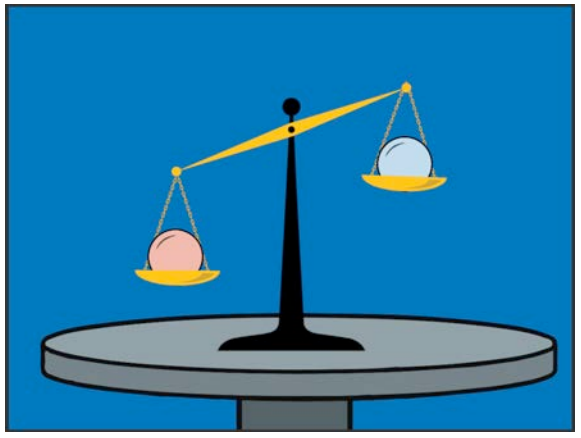
# Measurement Assessment: Weight

6 Items

- Pan balance
- Direct comparison
- Nonstandard measurement



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# Parent Measures

- Parent surveys, pre and post (whole sample)
  - Background/demographics, media usage, character familiarity
- Parent questionnaires, weekly (MUP+SV)
  - SV use, helpfulness, technical issues

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# Analysis – RQ 1

RQ1: To what extent does playing Measure Up (MU), with parents provided (or not provided) the Super Vision (SV) app, impact children's learning of measurement concepts?

- Ordinary Least Squares regression
- Predict posttest scores
- Control for pretest
- Include variable for condition (MU or MU+SV, reference group: control)
- Include covariates (gender, SES, age, school site)

# Results – RQ1

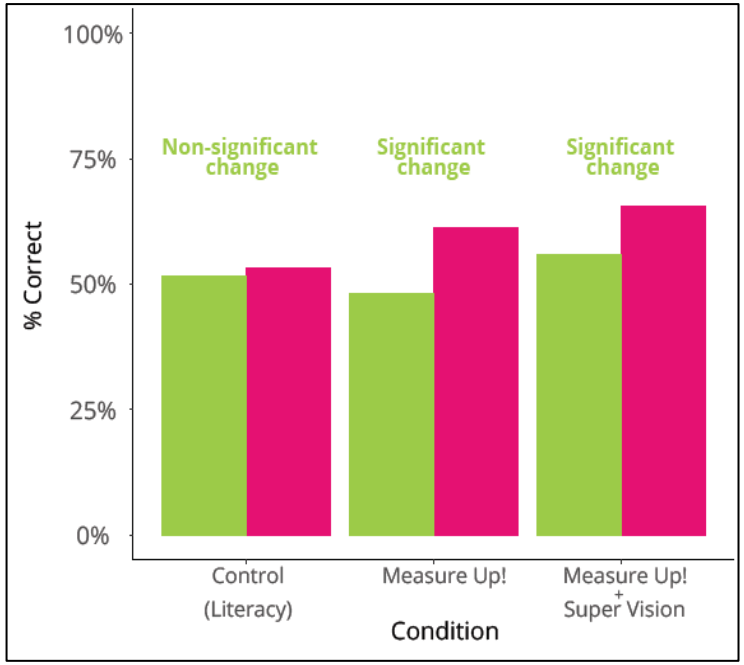
| Variable | Model 1 | Model 2 |
|---|---|---|
| Pretest | 0.873*** | 0.943*** |
| | (0.077) | (0.086) |
| MU-only | 2.268*** | 1.763** |
| | (0.595) | (0.659) |
| MU+SV | 1.752** | 1.606* |
| | (0.588) | (0.653) |
| … | | |
| Constant | 6.710 | 6.616 |
| | (3.828) | (4.180) |
| Observations | 99 | 86 |
| $R^2$ | 0.735 | 0.739 |

Model 1
- Pretest score
- Site
- Age
- Gender

Model 2
- Pretest score
- Site
- Age
- Gender
- Low-income

# Results – RQ1

- Statistically significant effect of treatment groups as compared with the control condition
  - 11% gain for MU group
  - 9% gain for MU+SV group
- No significant difference between MU and MU+SV
- Sub scores estimated with hierarchical linear regression models: **children gained most on weight items**



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# Analysis & Results – RQ2

- RQ2: Does parents' use of the SV app lead to increases in parents' awareness and support of their children's learning of measurement concepts?
  - Analysis: Qualitative analysis of survey responses from parents in MU+SV (n=30)
  - Results:
    - 50% of parents said SV led to talking with children

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# Analysis – RQ3

RQ3: What is the gameplay behavior of children playing MU?

- Telemetry data
- Descriptives: time spent, error rates, bounce rate, time spent over course of study
- Misconception measures

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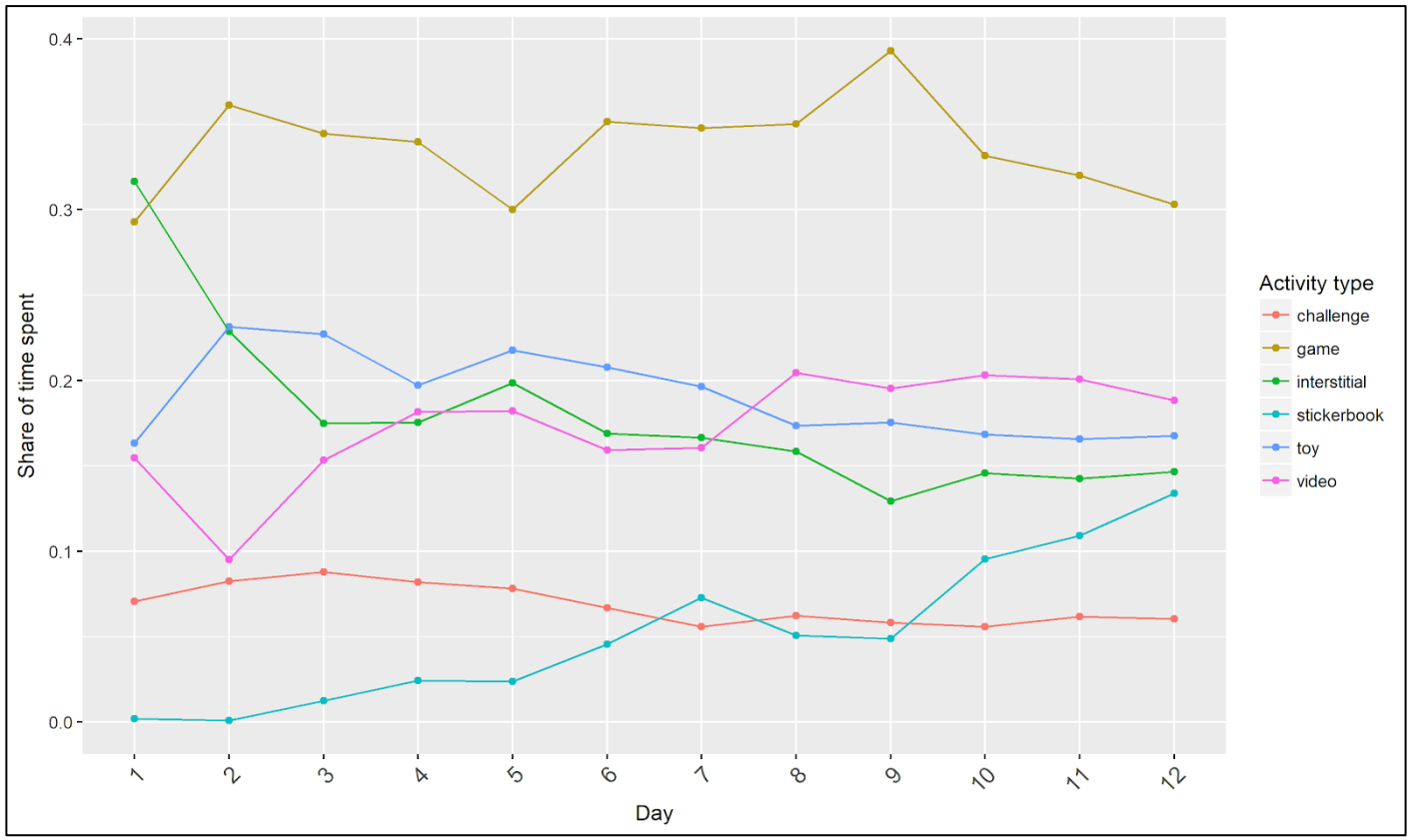
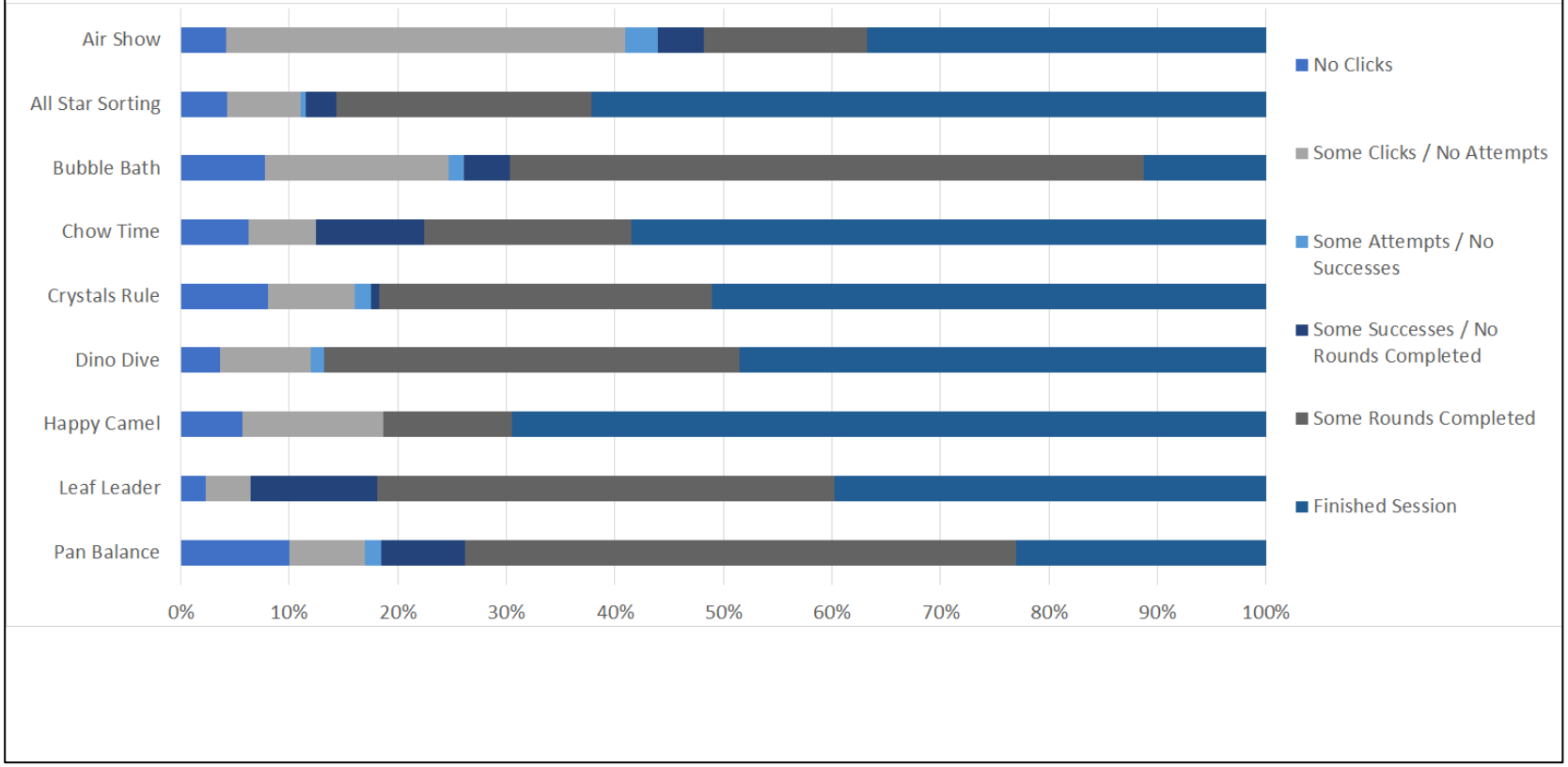
# Results – RQ3

Share of time spent by activity over the course of the intervention



# Results – RQ3

## Bounce Rate: rate at which children exit games



# Results – RQ3

Error Rate: Average number of errors per round for games and challenges