Linking Literacy and Numeracy in Tayari

Dr. Benjamin Piper
CIES Conference March 26, 2018

Getting Children Ready for School
PRIMR literacy and numeracy (2011-2014)

- Primary Math and Reading (PRIMR) Program
  - PRIMR literacy
    - Bilingual (alongside of MT programs)
    - Gradual release model
    - Designed by Kenya staff
    - Portrait
  - PRIMR numeracy
    - “Forced” gradual release model
    - Designed initially by external support
    - Landscape
    - Seen as more difficult by teachers

USAID & DFID Scale-up

GPE Scale-up

Early Childhood Development Programme
Introduction to Tayari

Pilot program at medium scale (2000+ centers) from 2016-18

Implemented by local education officers in 4 counties

RCT research design

3 treatment groups

Tayari longitudinal study with 3 datapoints for Treatment 2

4 learning areas – language, numeracy, life skills & social
Tayari PP2 Teachers’ Guides

Week 2 Day 4

Introduction
Daily Routine
- Sing a number song.
- Let some learners tell what they did before coming to school in the morning (e.g. wake up, brush teeth, eat breakfast).
- Guide learners to tell the order of events from first to last.

Main Activity
Sorting and grouping
Whole class
- Tell the class that today you will look for and gather objects of different colours, and shapes from the environment.
- Sort the objects by colour and shape.
- Explain to the learners that you have grouped objects of the same colour and shape together.
- Ask:
  - Why have you grouped these objects together?
Small group
- Provide learners with objects of different colours and shapes.
- Have each small group of learners walk around and gather objects of different colours.
- Guide learners to group objects of the same colour together.
Learner’s activity
- Guide them to circle all the green rectangles in their workbooks.
- Guide learners to circle the activity that comes first.

Conclusion
- Have a few learners show how they sort objects by colour and shape.

Week 2 Day 4

Theme: Our Neighbourhood
Sub-theme: Work done by our neighbours/shops or kiosks in our neighbourhood
Learning outcomes:
1. By the end of the lesson, the learner should be able to:
   a. Respond to greetings and farewells with reference to relationship in and out of school.
   b. Differentiate closely related sounds in and out of school.
   c. Take pleasure in activities that involve listening for comprehension.
   d. Demonstrate ability to form letters correctly in and out of class.

Content:
- News telling, rhyme, song, letter recognition, sounds

Resources:
- Letter charts

Activities:
- News telling, rhyming, joining dots

PCs:
- Conservation, Citizenship

Core Competencies:
- Citizenship, learning to learn, self efficacy

Introduction
Daily Routine
Guide learners to sing a song or recite a poem related to the theme. Guide them to greet each other and respond appropriately to greetings. Discuss the day and date. Select the learner of the day. Attach a card with his or her name to his or her clothes and discuss some of the letters (2-3) in the name.

Newstelling
Use the vocabulary (driving, teaching) to tell your news. In pairs, guide learners to tell their news using the vocabulary. Encourage them to extend their news using probing questions.

Main activities
Phonological Awareness (oral activity)
- Ask learners to cover their eyes.
  - Make two sounds (drum with a pencil and walk), one after the other. Ask learners to identify each sound and the order they heard the sounds.
  - Vary the order of making the two sounds and repeat a few times.
  - Have learners identify the order they heard the sounds.
Letter Recognition
- Have learners sing the “abc” song (letter names/sounds).
  - Point at each letter as you say the letter name/sound with learners.

Rhyme
- Write the rhyme on the blackboard.
- Recite the rhyme with learners using related expressions, gestures and movement.
  - Walking, walking.
  - Hop, hop, hop.
  - Running, running.
  - Now let’s stop.

- Demonstrate reading the rhyme pointing at each word.
- Read the rhyme again with the learners as they dramatize the actions.
- Ask questions from the rhyme e.g. Do children walk or hop like rabbits?
- Have learners point at letters o, p in the rhyme.
  - In small groups, have learners recite the rhyme and dramatize the actions.

Learner’s Activity
- Join dots and read letters O o, P p and Q q.
- Thread letters o, p and q.

Conclusion
- Guide learners to show movement in the rhyme as they recite it.

Teacher Tip
- Ask parents to tell learners how to take care of the environment.
Tayari Language and Numeracy

• Similarities
  – Page layout
  – Started at the same time as other subjects (unlike PRIMR)
  – Same instructional time

• Differences
  – Gradual release model
  – Heavy emphasis on manipulatives
  – More repeated tasks
Tayari Data Collection
## Tayari Longitudinal Study by Cohort and Time

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Jan 2016 baseline</th>
<th>2016 academic year</th>
<th>Oct 2016 midterm</th>
<th>2017 academic year</th>
<th>Oct 2017 endline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>3,257</td>
<td>11.2% attrition</td>
<td><strong>2,891</strong></td>
<td>18.7% total attrition</td>
<td><strong>2,647</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>91.7% in same school as Jan</td>
<td></td>
<td>91.5% in same school as last year</td>
<td></td>
</tr>
<tr>
<td><strong>PP1 cohort</strong></td>
<td>1,126</td>
<td>82.4% still in PP1</td>
<td>1,010</td>
<td>81.8% in PP2</td>
<td>930</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93.4% in same school as Jan</td>
<td></td>
<td>92.8% in same school as last year</td>
<td></td>
</tr>
<tr>
<td><strong>PP2 cohort</strong></td>
<td>1,365</td>
<td>82.1% still in PP2</td>
<td>1,227</td>
<td>90.4% in Grade 1</td>
<td>1,128</td>
</tr>
<tr>
<td></td>
<td></td>
<td>88.4% in same school as Jan</td>
<td></td>
<td>92.1% in same school as last year</td>
<td></td>
</tr>
<tr>
<td><strong>Combined cohort</strong></td>
<td>766</td>
<td>91.5% still in Combined</td>
<td>654</td>
<td>8.7% in Combined</td>
<td>589</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95.5% in same school as Jan</td>
<td></td>
<td>88.6% in same school as last year</td>
<td></td>
</tr>
</tbody>
</table>
Tayari Impacts for PP1 (Effect size in SD)

- School Readiness Index (longitudinal): 0.38
- School Readiness Index (external): 0.27
- Literacy Index: 0.31
- Numeracy Index: 0.25
- Socio-emotional and executive function Index: 0.20
Significant Predictors of Endline School Readiness

- Doesn't speak MT 6.2
- Toilet etiquette 3.7
- Express likes and dislikes 3.0
- Overall performance 2.9
- Group activity 2.8
- Numeracy performance 2.7
- Follow instructions 2.5
- Dress oneself 2.3
- SES Factor 2.3
- SES 1.0
- Autistic multiple impairment 0.6
- Vision impairment -8.8
- Speech impairment -9.4
- Emotional disorders -19.7

Early Childhood Development Programme
Tayari Index Scores over Time

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Midline</th>
<th>Endline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy</td>
<td>10.1</td>
<td>25.3</td>
<td>41.6</td>
</tr>
<tr>
<td>Numeracy</td>
<td>16.8</td>
<td>35.8</td>
<td>53.4</td>
</tr>
<tr>
<td>School Readiness</td>
<td>13.4</td>
<td>26.2</td>
<td>42.3</td>
</tr>
</tbody>
</table>

Legend:
- Blue: Baseline
- Red: Midline
- Green: Endline

Tayari: Early Childhood Development Programme
Tayari Endline Results from Baseline Scores

Control

- Literacy: 0.05
- Numeracy: 0.27
- Literacy & Numeracy: 0.28

Treatment

- Literacy: 0.13
- Numeracy: 0.13
- Literacy & Numeracy: 0.19

Legend:
- Blue: Literacy
- Red: Numeracy
- Green: Literacy & Numeracy
Key Findings

1. Tayari language and numeracy are more carefully integrated than previous programs
2. Literacy and numeracy growth rates were relatively similar
3. For control, numeracy was more predictive of endline school readiness
4. For treatment, numeracy and literacy were similarly predictive of school readiness
5. For Tayari, numeracy and language work together
1. Design literacy and numeracy together
2. Undertake longitudinal growth modelling on literacy and numeracy data
   1. PRIMR
   2. Tayari
3. Ignore numeracy at your peril
Thank you
bpiper@rti.org