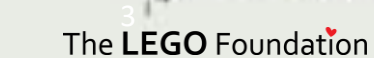
A background image showing several LEGO minifigures in a meeting room. One figure with blonde hair and a white shirt is in the center, holding a yellow cup. To the left, a figure with dark hair and a red shirt is seated. To the right, a figure with brown hair and glasses, wearing a blue suit, is standing. Other figures are partially visible in the foreground and background, all seated at white tables. The room has blue window frames in the background.

PLAY (Playful Learning Across the Years) Measurement Initiative

Overview of PLAY 1.0 tool development and guide to toolkit

Presentation Overview

1. Development of toolkit
2. Psychometric assessment
3. Guide to toolkit



To measure how **settings**
(caregivers in families,
teachers in classrooms)
support **learning through play**

across age groups
(0–2, 3–5, 6–12)

*and cultures/contexts
(especially LMICs)*



Intended uses

- National or regional monitoring of education and other service systems
- Impact evaluations of programs or interventions
- Assessing the implementation of a program or intervention



Self-Sustaining Engagement in Learning



- Underlying learning through play
- Relationship to each of the five characteristics of learning through play
- Six proposed dimensions or constructs

Learning through play characteristics

Joyful

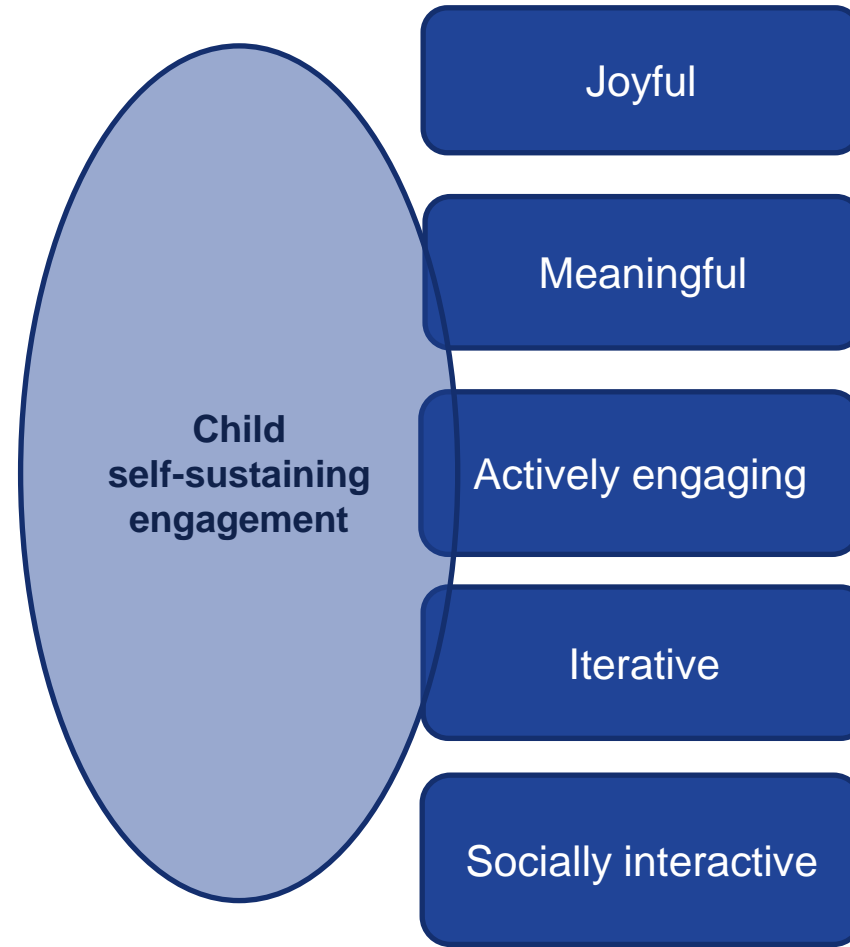
Meaningful

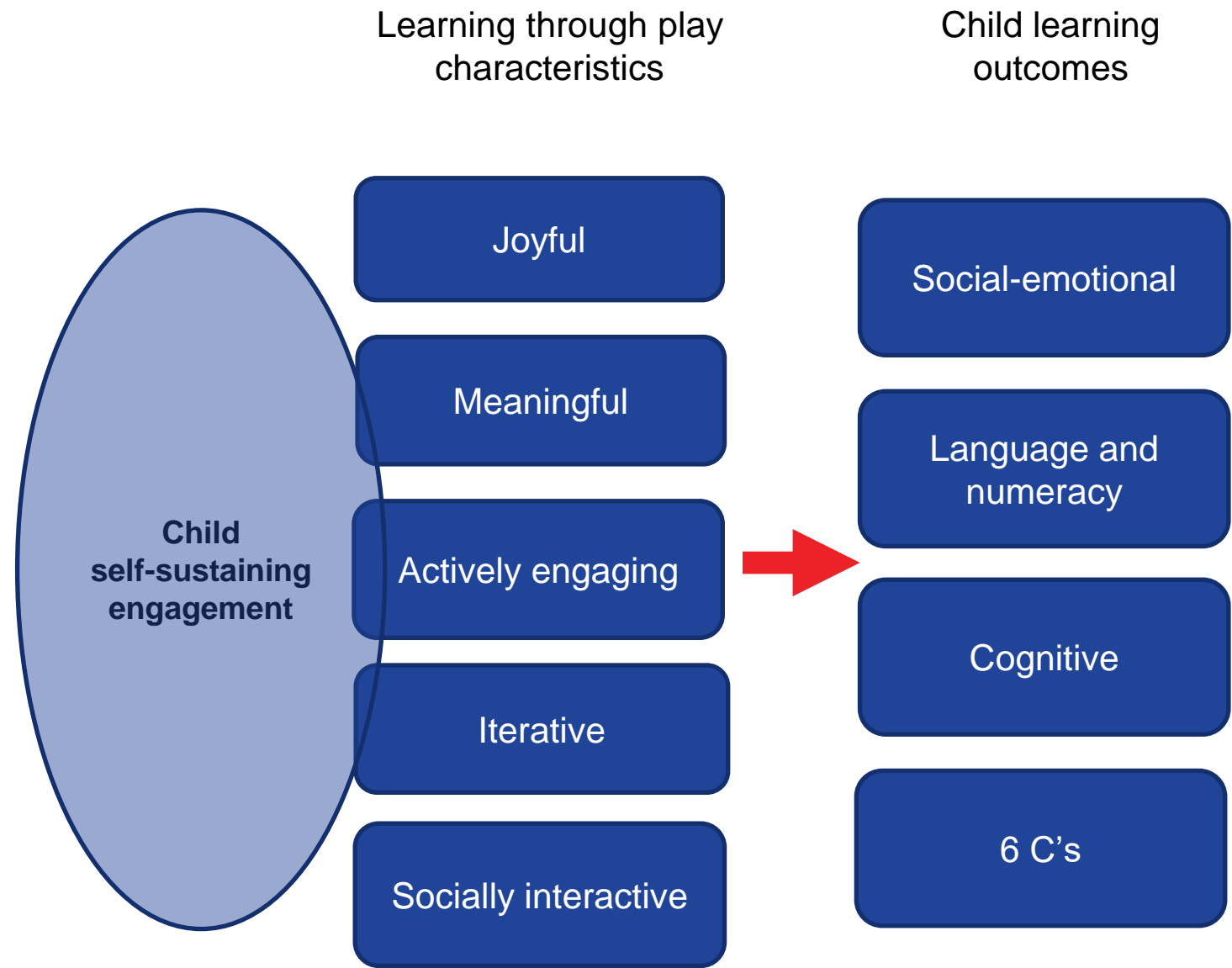
Actively engaging

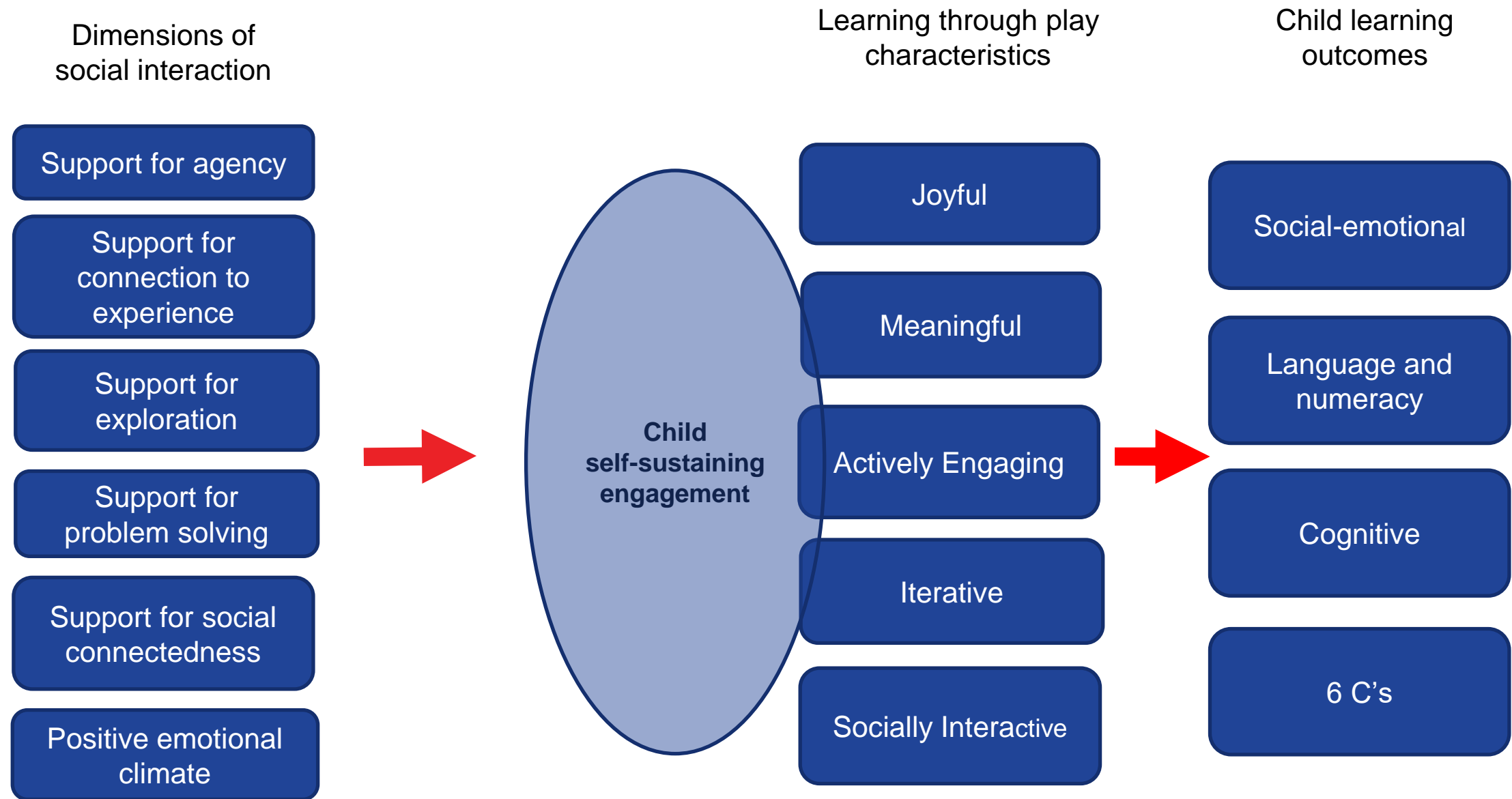
Iterative

Socially interactive

Learning through play
characteristics



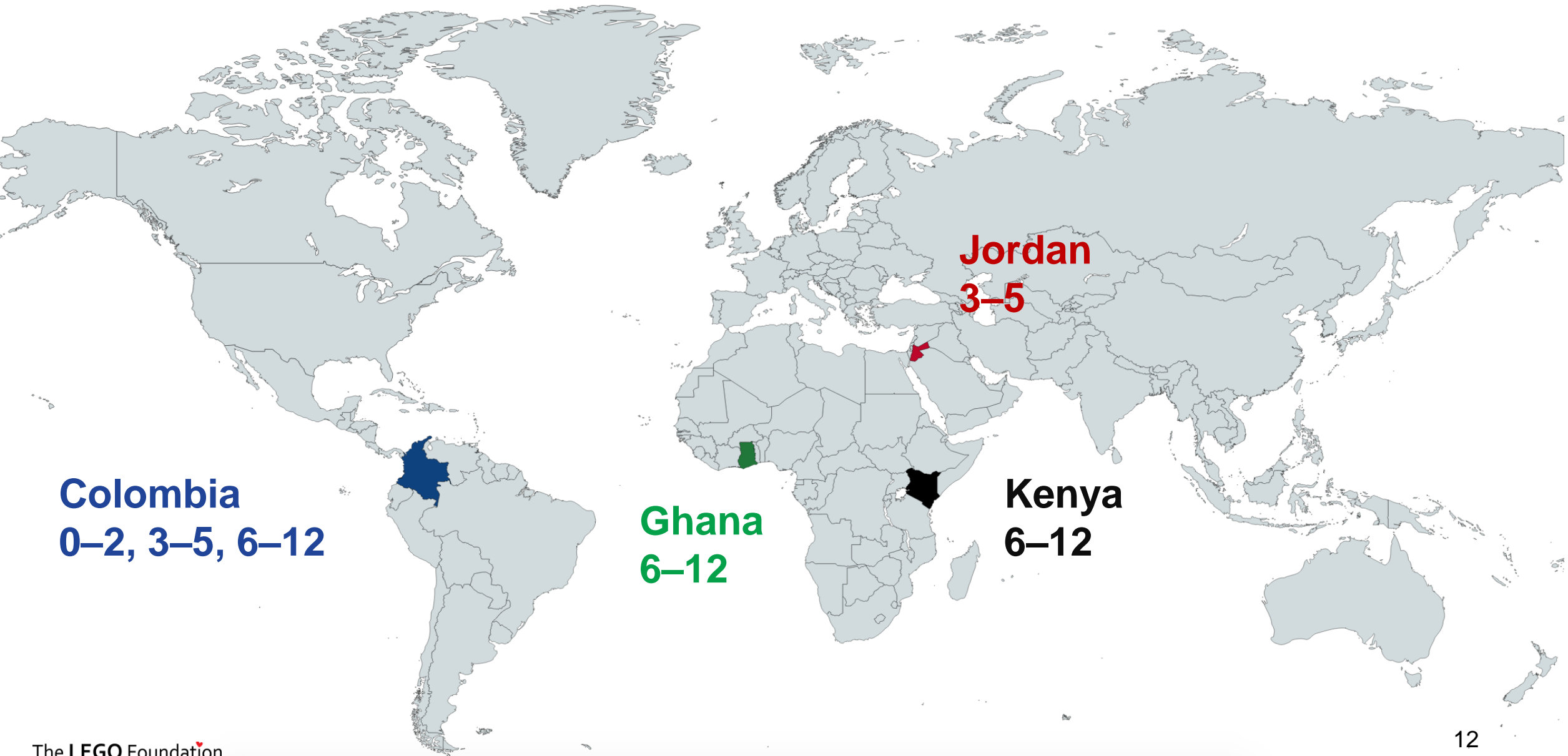






Tool Development

Locations of Contextualization



The 3 Phases of Tool Development

Phase	Purpose	Methods
BUILD	Local perceptions of playful learning	Semi-structured interviews with caregivers and teachers concerning their perceptions of playful learning
	Extend core playful learning constructs	Adaptation and extension of the core constructs identified in the overarching framework, based on local perceptions of playful learning
	Generate/adapt items for context	Semi-structured interviews with caregivers, teachers, and children to identify locally relevant behaviors and activities associated with core constructs
ADAPT	Respondent understanding	Cognitive interviews and small-sample pilot with respondents to ascertain their understanding of and response to assessment items
	Pilot and revise	Medium-scale pilot sample of all tools; data collection to inform replacement and revision of test items; repiloting
TEST	Psychometric assessment	Large-sample data collection as basis for item response theory and factor analyses

Example Build Phase Findings

Local perceptions of playful learning	Adults engage children in work-like play
Extend core playful learning constructs	<p>Social connectedness: encouraging prosocial behavior (e.g., sharing) and building a sense of togetherness</p> <p>Agency: teachers in Ghana/Kenya say that explicit instructions give children confidence to act independently</p>
Generate and adapt items for context	Subtle indicators of agency (e.g., “teacher does not restrict student movement”)



In collectivist cultures, children act toward communal goals, motivated by a sense of belonging and by personal relationships.

In such settings, children may be more motivated by the stated goals of the class and by the wishes of the teacher. This motivation does not necessarily imply a lack of autonomy. Children may be given a high degree of autonomy over their actions and choose to act in accordance with the wishes of the teacher and the group.

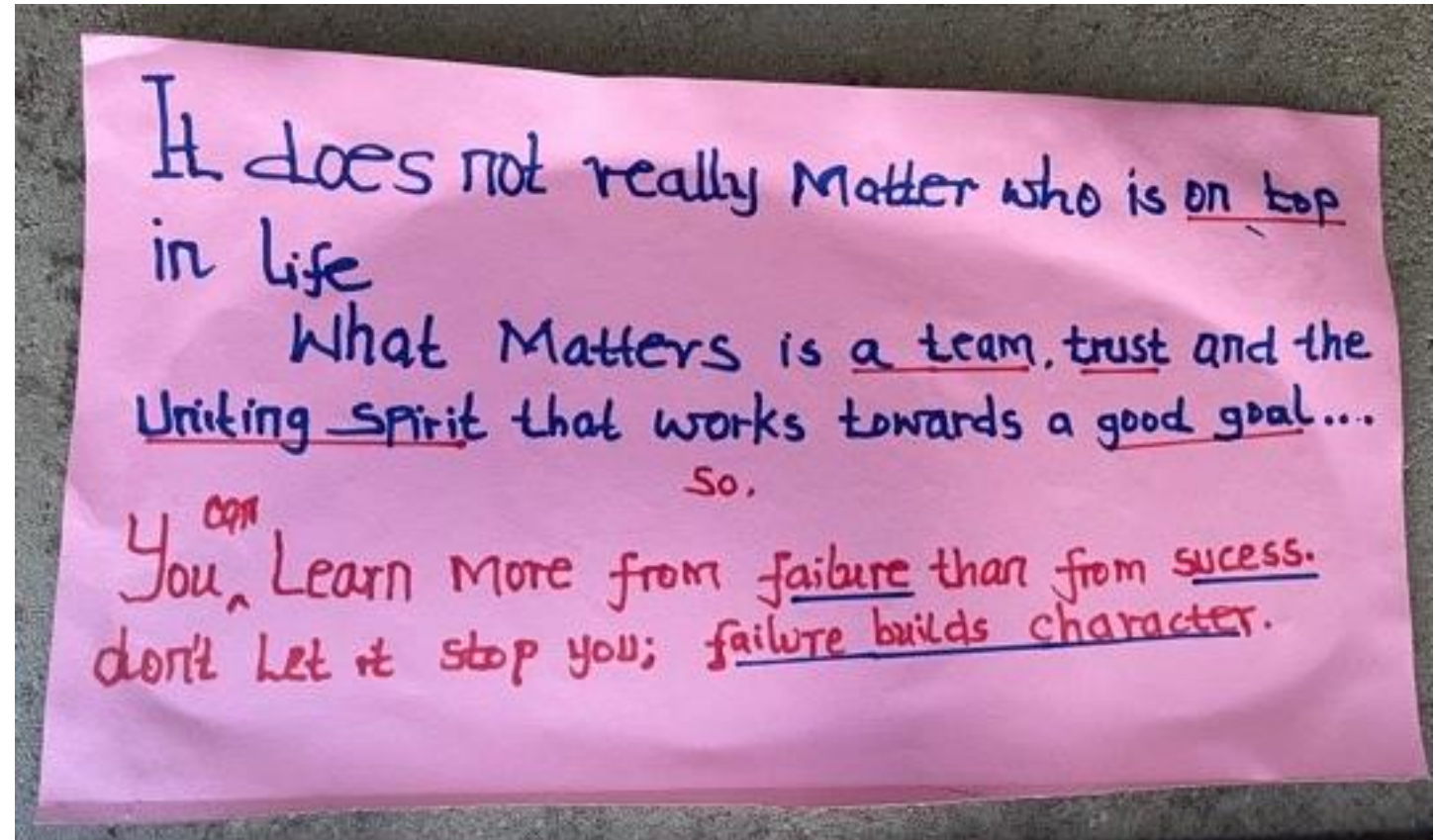


Photo: Kamutisya Primary School in Migwani, Mwingi Kenya taken on July 23, 2021



The Tools

Tool Overview



0-2 yrs
Home-based

Caregiver-child
observation

Caregiver
Survey



3-5 yrs
Home-based

Caregiver-child
observation

Caregiver
Survey

3-5 yrs
Classroom-based

Classroom
inventory

Teacher-child
observation

Teacher Survey



6-12 yrs
Classroom-based

Classroom
inventory

Teacher-child
observation

Teacher Survey

Child Survey

Classroom Observation Tool (for 6–12 years age group)

Support for Connection to Experience Items	Metric (Effectiveness, Frequency, Participation)
<p>CE1: Teacher connects concepts in the lesson to everyday objects or spaces that are physically present.</p> <ul style="list-style-type: none">•Colored objects are brought in for a lesson on adjectives.•A physical object is brought in to represent a word or concept.•Finding an object in the classroom that shares the feature of the language being learned (e.g., finding the letter on the wall, finding an object that begins with the same sound).	<p>Frequency</p> <p>High = Observed 2 or more times.</p> <p>Low = Observed once.</p>

- The observers notes the **presence** of the interaction or behavior and then rates it as **high or low** using a metric of effectiveness, frequency, or participation.
- Items corresponds to the constructs in the conceptual framework.

Primary Teacher Interview

Sort: The teacher **independently sorts cards that** describe instructional activities (*e.g., I use objects or actions to make connections for learners to their prior knowledge*) under headers of frequency of use.

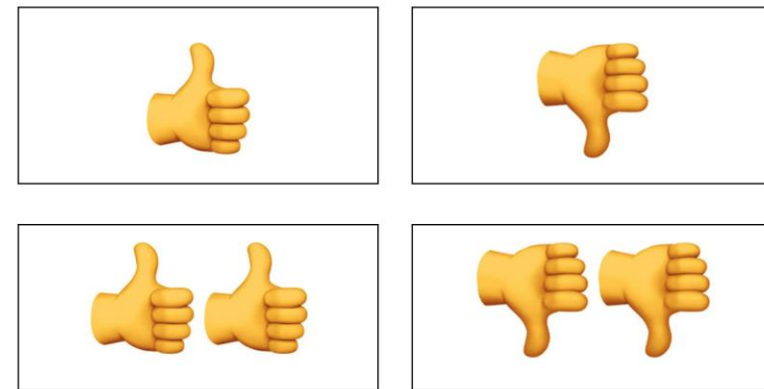
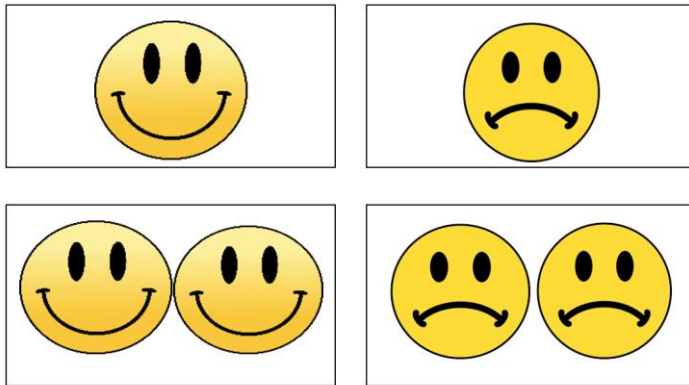
I never do it	I do it once or twice a year	I do it several times a month	I do it several times a week	I do it every day
---------------	------------------------------	-------------------------------	------------------------------	-------------------

Scenarios: The teacher reads a scenario. For example: *Imagine a teacher who shows learners some pictures of places they will recognize and which are related to the current lesson. Then, the teacher asks the learners comprehension questions about what they see in the pictures. The teacher likes to connect lessons to things learners already know.*

- Then the teacher **reports on:**
- frequency of use
 - confidence of doing something similar
 - effectiveness for student learning

Child Interview (for 6–12 years age group)

- **Degree of agreement:** A sentence is **read to** the student that describes an activity or other interaction in their classroom (e.g., *Your teacher uses objects to teach new lessons*). Then the student states their degree of agreement/disagreement by pointing at **faces** or **thumbs** (icon is context dependent).



- Items correspond to the constructs in the conceptual framework.

Caregiver-Child Observation (for 0–2 & 3–5 years age groups)

Item	0 = not observed	1 = low quality	2 = moderate quality	3 = high quality	Example
Caregiver follows the child's lead/initiative or expression of interest.	No related evidence was observed.	The caregiver follows the child's initiative once.	The caregiver follows the child's initiative twice.	The caregiver follows the child's initiative three or more times.	When Diego shows interest in switching from playing with instruments to playing with blocks, caregiver engages with him in the next activity that he has shown interest in.

- In a structured 15-minute observation using predetermined toys/materials, observers rate the interaction or behavior as **not observed, low quality, moderate quality, or high quality** using the scoring rubric that has metrics of effectiveness, frequency, and time.
- Items correspond to the constructs in the conceptual framework.

Caregiver Interview (for 0–2 & 3–5 years age groups)

- **Caregiving practices:** A statement is **read to** the caregiver that describes an activity or interaction with their child (e.g., *I am able to discern my child's emotional needs, such as wanting to be comforted when they are sad*). The caregiver indicates the frequency at which this statement applies to their caregiving practices.

0 = never	1 = sometimes	2 = often	3 = always
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- Items correspond to the constructs in the conceptual framework.

ECE Classroom Observation Tool (for 3–5 years age group)

Item	0 = not observed	1 = low to moderate quality	2 = high quality	Example
Teacher provides choices on what activities to engage in	0 instances	1–2 instances to choose what to engage with/ participate in	3+ instances to choose what to engage with/ participate in	Teacher sets up classroom with a variety of materials and resources that are accessible to the children, allowing them to engage with different types of items and activities. For example, the teacher says, "You can choose to draw or read a book this morning."

- The observers rate the interaction or behavior as **not observed, low to moderate quality, or high quality** using the scoring rubric that has metrics of effectiveness and frequency.
- Items correspond to the constructs in the conceptual framework.

ECE Teacher Interview (for 3–5 years age group)

Traditional: The teacher **responds to items** asking about their teaching practices (e.g., *I give students an environment in which they have access and opportunity to choose what to engage with*) under headers of frequency of use.

0 = never	1 = once per term/season	2 = occasionally (once per month)	3 = sometimes (several times per month)	4 = often (multiple times per week)	5 = all the time (everyday)
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Scenarios: The teacher reads a scenario. For example: *After coming back from playing outside, children brought leaves into the classroom they had collected. The teacher notices that they gathered many different kinds of leaves and decides to invite children to touch the leaves, put them side by side, to compare and contrast the properties of leaves (some are small, brown, yellow with holes). The teacher helps children notice different properties of leaves through exploration.*

Then the teacher **reports on:**

- frequency of use
- belief in connection to learning
- self-efficacy



Psychometric Assessment

For each country

- What is the best model (i.e., set of constructs) to match the data?
 - Exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and conceptual fit

Across countries

- Is there a single model (i.e., set of constructs) that fits the data across all countries?
 - CFA applied across all datasets

Constructs Supported in Factor Analyses across Measures

Observation Measures					
Constructs	Classroom 6–12		Classroom 3–5	Caregiver 0–2	Caregiver 3–5
Connection to experience			x	N/A	
Problem solving				N/A	x
Exploration	x		x		
Agency	x			x	x
Positive emotional climate					
Social connectedness	x		x		x
Interview Measures					
Constructs	Teachers Classroom 6–12	Children Classroom 6–12	Teachers Classroom 3–5	Caregiver 0–2	Caregiver 3–5
Connection to experience	x		x	x	x
Problem solving			x		
Exploration	x		x		
Agency	x	x	x		
Positive emotional climate		x	x	x	x
Social connectedness	x		x	x	x

Constructs Supported in Factor Analyses across Measures

Observation Measures					
Constructs	Classroom 6–12		Classroom 3–5	Caregiver 0–2	Caregiver 3–5
Problem solving				N/A	x
Exploration	x		x	x	
Agency	x		x	x	x
Positive emotional climate	x		x		
Connection to experience	x		x	N/A	
Social connectedness				x	x
Interview Measures					
Constructs	Teachers Classroom 6–12	Children Classroom 6–12	Teachers Classroom 3–5	Caregiver 0–2	Caregiver 3–5
Problem solving			x		
Exploration	x		x		
Agency	x	x	x		
Positive emotional climate		x	x	x	x
Connection to experience	x		x	x	x
Social connectedness	x		x	x	x



Primary Tools Analysis Findings

Primary Tool Development

Agency

- Children decide **how** a task is done
- Children influence decisions in the classroom
- Teacher refrains from curtailing an activity

Focus / cultural relevance

- Social connectedness

Reliability (IRR)

- Kenya – 0.97
- Ghana – 0.81
- Colombia – 0.57

6–12 Classroom Observation

Three-Factor Model (across 3 Countries)



Example of items per construct	0 = no evidence	1 = low to moderate quality	2 = high quality
Support for connection to experience & exploration (5 items, $\alpha = 0.66$) P3: Students respond to opportunities (from the teacher) to express their own ideas E4: Teacher gives explicit statements to encourage students to continue to explore the concept CE2: Teacher connects concepts in the lesson to the students' interests, background or life outside the classroom			
Support for agency / independence (10 items, $\alpha = 0.72$) A2: Students decide <i>what</i> or <i>how</i> to do an academic task PS4: Students try different solutions (iteration) A4: Students ideas influence teacher's instruction			
Support for social connectedness (4 items, $\alpha = 0.45$) SC4: Students demonstrate togetherness or camaraderie SC5: Teacher discusses or otherwise creates a sense of student/class togetherness			

6–12 Classroom Observation

Correlation between observation and teacher/child interviews in Colombia

	Classroom Observation			Student Interview	
	Support for exploration	Support for agency	Support for togetherness and cooperation	Support for positive climate	Support for agency
Teacher Interview					
Support for togetherness and cooperation		0.43***	0.26**	-0.098+	-0.089+
Support for questioning children and prompting discussion	-0.23+			-0.15**	-0.13*
Support for connection to experience and ideas		0.5***	0.56***		
Support for child agency		0.48***	0.26*		

Early Childhood Tools Analysis Findings



Early Childhood Tool Development

Areas of Focus

Agency

- Teacher provides opportunities for choice (roles/responsibilities, how to use materials or engage in activity)
- Teacher allows children to influence decisions in the classroom
- Teacher refrains from curtailing an activity

Social connectedness

Peer play

Cultural relevance

- Chores / work
 - 5 items in caregiver-child engagement scale
- Traditional games
 - Caregiver: engages the child in an activity that they may do at home together (singing a song, dancing, acting like a favorite cartoon character)
 - Classroom: promotes familiarity with culturally specific practices/objects/geographies/symbols





Early Childhood Observation Tools



- Classroom 3–5 (***Ghana, Jordan, & Colombia***)
- Caregiver 0–2, 3–5 (***Colombia***)

Reliability	Jordan >.65	Ghana >.70	Colombia >.70
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Early Childhood Survey Tools

- **Colombia** Caregiver Survey (0–2, 3–5)
 - Support for connection to experience (5 items, $\alpha = 0.79$)
 - Support for social connectedness (5 items, $\alpha = 0.71$)
 - Positive emotional climate
 - (5 items, $\alpha = 0.67$)
- **Colombia & Jordan** Teacher Survey (3–5)
 - 3-factor structure in Colombia
 - 4-factor in Jordan

3–5 Classroom Observation

Three-Factor Model (*across 3 Countries*)

Example of items per construct	0 = no evidence	1 = low to moderate quality	2 = high quality
Support for exploration & problem solving (6 items, $\alpha = 0.84$) OAG4: Teacher provides opportunities for children to generate and share ideas and opinions OEX6: Teacher expresses or shows curiosity to lead children to inquiry and information gathering			
Support for social connectedness / personal connections (5 items, $\alpha = 0.87$) OSC3: Teacher promotes children's interest in one another's lives OSC9: Teacher expresses understanding and acceptance of the different personal experiences, stories, and cultures of the students in the class			
Social & emotional support (3 items, $\alpha = 0.80$) OPEC8: Teacher encourages behaviors of friendship and/or social acceptance between children via sharing, cordiality, and affection OSC5: Teacher encourages peer active listening			

3–5 Classroom Observation

Correlations with Teacher Interview Factors (*Jordan*)

Teacher interview factor 4 (social connectedness) exhibited:

- Trend-level associations with observation factor 1 (exploration and problem solving)
- Small correlations with factors 2 and 3, personal connections and social and emotional support, of the observation tool

		Teacher Survey			
		Support for Agency	Connection to Experience and Problem Solving	Positive Emotional Climate	Social Connectedness
		r			
Observational Measure	Exploration and Problem-solving (observation)	0.08 95	-0.03 95	-0.02 95	0.17† 95
	Personal connections (observation)	0.11 95	0.05 95	0.001 95	0.23* 95
	Social and emotional support (observation)	0.15 95	0.02 95	0.04 95	0.24* 95

† p<0.10, * p<0.05, ** p<0.01, ***p<0.001

3–5 Classroom Observation

Additional Findings: Spearman Correlations with Teacher Interview Factors

Teacher interview factor 4 (social connectedness) exhibited:

- Trend-level associations with all
- 3 observational factors and social connectedness.
- Personal connections with support for agency & positive emotional climate
- Social & emotional support with support for agency & positive emotional climate

		Teacher Survey			
		Support for Agency	Connection to Experience and Problem Solving	Positive Emotional Climate	Social Connectedness
		r			
Observational Measure	Exploration and Problem-solving (observation)				0.01 [†]
		95	95	95	95
	Personal connections (observation)	0.03 [†]		0.02 [†]	0.001 [†]
		95	95	95	95
Observational Measure	Social and emotional support (observation)	0.05 [†]		0.05 [†]	0.004 [†]
		95	95	95	95

3–5 Classroom Observation

Additional Findings: Correlations with Structural and Process Quality

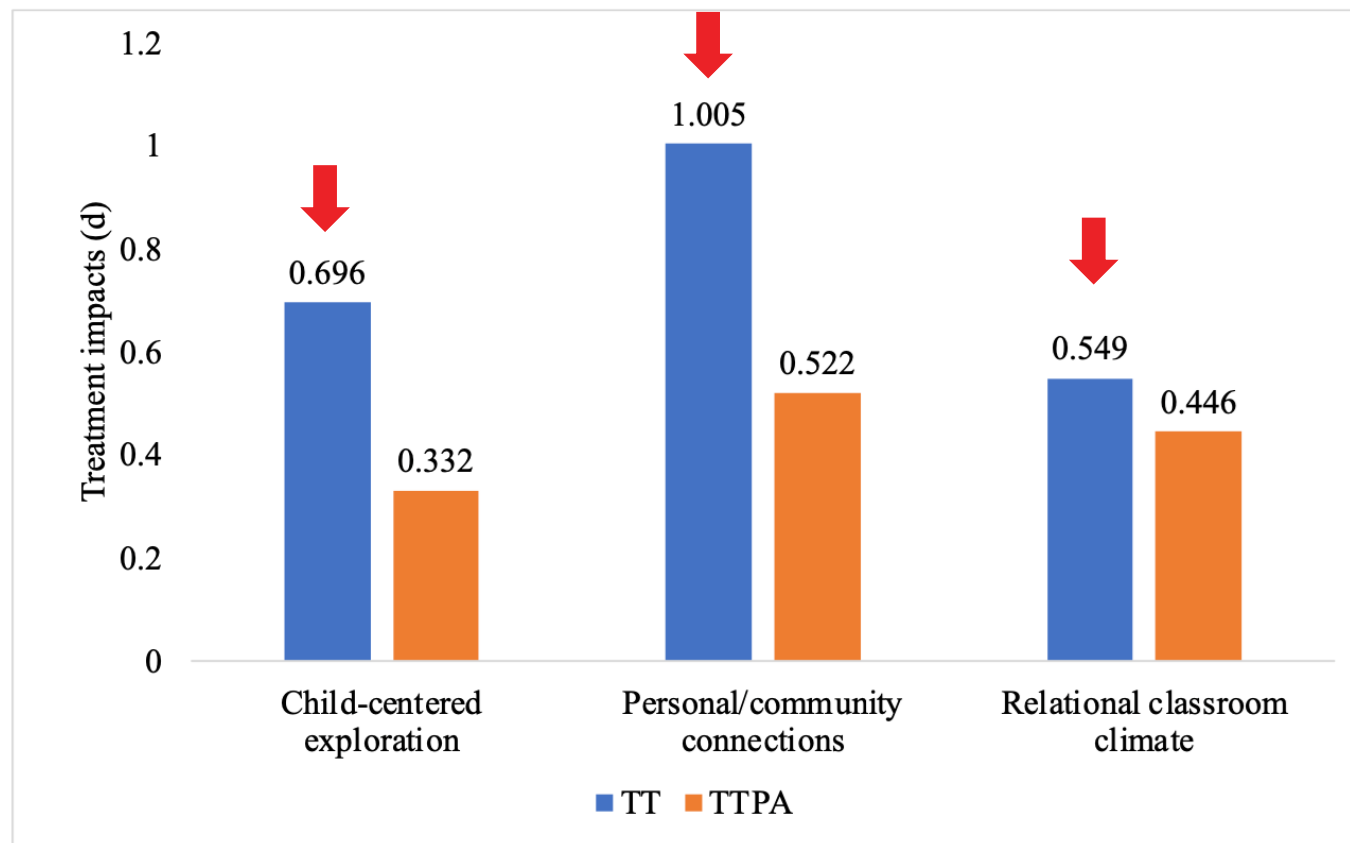
	Jordan			Ghana		
	Personal Connections	Exploration & Problem Solving	Social & Emotional Support	Personal Connections	Exploration & Problem-Solving	Social & Emotional Support
	r					
Structural Quality	0.41*** 95	0.31** 95	0.43** 95	0.05* 416	0.06* 416	0.05* 416
Process Quality	0.55*** 95	0.53*** 95	0.55*** 95	0.24* 419	0.25* 419	0.18* 419
Teacher Level of Education	0.19† 95	0.170† 95	0.13 95	0.09* 331	0.06* 331	0.12* 331
Years of Experience in ECE Teaching Role	0.02 95	-0.024 95	0.04 95	-0.04* 409	-0.06* 409	-0.07* 409
Training in ECE Jordan = has Ghana = has not	0.22* 95	0.19† 95	0.26** 95	-0.07* 410	-0.07* 410	-0.06* 410

† p<0.10, * p<0.05, ** p<0.01, ***p<0.001

3–5 Classroom Observation

Sensitivity to Play-Based Program RCT Impacts (*Ghana*)

- Quality Preschool for Ghana (QP4G) study: 423 video-recorded classrooms from 2015
- Very large effect sizes of treatments on PLAY factors, providing critical information beyond general quality measures of classrooms (larger positive impacts than for original TIPPS general quality factors)



3–5 Classroom Observation

Correlations with Child Outcomes – IDELA (*Ghana*)

Additionally, longitudinal models (controlling for baseline/fall child outcome score):

- Personal connections predict literacy ($d = 0.124$, $p < .05$) and social-emotional skills ($d = 0.148$, $p < .05$)
- Social & emotional support negatively predicts: executive function ($d = -0.215$, $p < .05$)

Note: original TIPPS emotional climate also showed some negative correlations in this dataset with child outcomes

Cross-sectional correlations with standardized child outcomes

	Exploration & Problem Solving	Personal Connections	Social & Emotional Support
School readiness composite	0.07*	0.07*	0.004
Literacy	0.08*	0.08*	0.01*
Numeracy	0.07*	0.07*	0.01
Social-emotional	0.05*	0.07*	0.02*
Executive function	0.05*	0.04*	-0.02*
Motor skills	0.03*	0.01	-0.01
Approaches to learning	0.03*	0.04*	0.06*

$N = 3,035$ children.

0–2 Caregiver-Child Observation

One-Factor Model (*Colombia*)

Support for agency and exploration, $\alpha = 0.83$
(support for child-centered exploration of materials)

Sample Items

OAG2	Caregiver permits child to choose how to engage with material(s)
OAG3	Caregiver follows child's lead/initiative or expression of interest
OAG4	Caregiver provides positive facial/gesture/tone feedback that shows approval for child initiative
OAG5	Caregiver observes child before intervening
OEX2	Caregiver supports a child's motor initiative (e.g., turning an object over)
OEX3	Caregiver allows child to mouth objects, conduct simple manipulations such as rotating objects

0–2 Caregiver-Child Observation

Constructs Included in Proposed Model for Play 2.0

Example of items per construct	0 = no evidence	1 = low quality	2 = moderate quality	3 = high quality
Support for agency (6 items) OAG2: Caregiver permits child to choose how to engage with material(s)				
Support for exploration (4 items) OEX5: Caregiver asks open-ended questions about physical objects				
Support for positive emotional climate (3 items) OPEC2: Caregiver is physically close with the child, through physical proximity and/or engaging in gentle touching and holding				

0–2 Caregiver-Child Observation

Additional Findings: Correlations with Caregiver Interview Scales (**Colombia**)

- Small positive correlations between the three factors from the caregiver interview and the one factor from the caregiver-child observation

Pairwise correlations with PLAY caregiver-child observation	
	Support for child-centered exploration of materials (observation)
	r
Support for Connection to Experience (survey)	0.28* 166
Support for Social Connectedness (survey)	0.18* 166
Positive Emotional Climate (survey)	0.26* 166

Note: * $p < .05$

3–5 Caregiver Observation

Three-Factor Model (*Colombia*)

Example of items per construct	0 = no evidence	1 = low quality	2 = moderate quality	3 = high quality
Support for agency (5 items, $\alpha = 0.72$) OAG1: Caregiver permits child to choose which material(s) to engage with				
Support for problem solving (5 items, $\alpha = 0.79$) OPS3: Caregiver allows child to figure out how to do something by themselves when stuck by a challenge				
Support for connection to experience & social connectedness (5 items, $\alpha = 0.60$) OSC5: There are multiple displays of physical affection between caregiver and child OCE3: The caregiver engages the child in an activity that they may do at home together (singing a song, dancing, acting like a favorite cartoon character)				

3–5 Caregiver-Child Observation

Correlations with Caregiver Interview Scales (*Colombia*)

	Support for Agency (observation)	Support for Problem-Solving (observation)	Support for Physical and Social Connectedness (observation)
	r		
Support for Connection to Experience (survey)	0.09 114	-0.05 114	-0.02 114
Support for Social Connectedness (survey)	0.12 114	0.03 114	-0.01 114
Positive Emotional Climate (survey)	0.12 114	0.03 114	0.02 114

Note: * $p < .05$

3–5 Caregiver Interview

Correlations with Caregiver Characteristics (*Colombia*)

Frequency
of engagement
in following
activities (past week):

- Book-reading
- Singing
- Playing games
- Playing with a toy

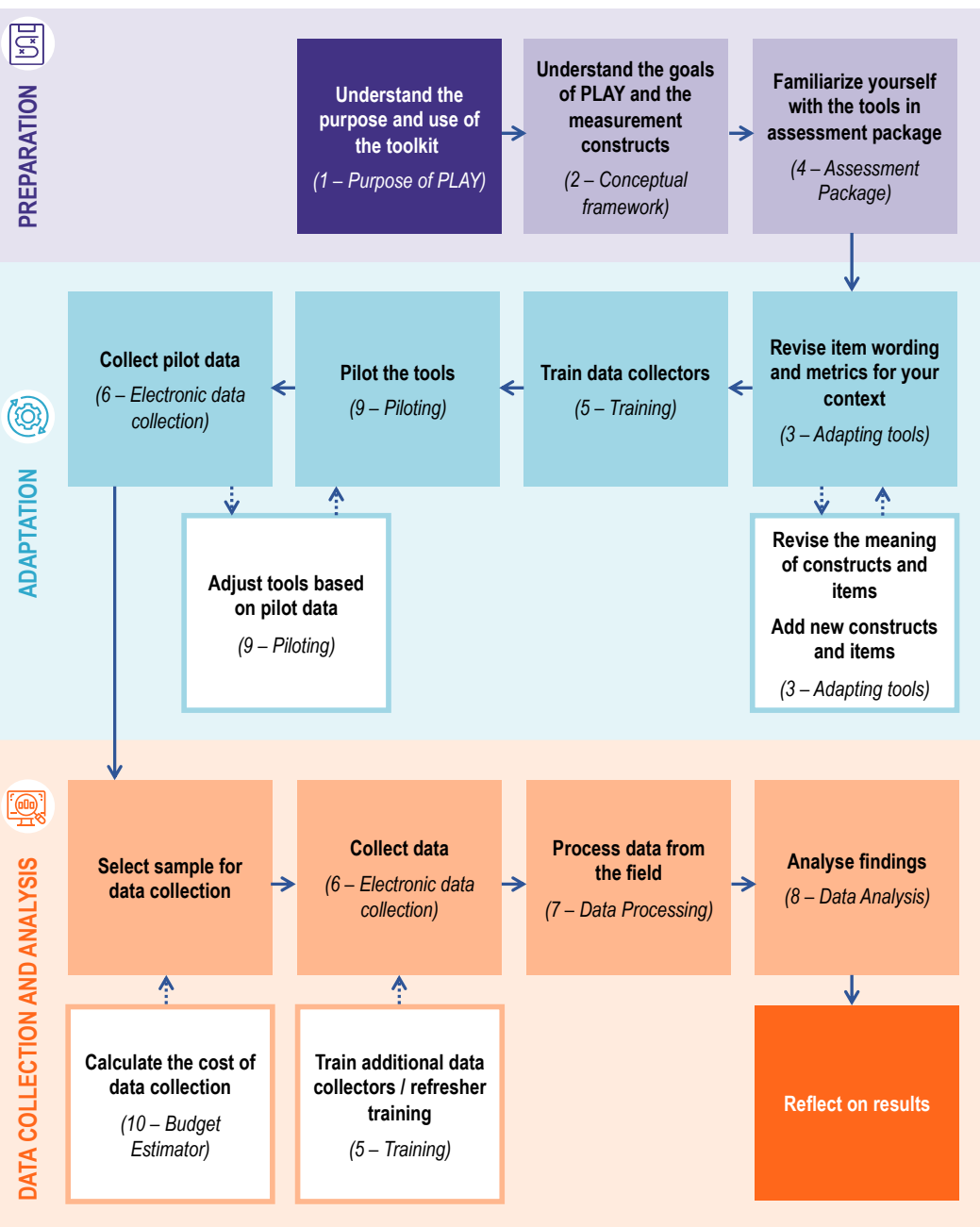
Pairwise correlations caregiver interview measure with caregiver characteristics

	Support for Connection to Experience	Support for Social Connectedness	Positive Emotional Climate
	<i>r</i>		
Frequency of Activities	0.25* 131	0.26* 131	0.33* 131
Household Resources	0.16 [†] 131	0.18* 131	0.20* 131
Caregiver Level of Education	0.08 48	0.02 48	-0.16 48
Caregiver Employed	0.002 47	-0.07 47	-0.2 47
Rurality	-0.13 131	-0.09 131	-0.05 131

Note: * $p < .05$. [†] $p < .1$.



Guide to the Toolkit



Step-by-Step Overview

The PLAY toolkit is a comprehensive resource that accompanies the PLAY tools. The toolkit can be used in more than one way to support the testing and implementation of the PLAY tools by various organizations

Adapting the Toolkit to Context (Section 3)

Legend:
Essential steps
Optional steps

Preparation

1. a) Characterize the context informally
b) Characterize the context formally
2. Expert review of items
3. **Qualitative research**

Adaptation

4. Revise item wording
5. Revise quality metrics
6. **Revise item meaning / add items**
7. **Review constructs**

Trainers' Guide (Section 5)

- Guide for individuals who are training data collectors to administer the PLAY Measurement tools
- Flexible to specific needs and circumstances of organization
- Provides detailed instructions on how to carry out each step of the overall training process

Eight overarching steps for training data collectors: Training preparation

1. Recruit and organize data collectors	<ul style="list-style-type: none">• Determine number and qualifications of data collectors needed• Decide how to organize assignment of data collectors during fieldwork, which will impact training structure
2. Arrange training schedule, materials, and space	<ul style="list-style-type: none">• Build a detailed, day-by-day training agenda based on which tools you are administering in your study and other logistical considerations• Acquire local videos for the setting needed (e.g., classroom, center, or caregiver-child dyad)• Arrange for training space and accompanying resources, such as tables and chairs, a projector, wifi

Eight overarching steps for training data collectors: Training content (sessions and activities)

3. Introduce the study, staff, and data collectors	<ul style="list-style-type: none">• Orient data collectors to the overall project purpose and how this specific data collection effort fits into it• Build rapport among the group
4. Introduce the PLAY constructs	<ul style="list-style-type: none">• Data collectors learn the conceptual underpinnings of the tools• Data collectors understand what each construct is and how it may present in the settings you are interested in
5. Introduce the observation tool(s) you are using	<ul style="list-style-type: none">• Data collectors become familiar with the structure and sections of each tool
6. Review and practice methods for each tool	<ul style="list-style-type: none">• Data collectors learn methods and best practices for conducting observations and surveys in general• Data collectors gain experience with these procedures and skills through practice
7. Evaluate data collectors' reliability on all observation tools	<ul style="list-style-type: none">• Determine whether data collectors have achieved appropriate level of understanding to proceed with data collection
8. Prepare for data collection and conduct practical visit	<ul style="list-style-type: none">• Data collectors are aware of fieldwork procedures and logistics• Execute "practical visit" to allow data collectors to gain experience conducting observations or interviews in the field before beginning official data collection on project sample

Guide to Piloting (Section 9)

- Guide for individuals who are using PLAY Measurement tools for the first time
- Amount of piloting required will depend on context and tool modifications
- Includes details on qualitative and quantitative pilot procedures

Six overarching steps for piloting	
1. Conduct pre-pilot activities <ol style="list-style-type: none">a. Train data collectorsb. Conduct cognitive interviewsc. Conduct field testing	<ul style="list-style-type: none">• Qualitative data collection activities designed to provide answers to questions about item wording, administration, reliability, and validity• Used to conduct first round of revisions to items, as needed• Hire and prepare data collectors for pre-pilot and pilot activities• Introduce data collectors to all tools and procedures for data collection• Use qualitative interviews to gain better understanding of how participants interpret items in the interviews• Conduct very small-scale administrations of all instruments (focus on observations) in order to ensure that procedures are clear and feasible
2. Calculate inter-rater reliability (prior to pilot)	<ul style="list-style-type: none">• Ensure that data collectors can reliably collect data across instruments (with a particular focus on the observation instruments)

Six overarching steps for piloting (continued)

3. Review and revise items (as needed)	<ul style="list-style-type: none">• Revise and re-render items as needed, prior to the start of the small-scale pilot activity
4. Conduct small-scale pilot <ol style="list-style-type: none">a. Determine sample size for the pilotb. Debrief with data collectorsc. Collect small-scale pilot datad. Conduct data quality checks	<ul style="list-style-type: none">• Develop a sample plan and sample sizes for collecting small-scale pilot data• Provide data collectors with an overview of any changes made to items or procedures resulting from the pre-pilot activities• Ensure that all logistical and financial considerations for data collection are covered• Data collectors should collect field-based data and upload results into electronic form on a daily basis• Daily data monitoring should be conducted to ensure high-quality data• All issues should be addressed and revisions to procedures should be clearly communicated to data collectors throughout data collection
5. Conduct pilot data analyses <ol style="list-style-type: none">a. Examine tools and proceduresb. Estimate item-level descriptive statisticsc. Calculate inter-rater reliability (pilot data)d. Estimate correlationse. Calculate internal consistencyf. Conduct exploratory factor analyses (if possible)	<ul style="list-style-type: none">• Qualitative feedback from data collectors and supervisors should be elicited in order to better understand how the tools and data collection procedures are functioning• Analyze results to examine variability in responses for each instrument• Document any items or constructs with potential issues• Estimate reliability across data collectors to determine whether specific items or constructs are difficult to measure reliably• Determine the strength of the relationships across items and constructs within each instrument• Determine if there are scales (constructs) with low reliability or if there are ill-fitting items within constructs• Develop initial insights into items that may require revision because they do not load as expected
6. Make final revisions to items (as needed)	<ul style="list-style-type: none">• Use best judgement from small-scale pilot to determine if any items require further revision• Ensure that instruments are fit for purpose (for full-scale data collection)

Guide to Data Collection (Section 6)

- No independent guide exists for overall data collection
- See Guide to Training for details on preparing for data collection (including logistics)
- See Guide to Electronic Data Collection for details on using Tangerine for data collection
- See Guide to Piloting for considerations on sample sizes, data collection team structures, data monitoring and oversight, and data quality-control checks
- Review costing tool to help budget for data collection

Guide to Data Processing (Section 7)

- Guide for individuals who are cleaning and processing data from the PLAY Measurement tools
- Includes details on variable naming, common data quality checks, deriving variables, and finalizing data
- This guide is intended for an audience familiar with general data structure and processing using statistical software (e.g., Stata, SAS, R, Mplus)

Six overarching steps for data processing

1. Prepare for data processing <ol style="list-style-type: none">a. Determine variable naming conventionsb. Determine the level of data for each instrument	<ul style="list-style-type: none">• Ensure that standard naming conventions are used for all variables so that each dataset follows same procedures• Have clear understanding of the level of data for each instrument in order to set up analyses
2. Conduct common data quality checks <ol style="list-style-type: none">a. Check and fix duplicatesb. Check final countsc. Merge the data	<ul style="list-style-type: none">• Use records of data entry errors to correct data• Ensure that any duplicate cases in the data are purposeful• Ensure that final data counts in the dataset align with data collection reports• Check data for merge errors and correct to ensure that full data are available for analysis

Six overarching steps for data processing (continued)

3. Derive primary school score variables (if primary is included) <ul style="list-style-type: none">a. Student Interviewb. Teacher Interviewc. Classroom Observationd. Classroom Inventory	<ul style="list-style-type: none">• Create score variables to summarize construct-level results for each instrument
4. Derive ECD Score Variables (if ECD is included) <ul style="list-style-type: none">a. Teacher Interviewb. Classroom Observationc. Classroom Inventoryd. Caregiver-Child Observatione. Caregiver Interview	<ul style="list-style-type: none">• Create score variables to summarize construct-level results for each instrument
5. Finalize data <ul style="list-style-type: none">a. Review all variable names and labelsb. Engage an external reviewerc. Develop a data codebook	<ul style="list-style-type: none">• Ensure that all data are properly labeled so that end users can easily understand each variable• Use an external reviewer to check the consistency and readability of all variable names, labels, and values• Create a codebook for each dataset that allows any user to read through and understand the study and the data
6. Create public-use files (if needed) <ul style="list-style-type: none">a. Remove or mask all personally identifiable informationb. Create a crosswalk for public-use datasetc. Engage external reviewers	<ul style="list-style-type: none">• Ensure that all personally identifiable information is removed or masked from public-use files so that individuals cannot be identified• Develop and safely store a crosswalk that allows data owners to link back to original file• Ensure that data are complete by engaging external reviewers to review the new dataset

Guide to Data Analysis (Section 8)

- Guide for individuals who are analyzing data from the PLAY Measurement tools
- The main purpose is to understand the descriptive statistics, reliability, and validity of the PLAY observation tools, teacher interviews, student interviews, and caregiver observations and surveys

Five overarching steps for data analysis	
1. Estimate descriptive statistics	<ul style="list-style-type: none">• Estimate averages, ranges, variability, and correlations across all items and constructs• Generate preliminary item and construct scores in order to understand PLAY outcomes
2. Calculate internal consistency	<ul style="list-style-type: none">• Estimate a measure of test/construct reliability for all instruments

Five overarching steps for data processing (continued)

2a. Calculate inter-rater reliability (observation instruments only)	<ul style="list-style-type: none">• Ensure that data collectors have consistency in scoring paired observations or videos• Conduct IRR tests for all administered PLAY observational tools
3. Conduct exploratory factor analyses (recommended but optional)	<ul style="list-style-type: none">• Understand the structure of the items, regardless of their pre-assigned constructs
4. Conduct confirmatory factor analyses	<ul style="list-style-type: none">• Examine the model fit statistics of proposed factor models from EFA
5. Examine relationships among different instruments (optional)	<ul style="list-style-type: none">• Explore the relationship among PLAY instruments• Explore the relationship between PLAY instrument results and other data (e.g., child outcome results)• Further explore the PLAY instruments in relationship to one another or other instruments/outcomes

Which Tools to Use?

Approach		Tools
Comprehensive	✳	Observation Adult interview (self-reported behavior and vignette-based reasoning) Student interview (for primary age group only)
Parsimonious		Observation only
Focus on learner perspective		Include student interview (for primary age group) in your set of tools
Focus on evaluation		Include observation tool in your set of tools



Summary & Next Steps

What does PLAY add to classroom measures of quality?

Constructs specific to self-sustaining engagement, which underlies learning through play

A measure of support for social connectedness—particularly relevant across cultures

A measure of support for agency

A measure of domain-general, child-centered conceptual understanding (support for exploration / problem solving)

Sensitivity across cultures and high- and low-capacity environments—e.g., items to measure low and high agency

PLAY 2.0



Review
&
finalize

Review and finalize
constructs and items

Support

Support 4 organizations in 5
countries in using PLAY

- South Africa, Bangladesh, Sierra Leone, Uganda, Colombia

Validate

Validate tools against
learning outcomes

- Understand how survey tools add to observation tools

Discussion Questions



How could this be applied in your work?

What advice do you have for us as we start PLAY 2.0?