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Early Grade Learning: A comprehensive approach to reading and mathematics instruction

Moderator: Deepa Srikantaiah, GRN

March 1, 2018

Panelists



Dr. Carole da Silva
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READING WITHIN REACH

Examining Connections Between Early Math and Early Reading Learning and Outcomes *A Research-to-Use Paper*

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Five Research-to-Use papers to be produced by May 2018

Review key literature in the field and address knowledge gaps to inform program design and implementation.

Topics for the Research-to-Use Papers are:

- Strategies and Approaches to Structured Pedagogy in Early Grade Reading
 - Formative Assessments for Use in Early Grade Reading
 - Approaches to Early Grade Literacy and Pre-School Interventions
 - Successful Coaching Models for Early Grade Reading Improvement
- Examining Connections Between Early Math and Early Reading Learning and Outcomes

Purpose of Paper

- Illustrates key teaching and learning strategies used in mathematics
- Discusses similarities and differences between the two subjects
- Concludes with recommendations for a comprehensive approach to early grade learning



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Brief Overview of Early Year Learning

- Foundational skills develop at home and in the community long before children start formal instruction in school
- Infants are born with an innate ability to learn language
 - Early speech and language development are important for later reading success in skills such as oral language, phonological awareness, print awareness and vocabulary.
- Infants are also born with an inherent number sense that is increasingly developed through interactions with the environment and other people
 - Early experiences are important to the development of number sense.



Best Practices in Math Instruction

- Use of Explanation and Justification
 - Why? How?
- Use of developmental progressions

Agodini et al. 2010, Ball 1993, Baroody, 2012, Clements & Sarama, 2015, Fennema et al. 1989, Gersten et al. 2009, Lampert & Cobb 2003, Ma 1999, National Research Council, 2001, Nickson 1992, Platas 2014, Saxe et al. 2001, Sloan, 1993, Vernaud 1992



Best Practices in Math Instruction

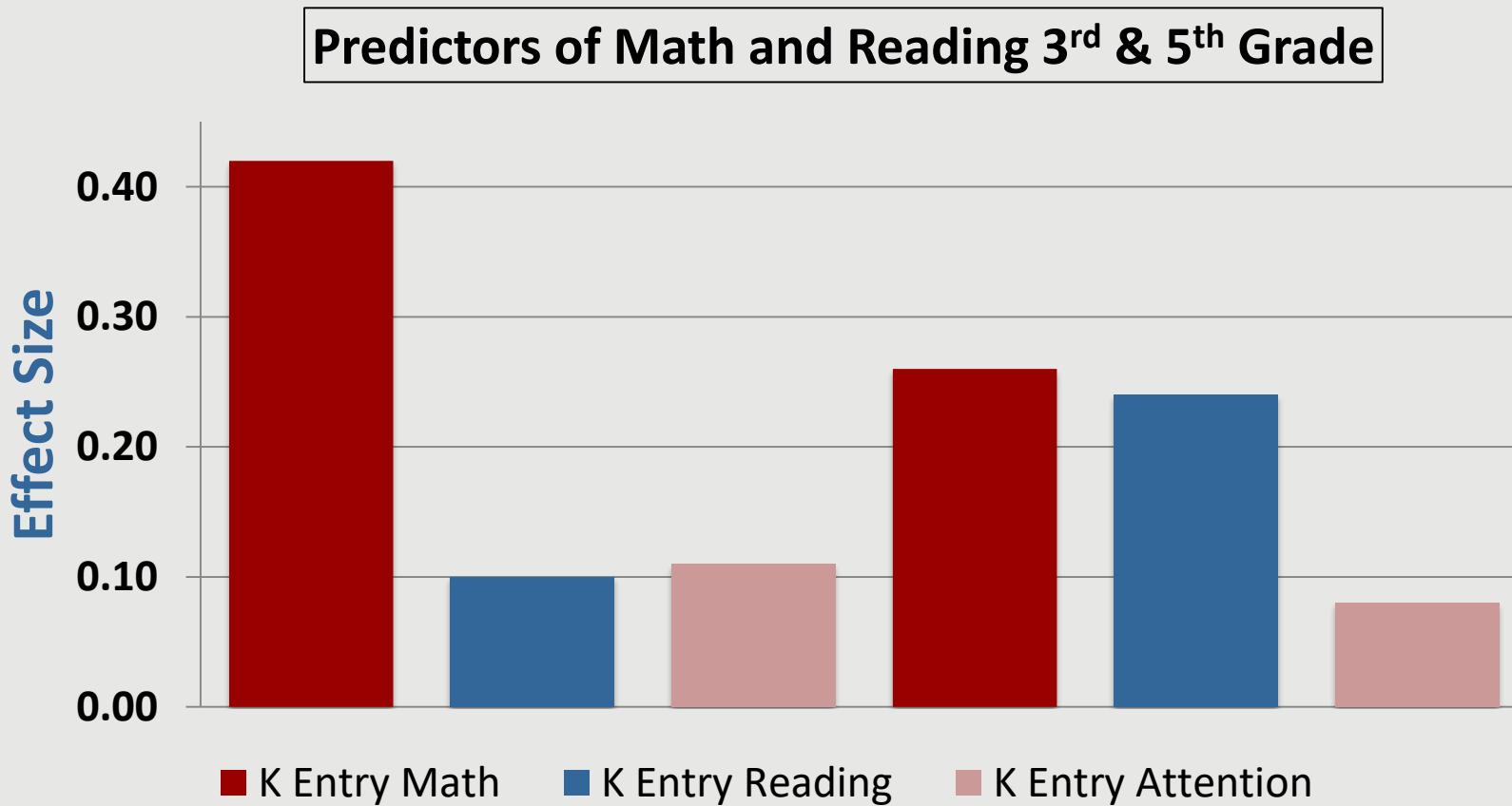
- Connecting formal and informal mathematics
- Multiple representations
 - Varied means to represent number

Carboneau, Marley, & Selig 2013, Carr and Alexeev 2011, Siegler and Lortie-Forgues 2014



Examining the Connections Between Mathematics and Reading

- In 2007, Duncan et al. examined 6 longitudinal data sets to look at the links between school readiness and later academic achievement (Grade 5).



Examining the Connections Between Mathematics and Reading

- In 2011, Purpua and colleagues investigated whether early literacy skills predicted early mathematics skills, and if so, which ones were predictive.
 - Found that early print knowledge and vocabulary scores uniquely predicted later math scores.
 - When accounting for the other skills, phonological awareness did not uniquely predict later math scores.

Examining the Connections Between Mathematics and Reading

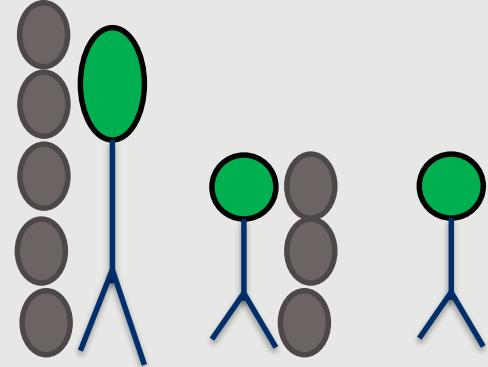
- There exist predictive relationships between early reading and mathematics and later achievement.
- Early math and reading scores are highly correlated.
- There is ample evidence of the importance of teaching both literacy and mathematics in the early years to build a strong foundation for subsequent schooling.
- Can a comprehensive approach be created given the differences between the two domains?

Differences between Mathematics and Reading

- **Organization of Content- Developmental Progressions**

- MATHEMATICS

- Perceptual
 - Side by side
 - Quantitative
 - No dependence on other domains



- READING

- Progressions building on each other
 - Oral language

- **Specific Instructional Strategies**

- Teaching Letters
 - Teaching Numbers

Similarities between Mathematics and Reading

| Reading/Writing | Mathematics |
|--|---|
| <p>Summarizing: Asking students to tell the main idea of the story in their own words. For example, tell in your own words: What were the main ideas? What is the problem? How did they fix the problem?</p> | <p>Students are given the problem: $8 + 9$. After solving the problem, the teacher asks students to come up with at least one other way to solve the problem.</p> |
| <p>Inferencing and drawing conclusions: Finding the main idea, important facts, and supporting details. Asking students to find evidence or clues in the text to support their idea (linking it to background knowledge, for example).</p> <p>Teacher: How do you know Shema was tired? Student: It says Shema yawned loudly. Teacher: Can you find anything else in the story to support your idea? Student: His eyes were red.</p> | <p>The teacher presents two figures to students to help them create a definition of a rectangle. Next, the teacher shows them 4 other figures and asks them to decide if the figure is a rectangle or not, using the definition to defend their answer.</p> |
| <p>Sequencing: Asking students to retell stories both orally and in writing identifying what happened in the beginning, middle, and end. Students can use flowcharts, and story maps to identify the parts of the story.</p> | <p>Students are solving the problem $34 + 16$. One student thinks the answer is 410. The teacher asks another student to convince this student that the answer is 50.</p> |

Case Studies



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Rwanda

Literacy, Language and Learning Project (L3)

Literacy, Language and Learning (L3)

Objectives

- Strengthen Ministry capacity in leading literacy reform
- Improve the quality of reading, mathematics and English teaching in P1 to P4
- Improve the amount of instructional materials for Kinyarwanda, mathematics and English
- Support the transition to English as the languages of instruction in P4
- Ensure that girls and students in isolated regions have increased access to quality education



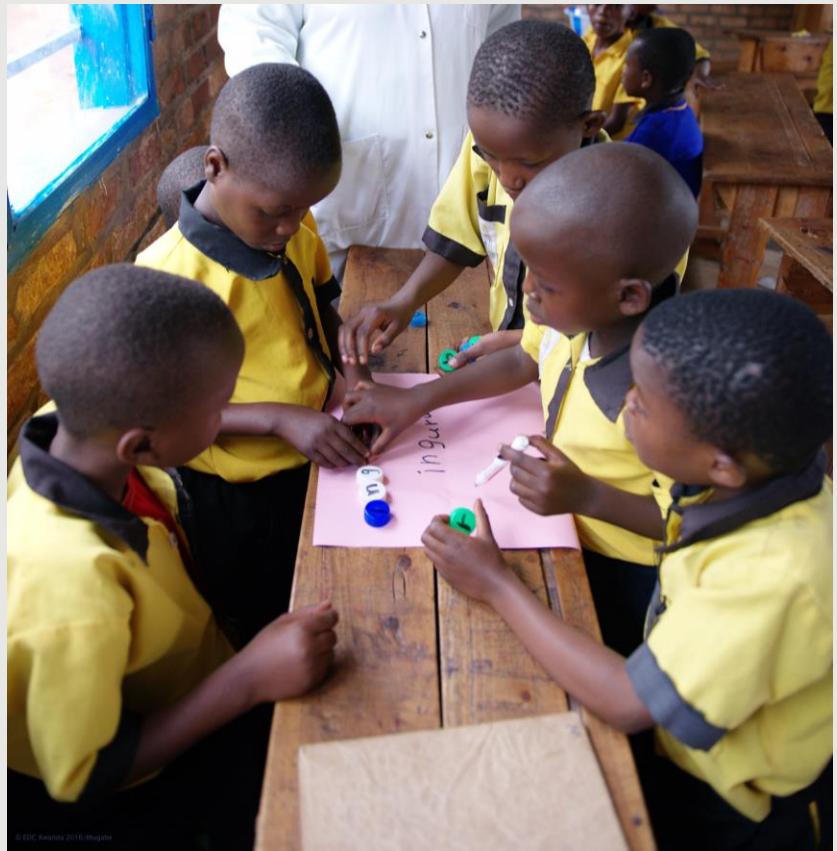
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Rwanda Education Board

EDC Learning transforms lives.

Literacy, Language and Learning (L3)

- Establishing a bridge between literacy and numeracy
- Building skill and complexity
- Headline stories
- Language unlocks thought
- Teacher training



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Kenya

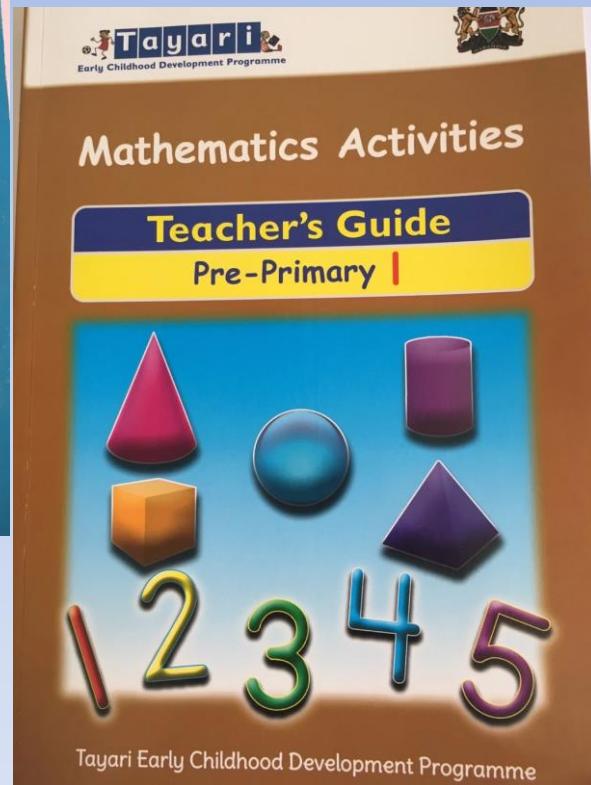
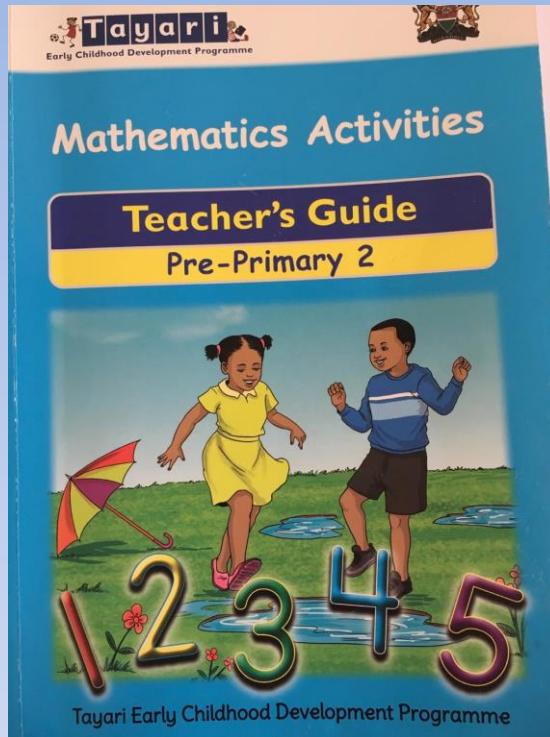
Tayari

Tayari: Objectives

1. Support the National Government to develop a ***tested, cost-effective, affordable and scalable*** early childhood model.
2. Support the County Governments to provide ***quality early childhood education*** across four selected counties, and scale-up beyond
3. To enable ***global uptake*** based on Kenya's experience.

Tayari: Materials

- Pre-primary 1 (4-5 year olds) and Pre-primary 2 (5-6 year olds)
- Teacher's guide with daily activities, student book



Tayari: Connections

- Two core strategies across reading and mathematics
 - Extending conversations
 - Use of materials
 - Management, distribution, and organization
- Emphasized during:
 - Teacher training
 - Coaching
 - Project staff classroom visits

Tayari

Connections

- Extending Conversations from Teacher Training Manual

Model: Draw and Write (2:10-2:30 20 Minutes)

Ask participants to refer to the lesson below; Demonstrate the write and model activity below; Ensure that you extend learners conversation and ideas during the modeling.
Inform participants that you are the teacher and their role is to act as 4-5 year old ECD children.
Tell participants that for this activity, we will focus on the instructional strategy of **extending conversations**

After the role play, ask participants to share with the plenary in regards to the following;

- How did the teacher engage the child in the conversation?
- The teacher kept on asking the learner questions, why do think she was doing that?

Guide participants in the discussion below;

Elaboration and expansion of children's ideas can happen in teacher responses as shown below;

| Strategy | Purpose | For example | |
|----------------|--|--------------------------------|--|
| | | The child says: | The teacher responds: |
| 1. Elaboration | Increasing the number of words and inserting new vocabulary. | My favorite color is red. | Your favorite color is red, like the one inside a watermelon (Or any red object within the child's environment). |
| 2. Expansion | Increase the number of words. | I would like to draw pictures. | You would like to draw pictures so that others would enjoy them. |

A Comprehensive Approach Forward

- Early reading and early mathematics should be funded to meet the needs of local contexts.
- An intervention with reading and mathematics components can be organized around similar resources, developmentally sequenced activities, and appropriate instructional models.
- Reading and mathematics are different enough that they should not be taught at the same time of the day, in the same school period.

A Comprehensive Approach Forward

- Interventions should focus on moving instruction in both subjects away from memorization, and towards the development of deep understanding in key areas, such as comprehension and number sense.
- Future projects should create opportunities to pilot early mathematics in reading programs.

A photograph showing several young children in a classroom setting, focused on reading colorful children's books. One book in the foreground is titled "Werovu wa Juma" and another is titled "Kisa cha Patapotea".

THANK YOU!

For more information:

globalreadingnetwork@urc-chs.com



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