Effective Teaching Practices in Early Childhood Education (ECE)

THE EVIDENCE BASE FOR THE *TEACH ECE* CLASSROOM OBSERVATION TOOL

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Abstract

The purpose of this literature review is to propose a framework for defining and measuring the quality of ECE teaching in Low- and Middle- Income Contexts (LMICs). It contributes to the literature by systematizing the evidence on effective ECE teaching practices, drawing as much as possible from available research in LMICs, and providing an organizing framework to create a common language and evidence-base among stakeholders in LMICs – from the national to the classroom level – to identify and discuss evidence-based, quality ECE teaching practices. The paper presents an overview of the *Teach ECE* classroom observation tool and a literature review of the evidence supporting the aspects of structural and process quality measured by *Teach ECE* and concludes with a brief discussion of how *Teach ECE* can be used for monitoring, formative, and research purposes.

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Introduction: Why measure the quality of teaching practices in ECE?

Evidence from multiple fields indicates that investments in the early years lead to a range of returns across the lifespan. These benefits include improved learning outcomes, reduced repetition and drop-out rates, higher likelihood of success in the workplace and in adulthood, and beyond (Shafiq et al., 2018; Corcoran et al., 2018; Engle et al., 2011; Nores & Barnett, 2010; Berlinski et al., 2009; Cunha et al., 2006). Recognizing this, governments have invested in increasing access to early childhood education (ECE), with global enrollment rates in ECE nearly doubling in the past 20 years. Between 2000 and 2019, enrollment rates in ECE grew from 33 percent to 62 percent, with the greatest growth occuring in Low- and Middle-Income Countries (LMICs) (UIS, 2020).

However, increase in access is not always accompanied by parallel improvements in the quality of ECE. In many countries around the world, the quality of ECE is low and unlikely to promote significant improvements in children's development (Britto et al., 2011; Yoshikawa & Kabay, 2015; Biersteker et al., 2016; Raikes et al., 2015). Even worse, low-quality ECE programs can even impede children's cognitive and socioemotional outcomes[1] (Baker et al., 2008; Bouguen et al., 2013; Rosero & Oosterbeek, 2011). Without an adequate emphasis on quality, children will not reap the potential benefits of ECE – resulting in a waste of system resources at best and a reduction in cognitive and socioemotional outcomes at worst (Biersteker et al., 2016; Britto et al., 2011; Marope & Kaga, 2015; Rao et al., 2012b).

ECE quality is commonly conceptualized and measured in terms of *structural* and *process* quality. **Structural quality** in ECE classrooms examines the length of the school day, adult-child ratios, ECE teachers' qualifications, and general features of the classroom environment that relate to children's health, safety, and well-being (Mashburn et al., 2008; Pianta et al., 2016; Whitebread et al., 2014). In the United States, there is evidence that full-day programs with small class sizes and well-qualified ECE teachers can contribute to positive learning outcomes, though the evidence on the impact of ECE teachers' level of education on children's learning is mixed (Early et al., 2007; Pianta et al., 2016; Wolf et al., 2018b). Structural quality can often be readily defined and measured – and as such is often the focus of policy regulations (Connors, 2016; Locasale-Crouch et al., 2016).

Process quality refers to the quality of dynamic interactions among ECE teachers, peers, and materials that children experience in ECE settings. It can also refer to how the ECE teacher organizes classroom activities, manages children's behavior, and responds to children's needs (Pianta et al., 2005). Research has found that these interactions are the most important contributors to children's gains in cognition and socioemotional development (Yoshikawa et al., 2013; Mashburn et al., 2008). On average, process quality as measured in classroom observation tools in the United States and other OECD countries is positively associated with children's cognitive and socioemotional development (Hamre et al., 2014; OECD, 2018; Sabol et al., 2013). Similar results have been mirrored in LMICs – for example, a study in Ecuador found that a one standard deviation increase in teacher quality, as measured by ECE teachers' scores on the CLASS™ observation tool (Pianta et al., 2008), was associated with a 0.11, 0.11, and 0.07

[1] In general, unless otherwise noted, the authors include under the cognitive domain skills related to language, pre-literacy, and pre-numeracy; and under the socioemotional domain social and emotional competencies, including self-regulation or executive function.

standard deviation increase[2] in kindergarten children's language, mathematics, and executive function skills, respectively (Araujo et al., 2016). A study in China found an association between CLASS scores and children's cognition (Hu et al., 2017). ECE professional development programs have also been found to have impact on child development (insofar as they impact resultant teaching practices) in such varied contexts such as Chile, Ethiopia, Ghana, Kenya, Rwanda, and the United States (Biancarosa et al., 2010; Dowd et al., 2016; Dusabe et al., 2019; Landry et al., 2006; Landry et al., 2011; Treviño et al., 2018, Wolf et al., 2018a). A meta-analysis of 60 studies of teacher coaching also found large pooled effect sizes of 0.49 standard deviations on teaching practices and a resultant medium effect size of 0.18 standard deviations on student learning in ECE and primary (Kraft et al., 2018).

Although teacher-child interactions have been "most consistently and strongly associated with children's development" (Mashburn et al., 2008, p. 743), it is important to note that structural and process elements of ECE classrooms are related and interactive—structural features of ECE classrooms enable high quality processes to occur systematically. For example, in Ghana, structural quality was found to predict process quality, while process quality predicted children's cognitive and behavioral outcomes in ECE (Wolf et al., 2018b). While process quality has been shown to be more predictive of child outcomes, it must be noted that "there are limits to what even the highest quality teacher can achieve with limited resources" (Whitebread et al., 2014, p. 26). This is particularly important to keep in mind when considering the quality of ECE classrooms in LMICs, where ECE teachers may face such challenges as large class sizes and limited resources.

Although evidence suggests that better teaching practices are needed to tackle the learning crisis, most education systems in LMICs do not regularly monitor these teaching practices. Even when teachers' pedagogical skills are monitored, the instruments used to capture teaching practices fall short on several accounts, as they typically: i) are not evidenced-based, ii) measure only the frequency of a given practice, rather than the quality of said practice, and iii) do not meet basic reliability[3] criteria (Ladics et al., 2018). Yet, improving ECE quality at scale in any context will require an understanding of the current state of quality in ECE provision. In order to take steps towards improving ECE teaching quality, it is necessary first to define a common language and an organizing framework around quality. Standardized measurement of ECE classroom quality can provide a common language to drive policy dialogue and an organizing framework to help shape interventions aimed at improving ECE quality.

Defining what constitutes high-quality ECE is challenging, as the components of quality are complex and notions of quality are not consistent across diverse contexts (Biersteker et al., 2016). Variations in ECE practices persist because these are informed in part by cultural norms that shape stakeholders' beliefs about what is best for young children (Rao, 2010; Tobin et al., 2009). Yet, our understanding of quality across diverse contexts is constrained by the fact that our normative ideas about quality are rooted in Euro-centric ideas about child development (Reid et al., 2019; Rogoff, 2003). Beyond cross-national differences, Anderson & Sayre (2016) note that there may be within-country differences in stakeholder definitions of quality, which result in

[2] Kraft (2018) offers one (among many) framework to interpret effect sizes in upper-elementary, middle, and high-school education: less than 0.05 SD is a small effect, 0.05 SD to less than 0.2 SD is medium, and 0.20 SD or greater is large. There is no established benchmark for early childhood, although Bloom et al. (2008) suggest that effect size benchmarks for younger populations should likely be adjusted upwards to reflect the larger annual learning gains in the early years.

[3] Reliability in this context is defined as the extent to which the tool produces stable and consistent results between individuals and over time.

varying policy priorities. It is important to be aware then that notions of quality are rarely context-independent and instead reflect society's views of the aims and functions of education at-large. An additional, compounding factor is that the evidence base linking elements of quality to learning outcomes is primarily grounded in research from high-income countries (Yoshikawa et al., 2013; Brunsek et al., 2017). Nevertheless, a growing evidence base from LMICs is helping to inform a more robust understanding of quality in these contexts (e.g., Brinkman et al., 2017; McCoy et al., 2017; McCoy & Wolf, 2018a; Nores & Barnett, 2010; Rao et al., 2012a; Yoshikawa & Kabay, 2015).

The purpose of this review is to propose a framework for defining and measuring the quality of ECE teaching in LMICs. It contributes to the literature by systematizing the evidence on effective ECE teaching practices, drawing as much as possible from available research in LMICs, and providing an organizing framework to create a common language and evidence-base among stakeholders in LMICs – from the national to the classroom level – to identify and discuss evidence-based, quality ECE teaching practices.

The paper is organized as follows: Section 1 presents an overview of the *Teach ECE* classroom observation tool; Section 2 provides a literature review of the evidence supporting the aspects of structural and process quality measured by *Teach ECE*, and Section 3 concludes with a brief discussion of how *Teach ECE* can be used for monitoring, formative, and research purposes.

Section 1: *Teach ECE*'s Development Process and Organizing Framework

What is Teach ECE?

Teach ECE is a free classroom observation tool that provides a window into one of the less explored and more important aspects of a child's education: what goes on in the classroom. The tool is intended to be used in ECE for children ages 3–6 and was designed to help countries, in particular LMICs, monitor and improve teaching quality.

How was Teach ECE developed?

The *Teach ECE* development team consisted of a developmental psychologist, an education specialist, an ECE teacher, an ECE researcher, and an ECE consultant. Existing classroom observation tools for ECE used in LMICs[4] were reviewed to identify key ECE teaching practices that were commonly captured across these. The theoretical and empirical evidence from ECE studies were also surveyed in a literature review to supplement these key ECE teaching practices from observation tools and inform the development of the tool. The team then mapped these ECE teaching practices to the *Teach Primary* framework (Molina et al., 2020) to identify whether the framework was applicable for use in ECE settings and to identify the

[4] High- and low-inference tools were reviewed. Low-inference tools are those that measure aspects of ECE classrooms that are easily observable, for example, through checklists. High-inference tools require observers who are highly trained and reliable and measure elements of the classroom that are usually related to process quality, like the quality of adult-child or peer interactions. These included the Measure of Early Learning Environments (MELE; UNESCO et al., 2017), the Classroom Assessment Scoring System™ (CLASS; Pianta et al., 2008), the revised version of the Early Childhood Environment Rating Scale™ (ECERS-R; Harms et el., 2005), the Stallings Classroom Snapshot (Stallings, 1976), and the Teacher Instructional Practices and Processes System™ (TIPPS; Seidman et al., 2014; Wolf et al. 2018b).

differences between *Teach Primary* and *Teach ECE*. After determining that the overarching framework was appropriate for use, the *Teach ECE* team revised elements and behaviors accordingly to reflect developmentally appropriate practices for children ages 3-6 as identified through the aforementioned review of existing ECE classroom observation tools and the review of the literature. At multiple points during its development, experts from within the World Bank with experience in ECE were engaged in reviews of the tool and provided ongoing feedback on its development. In parallel, the tool was piloted between July 2019 and March 2020 in the Dominican Republic, Mongolia, and Pakistan. The training of enumerators on the *Teach ECE* tool yielded 90%, 100%, and 79% reliability, respectively. *Teach ECE* was then submitted for review to a panel of leading ECE experts for an Expert Review[5] in April of 2020.

Teach ECE Organizing Framework

The first task of *Teach ECE* development was the creation of an organizing framework to capture aspects of both structural and process quality. This section contains an overview of the *Teach ECE* Checklist (measuring structural quality) and Observation Tool (measuring process quality). Following this, Section 3 will explore the evidence base behind the aspects of structural and process quality captured in the Checklist and Observation Tool. The manual, which includes the observation tool, can be found at the following website. Note that, due to the context-dependency of definitions of quality, opportunities for local adaptation have been built into the process of implementing the tool in order to more adequately capture the realities of classrooms in different contexts.

Table 1 contains the variables that are measured in the structural quality checklist. These provide a basic set of structural quality indicators on which systems can choose to build upon and adapt according to local context:

Table 1: Categories in Structural Quality Checklist

- Total enrollment (girls, boys, by age)
- Attendance (girls, boys, by age)
- Type of class (age groupings)
- Number of teachers assigned, number of assistants assigned, number of assistants assigned to provide specialized support to one or a select group of students, number of other adults (description of who the other adults were), and number of teachers/assistants present during the observation
- Number of children with disabilities (defined as difficulty seeing, hearing, walking, picking up small objects, communicating with others, or learning things)
- Official language of instruction, proportion of enrolled children who speak the same language at home as the one used by the ECE teacher, and language(s) the teacher taught in during the observation
- Learning activities observed: Language/Literacy; Math/Numeracy; Art; Music/Dance/Movement; Play; Health/Science; Personal Hygiene/Self-care; Meals/Snacks; Other (up to three categories may be checked simultaneously)

5 The experts consulted were: Frances Aboud, Caroline Cohrssen, Dawn Davis, Yyannu Cruz-Aguayo, Patricia Kariger, Sharon Kim, Florencia Lopez-Boo, Rita NG, Abbie Raikes, Anaga Ramachandran, Nirmala Rao, Rebecca Sayre, Edward Siedman, David Whitebread, and Hirokazu Yoshikawa.

- Format of instruction: Whole Group/Class; Small Groups; Pairs Working Together; Children Working/Playing alone
- Number of minutes children left unsupervised (if any)
- Severe negative verbal/physical interactions observed (if any, enumerators required to specify what they saw)
- Available resources & percentage of children who had the opportunity to manipulate these resources: writing utensils, art, fantasy play, blocks, educational toys or math materials, storybooks
- Classroom facilities and safety: clean drinking water, hand washing facilities appropriate for children, toilets with hand washing facilities appropriate for children, separate toilets for girls, and clean toilets

As part of the Observation Tool, which covers aspects of process quality, *Teach ECE* captures:

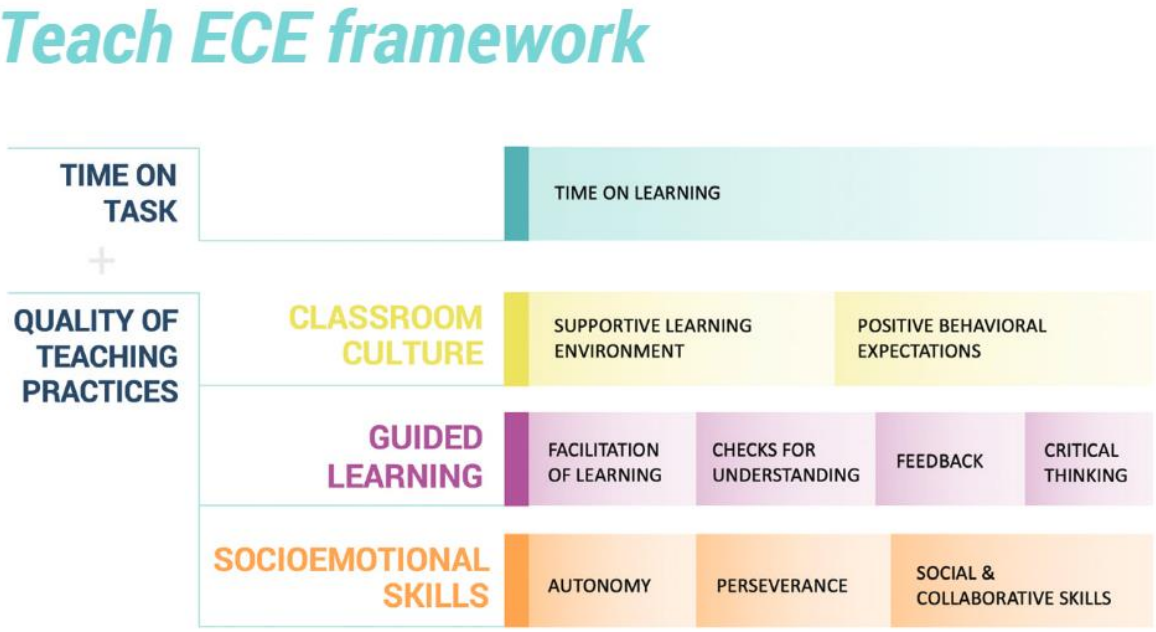
(i) Time on Learning: the time ECE teachers spend on learning activities and the extent to which children are on task, and

(ii) Quality of Teaching Practices that help develop children´s cognition and socioemotional development.

As part of the Time on Learning component, 3 "snapshots" of 1–10 seconds are used to record both the ECE teacher's actions and the proportion of children who are on task throughout the observation.

The Quality of Teaching Practices component is organized into 3 *Areas*: Classroom Culture, Guided Learning, and Socioemotional Skills (more on each below). The 3 *Areas* have 9 corresponding *Elements* that map on to 28 *behaviors* (see Figure 1). The behaviors are characterized as Low, Medium, or High, based on the evidence observed. These behavior scores are then converted into a 5-point scale for each Element that quantifies the Quality of Teaching Practices as captured in two, 15-minute observations.

Figure 1: *TEACH ECE* Areas



Teach ECE Areas

As mentioned above, the Quality of Teaching component of Teach ECE is organized into 3 Areas. They provide a broad framework to measure the following:

Classroom Culture: The focus is on the extent to which the ECE teacher creates a supportive learning environment and sets clear, positive behavioral expectations, and effectively redirects misbehavior. The Area also measures whether the ECE teacher is treating all children respectfully, consistently using positive language, responding to children´s needs, and challenging stereotypes based on gender and disability in the classroom.

Guided Learning: The focus of this Area is on how the ECE teacher facilitates learning. The focus here is not on whether the classroom is play-based, child-centered, or teacher-centered[6], but rather the extent to which the ECE teacher facilitates learning by explicitly articulating objectives that are aligned to the learning activity, clearly explaining important concepts using multiple means of representation, connecting the learning activity to other concepts or children´s daily lives, and modeling the learning activity through enacting or assisting and narrating or thinking aloud. It measures if the ECE teacher checks for understanding by using questions, prompts, or other strategies to determine children´s level of understanding; whether s/he monitors children during independent or group work and adjusts his/her teaching to the level of children or expands children´s language. Other behaviors that are measured here include whether the ECE teacher gives feedback by providing specific comments

[6] A teacher-centered activity is one in which the ECE teacher leads the activity and the children participate. It may also be referred to as direct instruction. A child-centered activity is one in which the children are protagonists, actively leading the activity and playing important roles in what occurs during the activity and how it takes place.

or prompts that help clarify children's misunderstandings or identify their successes, and whether critical thinking tasks as well as open-ended questions are taking place in the ECE classroom.

Socioemotional Skills: This Area measures the extent to which the ECE teacher fosters children's socioemotional skills that encourage children to succeed both inside and outside the classroom. It measures, for example, whether the ECE teacher instills autonomy by providing children with opportunities to make choices and take on meaningful roles in the classroom and whether children exhibit their autonomy through volunteering to participate by expressing their ideas or taking on roles. In addition, it looks at ECE teacher behaviors that promote perseverance such as acknowledging children's efforts (rather than focusing on their intelligence or natural abilities), having a positive attitude toward children's challenges such as framing failure and frustration as a part of the learning process, and encouraging children to engage in planning in the classroom. The Area also measures how the ECE teacher encourages children to work together to share ideas and work towards a common goal, how s/he promotes intra- or interpersonal skills such as perspective taking, empathizing, emotion regulation or social problem solving, and how the children themselves exhibit social and collaborative skills such as sharing ideas or working towards a common goal in the classroom.

It is important to note that while these elements are mapped to the area of Socioemotional Skills, they also contribute to children's cognition. Conversely, the elements included in the other Areas also contribute to the development of children's socioemotional development. This can be seen throughout Section 3 below. However, the decision was made to dedicate one of the areas of the tool specifically to Socioemotional Skills to raise awareness of the importance of these skills, helping to drive policy dialogue in this area.

Approaches to teacher-directed instruction, child-centered learning, and play in Teach ECE

Teach ECE takes into account the varied contexts in LMICs in which the tool may be applied. In these settings, learning activities ranging from predominantly teacher-centered to child-centered may be observed. As such, examples within *Teach ECE* have been developed to reflect this wide range of contexts and ensure applicability and sensitivity to quality instruction in its many forms. The definition of child-centered learning and play may vary based on the context in which it is applied (see for example a cross-cultural review by Roopnarine, 2012 or a case study on Bangladesh by Chowdhury & Rivalland, 2016). Taking a broad view and definition, activities in which children are actively engaged in meaningful and socially-interactive activities (Zosh et al., 2017; Jensen et al., 2019b) are scored higher across the different elements in *Teach ECE*.

A common debate in the field of ECE in high-income countries is whether early learning experiences should provide play-based activities or direct instruction focused on specific areas of cognition (Dowd & Thomsen, 2021; Zigler & Bishop-Josef, 2006; National Research Council, 2001, pp. 10-11). Play can be beneficial to young children's socioemotional development in the ECE classroom (Ashiabi, 2007) as well as their language development, especially when child-initiated play is scaffolded by adults (Weisberg. 2013; Han et al., 2010). Fisher et al. (2017) used guided play, free play, or direct instruction to expose children to geometric shapes, finding that guided play, in which adults scaffolded yet also allowed for child engagement and direct exploration, resulted in improved shape knowledge. Goble & Pianta (2017) found that the

amount of time children spent in free choice was positively related to children´s inhibitory control and negatively related to language and literacy development. They also found that while the time spent in teacher-directed activities was positively associated with children's language and literacy development, when ECE teachers were effectively engaged with children during free choice, there was an impact on children's language development. Therefore, they argue "that *teacher behavior* creates opportunities to learn distinct from the actual activity setting" (Goble & Pianta, 2017, p. 1048, emphasis added).

Language Facilitation in Teach ECE

Teach ECE introduces a focus on Language Facilitation throughout the tool, reflecting the strategies ECE teachers use to facilitate young children's language development, such as expanding upon their responses, engaging in back-and-forth exchanges, asking open-ended questions, modeling, etc. This has been found in a variety of contexts, ranging from studies conducted in the United States (Dickinson, 2011) to Chile (Bowne et al., 2016). It is evident in these differing contexts that when ECE teachers use complex language, define sophisticated vocabulary, have interactive conversations with children, and explain concepts, they promote children's language and literacy development. Language Facilitation is therefore evident throughout the tool and will be discussed in this review as part of the evidence for the different Areas, Elements, and behaviors.

Inclusion in Teach ECE

Teach ECE has a cross-cutting focus on inclusion within ECE classrooms. Inclusive teaching is conceptualized in the *Teach* framework as teaching that enhances access to learning so all children, including those with disabilities, are able to learn without environmental barriers. The United Nations (2016) defines inclusive education as that which:

1. Identifies and removes barriers to access to quality education for all children
2. Increases the presence, participation, and learning of all children through changes to culture, policy, and practice
3. Provides support to groups of children who may be at risk of marginalization, exclusion or developmental delay

Evidence from the United States indicates that inclusion can have positive benefits in ECE, with benefits in socioemotional and cognitive development in children with disabilities as well as their typically developing peers (Odom et al., 2004; National Research Council, 2001; Justice et al., 2014; Odom, 2000). The guidelines and tools for integrating inclusion principles from the United Nations' Conventions on the Rights of Persons with Disabilities and the Rights of the Child (United Nations, 2006) are available (e.g., Brown & Guralnick, 2012), yet they remain largely under-implemented (Wertlieb, 2018).

The *Teach ECE* tool applies the Universal Design for Learning (UDL) framework to support the needs of all children in inclusion, including children with disabilities and culturally and linguistically diverse learners (Ok et al., 2016). UDL has three main principles of providing multiple means of representation for learners, multiple means of engagement to gain and keep

children's interest and motivation, and multiple means of expression to allow children a variety of ways to demonstrate what they have learned (CAST, 2018). An example of how the UDL framework is applied in ECE is an emphasis on designing learning environments for a wide diversity of learners rather than having to make extensive adjustments for individual children. That way, all children are provided multiple ways of learning new concepts and processing new ideas or acquiring new skills and demonstrating what they have learned (Horn et al., 2016).

Section 2: Evidence Base for *Teach ECE*

Section 2 provides the empirical evidence behind the *Teach ECE* tool, beginning first with the Structural Quality checklist.

Structural Quality

Throughout the educational system, learning environments and their structural characteristics matter (Bernard, 2012). Strong structural features can also provide a critical foundation that supports components of process quality (Connors, 2016; Wolf et al., 2018a).

The *Teach ECE* Checklist measures **the overall adult-child ratio** in observed classrooms, as well as the number of assistants that support one child or a select group of children**.** In general, research has found that high-quality adult-child interactions occur at greater frequency and have a greater impact on children in classrooms in classrooms with low adult-child ratios (Pianta et al., 2009; Adlerstein & Cortázar, forthcoming; cf. Perlman et al., 2017). Qualitative research indicates that low adult-child ratios are associated with more verbal interactions and more sustained, and shared, thinking (Siraj-Blatchford et al., 2003). In addition, smaller class sizes can help improve ECE teacher retention by reducing stress among staff (OECD, 2019).

The Checklist also measures the **attendance** of children in comparison to the number of children enrolled in the class. Many studies attest to the importance of attendance on the potential gains of quality ECE. For example, an experimental trial in Chile found that the effects of an intervention in ECE were moderated by absenteeism – there were positive impacts of the intervention only for children with the lowest likelihood of absenteeism (Arbour et al., 2016).

In addition, the Checklist quantifies the **number of boys and girls with difficulty seeing, hearing, walking, picking up small objects, communicating with others, or learning things**. This identification of children is important as it can help to "make visible" at both an ECE classroom and systems level children with diverse needs. Information gathered here can make a case for increased ECE teacher training on inclusive teaching practices, and subsequently can increase the adaptation of these practices in classrooms. Early intervention is important (National Research Council, 2000), and inclusive teaching can be of great benefit in ECE. Finally, ECE teachers' perceptions of children with special needs impact how they act in the classroom. For example, a study found that when kindergarten teachers perceived that a greater proportion of children in the classroom had diverse learning needs, they found their own workload was greater (Bowman, 1999). Collecting data on how ECE teachers view learning needs in the classroom is important because their attitudes towards children with diverse needs vary (Chhabra et al., 2018; Sukumaran et al., 2015; Lee et al., 2015), and such perceptions can impact how teachers behave in the classroom.

Physical and spatial characteristics of ECE classrooms are also critical, especially in LMICs. The Checklist includes indicators on **classroom safety or safety hazards observed,**

clean drinking water, handwashing facilities appropriate for children, toilets with hand washing facilities appropriate for children, and clean toilets. Reducing exposure to accidents and unanticipated threats is a key feature of quality in ECE and in LMICs in particular (Britto et al., 2011). Safety and hygiene are basic elements of structural quality that should be present in every ECE classroom and may have an impact on process quality and child outcomes. One study in Cambodia (Rao & Pearson, 2009) found that community preschools conducted underneath ECE teachers' homes posed problems in terms of hygiene, lack of clean water and sanitation, and no appropriate space for children to play. The presence of these elements of safety and hygiene can also reduce the propagation of germs, keeping children healthy and promoting their attendance (Adlerstein & Cortázar, forthcoming; Mohamed et al., 2020).

In addition, the Checklist includes a question on another variable on safety: **whether the adults in the classroom leave the children unsupervised.** This is a variable of interest to analyze in terms of its possible relationship with the quality of ECE teaching practices. At a system-level, data on whether and to what extent children are being left unsupervised in ECE classrooms can have important insights for ECE teacher training as well as overarching regulations for ECE center functioning.

Another indicator in the Checklist is the **availability of resources and the opportunity to use these resources, as measured by the percentage of children who had the opportunity to manipulate the materials.** Resources here include writing utensils, art, fantasy play, blocks, educational toys or math materials, and storybooks (number of books in the language of instruction and in other languages). Classrooms should be spaces that are designed pedagogically, in which children have the opportunity to manipulate the materials in them (Adlerstein & Cortázar, forthcoming). Access to storybooks and the opportunity for children to interact with them with adult support are fundamental in the ECE classroom (Neuman, 1999; McGill-Franzen et al., 1999). The positive effects of the Madrasa Resource Center in East Africa on young children versus the comparison group was in part associated with the use of locally available materials for children to explore and experiment with (Malmberg et al., 2011). A longitudinal study of 10 countries that included Thailand and Indonesia found that as the number and variety of materials in ECE for 4-year-olds increased, children's cognitive outcomes at the age of seven improved (Montie et al., 2006). A study conducted in Chile found that the experiences children had with learning materials, equipment, and space were associated positively with child outcomes when they were seven years old, controlling for other factors (Herrera et al. 2005). Access to resources can be found to have positive effects even in classrooms that are already high-quality, as found in a study by Guo et al. (2010), who found an association between children's ability to manipulate and use written materials and their literacy development in the United States.

The Checklist also asks enumerators to record if there is evidence of **severe negative verbal or physical interactions** as a basic measure of children's wellbeing within the classroom. There is evidence that such practices are often associated with and can contribute to increased disorder in schools and behavioral and academic problems among students of all ages (Cameron, 2006). Furthermore, school discipline is sometimes administered prejudicially to those students who may be the most vulnerable (Cameron, 2006). Higher reports of school corporal punishment consistently come from resource-poor countries and, in the case of one study in Pakistan, from children from low-income families (Khuwaja et al., 2018). While there may not be a great deal of empirical evidence on negative verbal or physical interactions at the ECE level in LMICs,

exposure to corporal punishment in the home can have long-lasting adverse impacts on child development (Gershoff & Grogan-Kaylor, 2016).

In addition, the Checklist requires enumerators to identify **what kinds of learning activities children are engaged in.** In the *Teach ECE* tool, observers identify what kind of learning activities were observed: Language/Literacy; Math/Numeracy; Art; Music/Dance/Movement; Play; Health/Science; Personal Hygiene/Self-Care; Meals/Snacks; Other. Depending on the priorities determined in the local context, variations among ECE classrooms can be found, as was the case in a study conducted in the United States, in which variability was found in the amounts and types of learning opportunities children were given in mathematics and science in ECE (Piasta et al., 2013). The overall style of interaction between ECE teachers and children may vary depending on the learning activity; for example, activities related to Language/Literacy and Math/Numeracy may more often be associated with teacher-directed interactions, while Play or Art may be associated with more child-centered interactions (e.g., Fuligni et al., 2012).

In addition, the Checklist requires enumerators to note the predominant format of interaction children are exposed to, whether it be **whole group, small groups, pairs working together, or children working/playing alone**. One longitudinal study that examined four-year-olds' ECE experiences and their later development across 10 different countries found that the less time children spent in whole group (full-class) activities, the better their cognition at the age of seven (Montie et al., 2006). In general, research suggests that different activity settings allow for different learning opportunities and different kinds of interactions, e.g., child-centered or teacher-directed. As previously stated, one study found that the overall proportion of class time spent in free choice was positively related to children's inhibitory control, whereas class time spent in teacher-directed activities predicted gains in children's language and literacy development (Goble & Pianta, 2017). Whitebread & Sitabkhan (forthcoming) also make the argument for the importance of identifying the kind of grouping in which children are placed, highlighting the importance of individual teacher-child interactions of ECE teachers with small groups as important for allowing periods of sustained shared thinking, defined as interactions in which two or more individuals collaborate to solve a problem, clarify a concept, evaluate activities, or extend a narrative, which Siraj-Blatchford & Sylva (2004) describe as characteristic of effective ECE classrooms.

Additional structural variables that are recorded in the Checklist are **the official language of instruction, the language(s) ECE teachers teach in, and the proportion of children who speak the same language(s) at home as the one(s) used by the ECE teacher**. Research around the world indicates the importance of children being educated in the language they speak at home (their first language, L1, or mother tongue) (Ball, 2011). Doing so sets the foundations for literacy for children in their L1 as well as in other, subsequent languages (Ball, 2011). In Nigeria, for example, a quasi-experimental study of 80 children ages 4 to 6 found that when those who were taught in their L1, Yoruba, learned more than those taught in their L2, English (Awopetu, 2016). In the United States, lead teachers' Spanish use for overall instruction was associated with Dual Language Learners' Spanish receptive language and positive approaches to learning in Head Start classrooms (Limlingan et al., 2019) and was associated with Spanish-speaking children's better social skills, child assertiveness, decreased bullying and closer teacher–child relationships in prekindergarten classrooms (Chang et al., 2007). An experimental trial of 31 3- and 4-year-old children in Head Start found that exposure to L1 instruction resulted in native language and literacy development without significant cost to second language

development (Durán et al., 2010). Benefits accrue to cognitive and other outcomes as well. For example, a study in Peru found that mother tongue language instruction programs boosted outcomes in mathematics for children in their first few years of schooling (Hynsjö & Damon, 2015). Mother tongue instruction can also impact attendance and overall attainment (Smits et. al., 2008). The ECE teacher's language use can also include codeswitching (switching languages and using the children's native language to adjust instruction). Codeswitching facilitated children's vocabulary development and improved their attitudes towards learning in a small-scale study in a private preschool among 5- and 6-year-olds in Korea (Song & Lee, 2018). An issue of concern is that several studies indicated that multilingual children are exposed to unequal learning opportunities compared with their monolingual peers. It is therefore important to collect information on children's home languages, the official language of instruction, and the language(s) the ECE teacher uses to communicate in the classroom.

Process Quality

A detailed description of the evidence for each Area, Element, and behavior of Teach ECE is provided in detail, with a summary table of the evidence for each provided in Annex A. While there is more evidence available from high-income countries on the elements of quality in ECE than from LMICs, the authors hope that Teach ECE can be used to contribute to the evidence base in LMICs.

Time on Learning

Teach ECE includes the following two observable behaviors to determine whether ECE teachers maximize time on learning in the classroom:

> *0.1 The teacher provides learning activities for most children.*
> *0.2 Children are on task.*

0.1 The teacher provides learning activities for most children.

A growing body of research explores the relationship between time use and learning in ECE (eg. Fuligni et al., 2012). This literature points to the importance of ECE teachers' ability to combine focused time on learning with efficient time management, classroom organization, and a positive classroom climate (Booren et al., 2012; Phillips et al., 2009; Vitiello et al., 2012). Hamre & Pianta (2007) note, "Classrooms function best, and provide the most opportunities to learn, when students are well behaved, consistently have things to do, and are interested and engaged in learning tasks" (p. 64). Effective ECE teachers maximize instructional time by setting clear behavioral expectations and minimizing the time spent on managerial tasks (La Paro et al., 2004). Providing children with more opportunities to engage in language and literacy activities can also lead to their development in these areas, as shown in studies conducted in Chile and the United States (Mendive et al., 2016; Coyne et al., 2009).

Yet evidence from the United States suggests children spend a significant amount of their time *not* engaged in learning (Early et al., 2005, p. 31). One large-scale observation study found that children spent 42% of the day not engaged in learning activities and 22% of children's time was spent in routines such a hand washing, transitioning, and waiting in line (Early et al., 2005). A small-scale study conducted in Chile indicated that children spent the majority of their school day on recess, snack, and transitions in kindergarten, as opposed to learning activities (Strasser et

al., 2009). Although much time in ECE classrooms is necessarily spent on routines, effective ECE teachers can infuse transitions with learning activities like singing, reading, or counting to maximize learning opportunities (Pianta et al., 2005; Hamre & Pianta, 2007, p. 54). When ECE teachers engage children in simple activities, such as a back-and-forth conversation during hand washing or a question prompt to think about as they line up, they transform routines and transitions into teaching and learning moments (National Research Council, 2015). Less is known about time use in ECE contexts in LMICs; however, in these contexts, time on learning is often limited by high rates of teacher absenteeism, periodic informal school closures, and low time on task even when teachers and children are present in the classroom (World Bank Group, 2018). Spending a considerable amount of time off-task can impede learning.

0.2 Children are on task.

Engagement is an important indicator of whether learning is taking place (Christenson et al., 2012) and it can be argued that children *must* be engaged in order to learn (Emmer & Stough, 2001). Children are most engaged when they are actively involved in their learning and when learning opportunities are relevant to their daily lives and experiences (Pianta et al., 2012). "Engaged time" refers to the time children spend interacting with the environment in a way that is appropriate for their developmental level and the local context (McWilliam & Bailey, 1995). Various elements have been identified as promoting children's engagement, or being on task, such as: seamless transitions between activities, accessible materials, and carefully sequenced activities (McWilliam & Casey, 2008).

Children's engagement is also an indicator of whether or not children are on task and an activity is developmentally appropriate, meaning that they are geared toward children's developmental levels and abilities (Copple & Bredekamp, 2009; Clements & Sarama, 2004). A meta-analysis found that children have slightly higher levels of emergent literacy and numeracy skills and better social and behavioral skills when they are provided with higher quality and developmentally-appropriate educational activities (OECD, 2018).

Classroom Culture

In *Teach ECE,* Classroom Culture encompasses two elements: the extent to which the ECE teacher fosters a Supportive Learning Environment that is conducive to learning for *all* children and the extent to which the ECE teacher is effective at setting Positive Behavioral Expectations in the classroom.

Supportive Learning Environment

Children's development occurs as a function of their interactions with their environment (Bronfenbrenner & Morris, 2007). One of the foundations of a high-quality ECE classroom is a positive and supportive emotional climate, marked by positive teacher-child relationships. There is significant evidence that a warm classroom environment in which ECE teachers treat children with respect, use positive language, and are responsive to children's needs can promote children's cognition and socioemotional development (Whitebread et al., 2014; Yoshikawa et al., 2013; Hamre & Pianta, 2005; Hughes & Kwok, 2006). It is also critical that ECE teachers treat children equitably (Schenke et al., 2017). When teachers exhibit these behaviors, they foster positive relationships with children, which are a critical foundation for supporting children's learning and development (Birch & Ladd, 1997; Hamre, 2014). *Teach ECE* includes the

following behaviors (including two sub-behaviors) to measure the extent to which the ECE teacher is effective at establishing a supportive learning environment in the classroom:

1.1 The teacher treats all children respectfully.
1.2 The teacher uses positive language with children.
1.3 The teacher responds to children's needs.
1.4a The teacher does not exhibit gender bias and challenges gender stereotypes in the classroom.
1.4b The teacher does not exhibit disability bias and challenges disability stereotypes in the classroom.

1.1 The teacher treats all children respectfully.

ECE teachers foster positive relationships with children by treating them with respect. A respectful and open teacher-child relationship helps to foster children's ability to think autonomously and creatively (Piaget, 1954). Respectful classrooms are ones in which children feel valued and safe (Wessler, 2003). ECE teachers show respect for children when they exhibit behaviors like calling on them by name, using a warm tone of voice, physically getting down to their level, actively listening to their ideas and questions, and responding to their needs (Miller & Pedro, 2006). When ECE teachers show respect for children, children are likely to show respect for their peers, further contributing to a supportive learning environment (Miller & Pedro, 2006; Wessler 2003). Children show larger gains in self–regulation when they experience closer ECE teacher–child relationships (Cadima et al., 2016). However, it is important to consider that what constitutes a respectful adult-child interaction may also vary by context and cultural norms (Dixon et al., 2008). For example, in some cultures, calling children by name may be respectful in some cultures and not in others. Therefore, this is an important behavior that should be adapted by stakeholders to reflect local norms and practices.

1.2 The teacher uses positive language with children.

High-quality ECE classrooms are characterized by ECE teachers' active and positive engagement with children (Burchinal et al., 2010). ECE teachers communicate caring and respect for children with the language they use, and the use of positive language, including praise and encouragement, contributes to fostering a positive classroom climate. ECE teachers who focus on using positive language in their interactions with children attain greater cooperation and more time spent on learning (Kersey & Masterson, 2011), as well as compliance and engagement, in the case of children at risk for behavioral disorders (Fullerton et al., 2009); positive language reflects positive attention, which lead to positive relationships with children (Howes & Ritchie, 2002). Effective ECE teachers hold high expectations for all children and use praise to acknowledge children's efforts. ECE teachers' expectations of children can affect their learning and later outcomes (Hinnant et al., 2009). Research shows that positive, sincere praise boosts children's motivation and engagement in learning activities (Henderlong & Lepper, 2002). More approving, less disapproving, and more positive tones of voice are associated with children's gains in cognition and self-regulation (Fuhs et al., 2013).

1.3 The teacher responds to children's needs.

Effective ECE teachers display attentiveness and sensitivity to children's needs (Hamre & Pianta, 2007). When ECE teachers engage in emotionally supportive and responsive behaviors, children's outcomes in cognition and socioemotional development improve (Hamre, 2014). In Tanzania, ECE teacher sensitivity was found to be associated with children's prosocial behavior (Shavega et al., 2014). ECE teacher responsiveness to children's needs contributes to positive teacher-child relationships, supports children's socioemotional development, and promotes learning by ensuring children's basic needs are met so that they can stay on-task and engaged.

At the most basic level, children's needs must be met in order for them to engage in and benefit from learning opportunities. Children who feel hungry or need to use the bathroom will not be able to focus on activities if these needs are not met. An effective ECE teacher anticipates, notices, and responds to children's needs so that they can remain engaged in learning activities. This could mean allowing a child who is tired to rest in a quiet area of the classroom and responding quickly to children's toileting needs. Effective ECE teachers also support children's socioemotional development and positive peer interactions by responding proactively and comprehensively when children encounter challenges in their interactions with peers (Girard et al., 2011).

When ECE teachers notice and respond promptly to children's needs, they strengthen their relationship with children and promote a positive classroom climate. Close teacher-child relationships are related to children's positive views of school and cognitive development (Birch & Ladd, 1997). Positive teacher-child relationships also promote the development of self-regulation (Williford et al., 2013). A paper by Johnson et al. (2013) found that classroom emotional support could promote prosocial skills in children who had depressed caregivers at home. High-quality emotional interactions between ECE teachers and children can lead to reduced behavior problems and a lower prevalence of externalizing behaviors (Mashburn et al., 2008), while negative relationships and interactions are associated with poor behavioral outcomes and negative attitudes about school (Birch & Ladd, 1997). For example, one study showed the teacher-child relationship to be more important than other familial and non-familial relationships in the development of externalizing behavior (Silver et al., 2010).

1.4a The teacher does not exhibit gender bias and challenges gender stereotypes in the classroom.

In a supportive classroom, children are treated equitably, regardless of social identity markers like gender. The words ECE teachers use and the behaviors they engage in serve as a powerful model for children in the classroom. Because children's beliefs about gender roles and expectations solidify between the ages of 3 and 5 (Ruble et al., 2007), ECE classrooms can be important places to challenge gender stereotypes and bias (Bhana et al., 2011).

When ECE teachers treat particular children in the classroom differently due to gender, other children in the class may learn that these behaviors are appropriate and begin to engage in them (Stanulis & Manning, 2002). Eventually, the differential treatment of children can become a cultural norm in the classroom. Of particular concern is how gender stereotypes and biases are perpetuated in these ECE classrooms. By the time they enter ECE, children have already internalized ideas about gender norms in their society. As ECE classrooms are important sites of learning about how one's identity is perceived and valued, they are critical arenas in which stereotypes can be challenged or inadvertently reinforced. Research shows that their play and interaction can reflect and reinforce normative ideas about roles for men and women and what is

masculine versus feminine (MacNaughton, 1997). From a young age, boys and girls may adapt their behavior in relation to what is expected of their gender; these patterns have been observed in classrooms in Ghana, where researchers concluded that by the age of seven or eight children were enacting patterns of male dominance and female subordination (Bhana et al., 2011).

ECE teachers themselves are also products of their social and cultural environments and may act in ways that reinforce these stereotypes (Meland & Kaltvedt, 2017). ECE teachers may reproduce gender stereotypes through actions like calling on boys more than girls and assigning classroom roles and responsibilities based on gender. A study from Kenya (Mweru 2012) found evidence that ECE teachers encouraged children to select play materials considered appropriate for their gender and use play materials in a gender-specific way, with this practice being applied more frequently with boys (p. 7). Though inadvertent, these actions, repeated over time, send clear messages to children about the value attached to their gender identities and the roles available to them based on their gender. For example, research from Cameroon showed that Baka children's engagement in household tasks did in fact mirror adult's sex-segregated activities (Gallois et al., 2015). Because ECE teachers are often unaware of their implicit biases and the ways gender biases may surface in their classroom practice, it is critical to draw ECE teachers' attention to these patterns so that they can enact teaching methods that subvert stereotypes (MacNaughton, 1997). For example, encouraging teachers to challenge gender stereotypes in the classroom through illustrations or storytelling, or prompting teachers to think more explicitly about how they can assign classroom roles to challenge gender stereotypes.

1.4b The teacher does not exhibit disability bias and challenges disability stereotypes in the classroom.

Effective ECE teachers use equitable and positive classroom behaviors to signal their respect for children and their interest in their ideas, regardless of ECE teachers' perceptions of children's abilities (Marzano & Marzano, 2004). On the other hand, stigmatizing behavior and attitudes can lead to their low self-efficacy and decreased engagement among stigmatized children in the long term (Haight et al., 2016).

The range of abilities found among ECE children can be especially diverse given the relative differences in age and development of children in the same ECE classroom. For example, the developmental difference between a 5-year-old and a 5 year, 10-month-old is much larger than between a 15-year-old and a 15-year, 10-month-old, and young children do display differing abilities solely based on their relative age difference (Bowman, 1999). There may also differences between teachers' *expectations* of children's competencies and the actual competencies of young children (Rimm-Kauffman et al., 2000) that contribute to exclusionary practices in the classroom. Importantly, disability bias can also often intersect with other forms of bias, such as bias based on gender, racial and ethnic minorities, children of lower socio-economic status, or children who do not speak the language of instruction at home. These children are more likely to be labeled as having a learning disability than their peers (Bruce & Venkatesh, 2014; Dever et al., 2016; Skiba et al., 2008; Sullivan, 2011), though they show no developmental delays. Disability bias and stereotyping must therefore be made visible for systems and for teachers to make ECE classrooms inclusive for all children.

Positive Behavioral Expectations

Positive reinforcement and praise help children understand what is expected of them in the ECE classroom. In ECE classrooms where behavioral expectations are clear and reinforced

with positive language, children are able to stay on-task. This, in turn, minimizes time spent on transitions and behavior management and maximizes opportunities to learn (Bayat, 2011; Sigler & Aamidor, 2005). In addition, ECE teachers should provide explicit positive behavioral expectations to help develop children's self-regulation.

There is evidence that with training and support on managing children's behavior in a positive way, ECE teachers can provide children with more effective support for self-regulation. A systematic review found that supportive ECE teaching behaviors led to a positive classroom environment serving multicultural classrooms in the United States (Khalfaoui et al., 2021). The Chicago School Readiness Project, for example, demonstrated the effectiveness of an ECE classroom-based approach to supporting children's self-regulation. Results from this randomized control trial showed that providing ECE teachers with classroom management training can lead to reductions in children's negative and externalizing behaviors and improvements in children's self-regulation skills and cognition (Raver et al., 2009).

2.1 The teacher sets clear behavioral expectations for classroom activities and/or routines.
2.2 The teacher acknowledges children's positive behavior.
2.3 The teacher redirects misbehavior and focuses on the expected behavior, rather than the undesired behavior.

2.1 The teacher sets clear behavioral expectations for classroom activities and/or routines.

Setting clear behavioral expectations in the ECE classroom contributes to the development of a supportive learning community. Effective classroom management also contributes to learning by allowing ECE teachers to accomplish their learning objectives (Emmer & Stough, 2001; Hamre, 2014). ECE teachers can set the stage for positive behavior and minimize misbehavior and disruptions by establishing clear rules and expectations (LePage et al., 2005). An intervention based on classroom management, with a strong focus on teaching clear behavioral expectations for children, reduced children's emotional dysregulation and increased their prosocial behavior and social competence (Reinke et al., 2018). Children's self-regulation is also supported when ECE teachers provide clear expectations and predictable and appropriate routines (La Paro et al., 2004).

2.2 The teacher acknowledges children's positive behavior.

It is important for ECE teachers to acknowledge positive behavior. Positive reinforcement helps children understand which behaviors are acceptable and which are not, helping to increase the likelihood that desired behaviors will be repeated (Sigler & Aamidor, 2005). An adult's positive response to a child's behavior indicates that the behavior is different from others and signals that it is desirable (Hull, 1943; Rescorla & Wagner, 1972). ECE teachers' use of praise and positive narration of children's behaviors can contribute to producing more desirable behaviors in the classroom, and there is evidence that when ECE teachers can ignore negative behavior while simultaneously reinforcing desired behaviors, inappropriate behaviors decline (Sigler & Aamidor, 2005; Driscoll & Pianta, 2010). In an ECE classroom, an ECE teacher may use positive narration by saying to a group of children: "Good job! I just noticed that this small group is taking turns to speak and is working together to solve the puzzle." With this specific comment, the ECE teacher focuses on the desired behaviors of turn-taking and collaboration. Positive narration and praise that is specific and sincere has been shown to help

children clearly understand which behaviors are acceptable in the classroom and to encourage children to engage in those behaviors instead of negative ones (Bayat, 2011).

2.3 The teacher redirects misbehavior and focuses on the expected behavior, rather than the undesired behavior.

The way ECE teachers respond and redirect children when they misbehave has an impact on ECE classroom culture. In high-quality ECE classrooms, ECE teachers redirect misbehavior by focusing on the expected behavior rather than the undesired behavior (Conroy et al., 2009). Research shows that the teacher-child relationship is undermined when punishment and reprimands are leveraged in response to misbehavior, and that a focus on negative behaviors detracts from a positive classroom culture (Dobbs et al., 2004; Emmer & Stough, 2001). Moreover, research has shown that disapproving behavior can also be negatively associated with child outcomes (Christopher & Farran, 2020). Instead, a non-punitive approach to behavior management has been shown to benefit all children. In inclusive classrooms, non-punitive classroom management has been shown to improve prosocial behavior and reduce aggression among children ages 4 through 8 with oppositional defiant disorder (ODD), a disorder which manifests itself through misconduct such as noncompliance, aggression, and oppositional or defiant behavior (Webster-Stratton et al., 2004).

Focusing on negative behavior may also lead to the unintended consequence of perpetuating unwanted behaviors, particularly in ECE classrooms. Behavior, whether desired or undesired, is reinforced for children when they receive attention in response to their behavior. Any attention given to behavior, whether positive or negative, will therefore increase the likelihood that the behavior will be repeated (Sigler & Aamidor, 2005; Sternberg, 1998). ECE teachers must, of course, intervene quickly and decisively when misbehavior is dangerous or harmful (Sigler & Aamidor, 2005).

Guided Learning

In *Teach ECE*, Guided Learning encompasses four Elements: the extent to which the ECE teacher is effective at the Facilitation of Learning, the extent to which the ECE teacher Checks for Understanding effectively, whether and how well the ECE teacher provide Feedback to deepen children's understanding, and the extent to which the ECE teacher fosters children's Critical Thinking skills.

Facilitation of Learning

Teacher-child interactions are the key driver of learning in ECE settings, regardless of the curriculum or philosophical approach taken (Pianta et al., 2012). There is significant evidence that *how* children and ECE teachers interact in the classroom shapes children's cognition but also their socioemotional development in such different contexts as Chile and Ghana (Leyva et al., 2015; McCoy & Wolf, 2018). Guided learning, with adult-child interaction, has an important role to play in children's learning. While children can lead the learning process, support and scaffolding from ECE teachers are still valuable. There are times when teacher-led or direct instruction has its place, as in the case of behavior 3.2, described below, when the ECE teacher's explanation of concepts is clear. There is a continuum of learning approaches and the different formats and kinds of learning activities contribute to different kinds of learning for children, with ECE teachers playing important roles in each kind of format and learning activity (Goble & Pianta, 2017; Zosh et al., 2017).

3.1 The teacher explicitly articulates the objectives of the learning activity.

Effective facilitation of learning begins with ECE teachers who are organized and prepared for learning activities. As noted previously, ECE teachers who are well-prepared can maximize children's engagement and learning. When ECE teachers communicate to children what they will do in a learning activity and why, they support children's metacognitive development, and their awareness of their own thinking and ability to regulate their actions in relation to that knowledge (Chatzipanteli et al., 2014). Research has shown that metacognitive skills are critical to cognition (Pianta et al., 2012) and that even very young children can demonstrate metacognitive abilities (Whitebread et al., 2007). Executive function skills have also been found to be predictive of later academic achievement (Rolla et al., 2019), which, in conjunction with metacognition, also contribute to children's ability to be active agents in their own learning processes in the classroom (Marulis et al., 2020). Providing children with information about what they will be doing and why supports their understanding of what the learning process requires, which they can apply to future tasks (National Research Council, 2001).

When ECE teachers explicitly tell children what they are doing and why, they invite children to take an active role in the learning process. Children come to school with ideas or theories about the world and how things work. They test out these ideas and build new knowledge and understanding through interactions with others and their environment. Sociocultural theory posits that children learn as they take part in a process of co-constructing knowledge with others, with guidance and support from an adult (Rogoff, 2003; Vygotsky, 1978). Children are not blank slates that receive knowledge delivered by others (National Research Council, 2001, p. 38). Instead, effective facilitation of learning should build on their thinking, allow opportunities for experimentation and invention, and create opportunities for children to explain their thinking and problem-solving strategies (Stigler & Hiebert, 1999). Such an approach fosters the co-construction of understanding and fosters higher-order thinking and conceptual growth (National Research Council, 2015).

To communicate the goal of a learning activity effectively, ECE teachers must be aware of how concepts are situated within a larger progression of learning and development. ECE teachers can enact effective and developmentally appropriate teaching practices when they have a strong understanding of concepts (Dickinson, 2011) and understand children's developmental trajectories in relation to those concepts (Clements & Samara, 2014). ECE teachers use this information to design learning activities that promote children's development of higher levels of thinking and understanding in relation to those concepts (Clements & Sarama, 2014). In other words, effective ECE teachers understand the progression of concept development in young children and use that information and what they know about the children in their classrooms to sequence and individualize learning activities (Clements & Sarama, 2004; National Research Council, 2015). Effective teaching is not just a matter of ECE teachers' understanding concepts or a domain—they also need to be able to link that to what is known about how children learn and develop.

In addition, it is important to note that free play is scored in the High range in this behavior. Free play helps to reinforce concepts and learning activities ECE teachers initiate in the classroom, yet during free play, children define specific learning objectives for themselves when they choose specifically what they are going to engage in and how. In a similar vein, it is not necessary for ECE teachers to set specific learning objectives for free play. However, it is

necessary that the ECE teacher appropriately scaffold the activity selected by the child or children, which is captured by other behaviors in the tool.

3.2 The teacher explains concepts and/or provides learning activities using multiple forms of representation.

Learning activities provided introduced through multiple forms of representation improve all children's access to concepts (Rose & Strangman, 2007; National Research Council, 2001; Horn et al., 2016). For example, verbal explanation with visual aides and/or text, followed by children's use of high-quality manipulatives, has been found to aid children to build, strengthen, and connecting various representations of mathematical concepts (Clements, 2000; Siegler & Ramani, 2009; Ramani & Sigler, 2008; Scalise et al., 2020).

Teach ECE draws from the UDL framework (CAST 2018) to define the multiple means of representation to teach concepts in the classroom. The multiple means of representation considered in the *Teach ECE* tool are: Spoken Language, Music, Text, Visual Aides, Concrete Objects, and Movement. A high-quality range in this behavior in *Teach ECE* requires the use of at least three means of representation. The advantages of providing multiple means of representation are that they improve children's access to concepts, allow the learning environment to accommodate different children's needs, and can provide all children with the supports they need in order to participate fully in learning activities and with multiple levels of complexity, recognizing that children participate in learning activities with a range of background experience and knowledge (Rose & Strangman, 2007; National Research Council, 2001; Horn et al., 2016).

*3.3 The teacher makes connections during the day that relate to other con*cepts *or children's daily lives.*

Learning in the ECE classroom should be meaningful and connected to children's daily lives and experiences. Children's learning occurs along a developmental progression and their thinking becomes more sophisticated and abstract as they progress along this pathway (Clements & Sarama, 2014). Children learn most readily when new concepts build upon their existing understandings and draw upon the social and cultural funds of knowledge that children bring with them to the classroom (Carpenter et al., 1989; Moll, Amati, Neff, & Gonzalez, 1992; National Research Council, 2001). For children to develop strong conceptual understandings, ECE teachers must "[attend] explicitly to concepts, which means discussing the connections among facts, procedures, concepts, and processes" (National Research Council, 2015, p. 247). There is evidence that this approach fosters high levels of children's learning (Sarama et al., 2012).

Children can perform beyond what might be expected of them developmentally when they have a great deal of knowledge about a topic. For example, Gobbo & Chi (1986) found that young children who had become "dinosaur experts" were able to perform classification tasks that exceeded developmental expectations because they knew a great deal about dinosaurs. Applying their background knowledge is key, for example, in children's learning new vocabulary and in oral comprehension (Kaefer et al., 2015). Linking new learning activities and concepts to children's experience also increases engagement and motivation to learn. Classroom activities are more relevant and engaging to children when teachers throughout the educational system explicitly link them to children's daily lives and the world beyond the classroom (Pianta et al.,

2012, p. 371). Effective ECE teachers therefore "consistently integrate real world situations, problem solving, and content into instruction" (National Research Council, 2015, p. 248).

Connecting new concepts to children's cultural context and experiences also supports children's learning. "Culture is seen as providing the content—the objects and ideas—of thinking" (National Research Council, 2001, p. 45). There is evidence from India that children from the age of 6 performed tasks better when they were asked to engage with familiar objects rather than unfamiliar ones (Lantz, 1979). Moll et al.'s (1992) Funds of Knowledge for Teaching approach posits that "by capitalizing on household and other community resources, we can organize classroom instruction that far exceeds in quality the rote-like instruction…children commonly encounter in schools" (p. 132). They argue that teachers should draw on cognitive and cultural resources found in children's households to make learning more meaningful and effective (González & Moll, 2002).

3.4 The teacher models by enacting OR assisting AND narrating/thinking aloud.

> *3.1 The teacher explicitly articulates the objectives of the learning activity.*
> *3.2 The teacher explains concepts and/or provides learning activities using multiple forms of representation.*
> *3.3 The teacher makes connections during the day that relate to other concepts or children's daily lives.*
> *3.4 The teacher models by enacting OR assisting AND narrating/thinking aloud.*

Effective teachers provide children with assistance, or scaffolding, to support their learning and development. The notion of scaffolding grows out of Vygotsky's (1962; 1978) theory of the zone of proximal development (ZPD). Vygotsky posed that a child's zone of proximal development is a window of opportunity where, with adult support, a child can be guided through tasks that are just beyond his/her current ability. At the low level of the ZPD, a child can complete tasks and solve problems independently. "The upper level is defined by the most a child can do with assistance" (Bodrova, 1997, p. 20). With adult support, or scaffolding, a child can advance incrementally to higher levels of thinking and more abstract problem-solving within his/her zone of proximal development. Scaffolding involves organizing learning opportunities that are within a child's current competence but also provide an opportunity for further development. Scaffolding is a dynamic process — ECE teachers provide more support when a child falters and decrease support just enough to challenge the child to make progress (Duke & Block, 2012; Turnbull et al., 2009).

ECE teachers use practices like enacting, assisting, and narrating or thinking aloud to scaffold children's understanding. These practices have been linked to improved child outcomes (Bingham et al., 2017; Fuson, 2004). Modeling or enacting involves ECE teachers' demonstrating to children the steps or process for solving a problem or completing an activity. Ideally, ECE teachers use a strategy of thinking aloud while they engage in modeling. Modeling also promotes children's self-efficacy and self-regulation, which is central to learning (Schunk & Zimmerman, 2007). While narration may include a think-aloud protocol, it can also involve encouraging children to describing what is going on sequentially during a past or present event, like a sportscaster during a sports event (Barnes et al., 2016). Narrating may be a way of teaching children academic language, which can facilitate their later academic success (Barnes et al., 2019).

Checks for Understanding

Effective ECE teachers use Checks for Understanding and other formative assessment strategies to monitor children's level of understanding so that they can adjust learning activities according to children's development and emerging understanding. Formative assessment is critical for effective teaching practice (Riley-Ayers, 2014). It is used to provide information and feedback that can be used to adjust ongoing teaching with the goal of improving children's learning and is based heavily on ECE teachers' observations and documentation of children's learning and development across a range of domains (National Research Council, 2015).

4.1 The teacher uses questions, prompts, or other strategies to determine children's level of understanding.
4.2 The teacher monitors most children during independent/group learning activities, including free play.
4.3 The teacher adjusts teaching to the level of children.

4.1 The teacher uses questions, prompts, or other strategies to determine children's level of understanding.

ECE teachers can engage in formative assessment by asking children questions to elicit information about their learning (Massey et al., 2008). In the context of ECE, instructional conversations have been identified as a feature of high-quality classrooms because they provide ECE teachers with information that they can use to support further learning (Pianta et al., 2002). Through such conversations ECE teachers obtain information about individual children's level of understanding that they can use to adjust the amount of scaffolding they provide to children and to tailor learning activities to children's developmental needs (Pentimonti & Justice, 2009).

Research shows that the *types* of questions ECE teachers ask to check for understanding matter. Not all types of questions are equally effective in providing ECE teachers with feedback on children's understanding as different types of questions yield different types of responses. In a qualitative study of 12 Canadian and 8 South African classrooms, ECE teachers were often observed extending children's play by asking open-ended questions (Jensen et al., 2019a). On the other hand, "closed" yes or no questions require different responses compared to open-ended questions that start with *what, why,* or *how* (Massey et al., 2008). In addition, questions posed to the entire class that prompt a choral response (e.g., "Do you understand?" "Yes!") are not useful for assessing understanding because they do not provide ECE teacher with information about whether *individual* children have understood a concept. Research from Tanzania has shown that ECE teachers may often pose questions to an entire group of children that prompt a choral response (Mligo, 2016; Mtahabwa & Rao, 2010). This call-and-response pattern suggests the need for additional attention to asking high-quality questions and soliciting information from individual children, rather than only asking whole-group, closed questions.

4.2 The teacher monitors most children during independent/group learning activities, including free play.

In high-quality ECE classrooms, ECE teachers engage in repeated, systematic observation of children to obtain information about children's learning and development so that they can tailor instruction to the needs of individual children (Riley-Ayers, 2014). ECE teachers are encouraged to circulate around the classroom as children work independently or in small groups to observe and support their learning. In order to monitor, ECE teachers may glance

quickly at each child's work or play to ensure they are completing a task/activity correctly. This type of formative assessment provides ECE teachers with important information about what children know and can do. They can then better understand children's developmental trajectories and make decisions about what concepts and learning activities to work on in the future (National Research Council, 2015, p. 300).

4.3 The teacher adjusts teaching to the level of children.

Effective ECE teachers are responsive to children's learning needs and adjust their teaching so that they are providing the right amount of scaffolding needed to help children advance along a developmental progression of learning (Clements & Sarama, 2014; National Research Council, 2001). Research shows that responsive ECE teaching promotes decreased levels of teacher-child conflict and leads to gains in language and literacy skills and working memory (Bierman et al., 2008; Hamre et al., 2013). It is important in the context of teacher-child interactions to focus on how actively the ECE teacher scaffolds, adjusting teaching to the level that individual children need (Burchinal, 2017).

Another form of adjusting teaching comes through expanding upon children's language, a form of Language Facilitation. For example, the *Teach ECE* Manual states that if a child says that she has two feet, the ECE can expand upon the child's language by responding, "Yes, you have two feet and 10 toes. Your toes are smaller than my toes." As previously stated, Language Facilitation can promote children's language and literacy development.

Feedback

The *Teach ECE* tool also measures whether ECE teacher is also effective at providing Feedback, with the objective of helping children understand how they are being successful or where they are less successful. Doing so helps children know and keep doing what is working well and/or know how to adjust the next time they face a similar learning task or participate in a similar learning activity.

5.1 The teacher provides specific comments or prompts that clarify children's misunderstandings.
5.2 The teacher provides specific comments or prompts that help identify children's successes.

5.1 The teacher provides specific comments or prompts that clarify children's misunderstanding; and *5.2 The teacher provides specific comments or prompts that help identify children's successes.*

ECE teachers need to provide specific feedback on how children are learning. Ideally, this feedback should be used both to clarify misunderstandings as well as to signal when children are successful.

Over the course of their interactions with children, effective ECE teachers use feedback loops in order to support young children's understanding (Hamre & Pianta, 2005). Research on kindergarten in the United States has shown that classrooms that scored high on Instructional Quality, as measured by the CLASS™ observation tool (Pianta et al., 2008), incorporated feedback to children, with the goal of evaluating and improving performance (Pianta et al., 2002). Although related, feedback on misunderstanding differs from identifying a success. When a misunderstanding is identified, teachers should address the mistake and use specific feedback

to clarify and correct the misunderstanding before moving on to a new topic (Brophy, 1986). When used well, "effective teacher feedback is a simple and powerful form of teacher attention that can enhance learning, increase achievement, and promote self-regulatory competence in children with and without disabilities" (Conroy et al., 2009, p. 21).

In order for feedback to be effective, it should be intentional, explicit, prompt, direct, specific, and positive. ECE teachers can create an atmosphere where children feel comfortable taking risks because "mistakes are valued for their potential to enhance learning" (Conroy et al. 2009, p. 21). In the ECE classroom, teachers engage in feedback loops that involve back-and-forth exchanges with children or an individual child until s/he understands the concept. In a high-quality ECE classroom, this involves the ECE teachers' use of scaffolding and follow-up questions that lead to clarification of the misunderstanding/misconception. This kind of positive, targeted verbal feedback is associated with increased children's outcomes (Dickinson & Porche, 2011; Howard et al., 2018).

Critical Thinking

Learning involves more than being able to memorize and recall facts (National Research Council, 2015, p. 246) and requires both the understanding and remembering concepts and the ability to apply this knowledge to new ideas. ECE teachers have a big part to play in fomenting young children's critical thinking skills. Specific behaviors include asking children open-ended questions and providing children with learning activities that make them think independently (termed "thinking tasks" in *Teach ECE).* As a result of these ECE teaching practices, children in turn, ask open-ended questions, thinking tasks, or conduct open-ended tasks such as self-guided play.

6.1 The teacher asks open-ended questions.
6.2 The teacher provides thinking tasks.
6.3 The children ask open-ended questions or perform thinking tasks.

6.1 The teacher asks open-ended questions.

Effective ECE teachers scaffold and extend children's learning by asking open-ended questions or prompts that provide opportunities for children to express their ideas and explain their thinking (National Research Council, 2015; Wasik & Hindman, 2013; McNerney et al., 2020). Open-ended questions are an important way to develop young children's critical thinking skills, moving them away from the rote memorization of facts and towards learning how to learn (Suleeman & Widiastuti, 2018)[7]. Closed-ended questions can be useful for assessing children's content knowledge (e.g., "What color was the fish in that story?"), but do not prompt detailed responses or ask children to engage in more complex, critical thinking, such as comparing and contrasting characters from a story or asking children what they think will happen in a science experiment (Wasik & Hindman, 2013).

Beyond fomenting children's critical thinking skills, open-ended questions also promote children's vocabulary development (Cabell et al., 2015). More broadly, open-ended questions are important to promote children's overall language development. There is evidence that these

[7] "An open-ended prompt is typically defined as a question or statement that generally has more than one correct answer and typically requires a multiple-word response. Open-ended prompts are often questions beginning with terms such as *why* and *how* but could also use words such as *who, what, when,* or *where*" (Wasik & Hindman, 2013, p. 304).

extended teacher-child conversations promote children's language growth (Wasik & Bond, 2001; Grifenhangen et al., 2017; Brunsek et al., 2017). However, ECE teachers are rarely observed asking open-ended questions in their interactions with children, relying instead on low-level questions that do not engage children's higher order thinking skills. In addition to closing off opportunities to develop higher-order thinking skills, an overreliance on closed-ended or yes/no questions limits children's oral language development (Wasik & Hindman, 2013). Even when ECE teachers do ask open-ended questions, they do not always allow sufficient wait time for children to think and respond to their questions, which limits the effectiveness of this teaching practice (Wasik & Hindman, 2011).

ECE teachers can initiate engaging exchanges with an open-ended prompt and extend the conversation by responding to children's responses (Grifenhagen et al., 2017; Wasik & Bond, 2001). More important than the absolute number of open-ended questions asked, however, is the opportunity given for children to *respond* to these questions (McNerney et al., 2020). Therefore, not only does *Teach ECE* measure the number of open-ended questions, but in order to score in the High range, the ECE teacher needs to respond to children. For example, one study that examined the role of open-ended prompts during book reading in predicting children's vocabulary gains found that children in classrooms in which an ECE teacher asked more than 20 open-ended questions during a book reading session did not demonstrate greater vocabulary growth than children who heard only 5 open-ended questions. Children learned more vocabulary over the year when ECE teachers asked follow-up questions and provided opportunities for multiple children to respond to an initial prompt (Wasik & Hindman, 2011) and extended their play when ECE teachers asked open-ended questions and using follow-up prompts (Jensen et al., 2019a).

6.2 The teacher provides thinking tasks.

As already indicated, learning entails more than being able to memorize and recall facts (National Research Council, 2015, p. 246). It requires the understanding and remembering concepts *and* the ability to apply this knowledge to solve new problems or answer new questions. Effective ECE teachers more often support such meaningful learning through thinking tasks over promoting rote learning.

Meaningful learning aligns with a constructivist view of learning, which recognizes that learning occurs as children interact with the world and make sense of those experiences through critical thinking and problem solving. Mayer (2002) described how teachers can foster meaningful learning, or children's ability to transfer what they have learned to new situations. Supporting meaningful learning entails providing children with opportunities to understand, apply, analyze, evaluate, and create. High-quality thinking tasks are learning activities that help children *understand* new concepts by relating them to prior learning, *apply* what they have learned to new problems, engage in *analysis* and *evaluation*, and *create* new ideas based on previous learning. Thinking tasks can be designed to promote learning across domains and serve to deepen children's understanding of concepts and promote engagement in learning (Clements & Sarama, 2012; Taylor et al., 2003).

Free play is considered a high-quality thinking task in *Teach ECE* when it involves using an approach in which children are actively engaged in meaningful and socially-interactive activities. In a Vygotskian definition of play, children must create an imaginary situation, take on and act out roles, and follow a set of rules determined by specific roles (Bodrova, 2008). In other

words, children have to apply what they have learned to new problems, create new ideas, problem-solve, and beyond.

6.3 The children ask open-ended questions or perform thinking tasks.

When children ask open-ended questions and perform thinking tasks it is evident that they are engaged in the learning process and in actively building new understanding. These activities reflect the culture/norms that the ECE teacher has created in the classroom, with children being more likely to exhibit these behaviors if the ECE teacher models and creates opportunities for them to occur.

High-quality language environments are characterized by opportunities for children to engage in content-based discussions (National Research Council, 2015). ECE teachers who use open-ended prompts and engage in extended discourse model the use of open-ended questions as a means to get new information and enhance their understanding of a concept. When children pose open-ended questions, it is evident that they are learning to engage in higher-order thinking (Taylor et al., 2003). It is important to note that there may be cultural variation in relation to children's use of open-ended questions. Reid et al. (2019) note: "Some children may eagerly approach teachers with questions, demonstrating their expressive communication skills and motivation to learn, while others may exercise a more restrained approach, waiting to hear what teachers say and do" (p. 50). Children's engagement in tasks was found to be associated with closer relationships with their ECE teachers (Sabol et el., 2017).

Thinking tasks which are open-ended require active engagement that promotes the use and/or application of knowledge and which are likely to generate interest and engagement. This in turn can lead to increased learning – in particular language development – as compared to activities focused on recall and memorization (Whorrall & Cabell, 2015). Children's engagement in thinking tasks will promote not only cognitive development in areas like mathematics but will promote development in domains like self-regulation or executive function, as children learn to monitor their own learning (Clements et al., 2016).

The *Teach ECE* tool also seeks evidence of children's own, unprompted engagements in thinking tasks; in fact, this is even more desirable. Children can be engaged in substantial thinking tasks in which they are the protagonists. For example, a study conducted in Bangladesh found that children learned more about numbers, measurement, shapes, patterns, and space when they were involved in substantial thinking tasks like working in pairs on creating new shapes or patterns (Opel et al., 2012). Alternatively, children can be engaged in substantial thinking tasks when they are involved in free play, as previously discussed.

Socioemotional Skills

In *Teach ECE*, Socioemotional Skills encompass three elements: the extent to which the ECE teacher fosters children's Autonomy, Perseverance, and Social & Collaborative Skills through peer interaction.

Autonomy

Autonomy is defined in *Teach ECE* as how ECE teachers help children take ownership of the learning process by providing them with choices, opportunities to take on roles in the classroom, and the children in turn volunteer to participate actively in learning activities.

7.1 The teacher provides children with choices.
7.2 The teacher provides children with opportunities to take on roles in the classroom.
7.3 Children volunteer to participate in the classroom.

7.1 The teacher provides children with choices.

Choice is an important element of high-quality ECE classrooms; in the most basic sense, choice can be understood as the presence of options for children. In *Teach ECE*, in the High range, the ECE teacher provides the children with the opportunity to make at least one choice, with three or more options to choose from. The act of choosing is critical to children's learning and development because it fosters interest and engagement and supports the development of autonomous motivation, which also fosters cognition (Erickson & McDonald, 2019; Evans & Boucher, 2015). In fact, choice, and often open-ended choices, are a common element of curricular approaches in ECE (e.g., HighScope, Tools of the Mind, Creative Curriculum®). The notion of developmentally appropriate practice, which has been influential in shaping ideas about ECE quality in the United States, stresses that ECE teachers should develop opportunities for children to make choices to support their decision-making abilities and the engage them in learning (Copple & Bredekamp, 2009). ECE may provide children with decision-making opportunities in the context of learning centers, for example. At a designated time during the day, children may be free to choose an area of the room in which to play and/or explore a range of materials. In addition, children may have the opportunity to make a choice about *what* they will do and *how* they will do it after they have selected an area of the room to play in and/or materials with which to play. When ECE teachers provide children with opportunities to choose among a range of well-organized and developmentally-appropriate activities and scaffold those experiences, they support children's cognition and socioemotional development (Whitebread et al., 2014; Pianta et al., 2012).

Alternatively, the ECE teacher may provide children with open-ended choices or free play, reflecting the potential diversity of learning experiences provided in ECE contexts. Several research studies have found that ECE teachers are more effective in promoting children's cognition and socioemotional development when they effectively guide children´s self-initiated, free choice and/or play activities (Barnett et al. 2008; Goble & Pianta, 2017; Diamond et al., 2019). For example, one longitudinal study that examined 4-year-olds' ECE experiences and their later development at the age of seven across 10 different countries found that children who were in learning activities in which free choice activities predominated had significantly better language outcomes at the age of seven than those in which personal care and group social activities predominated (Montie et al., 2006). Children's interactions with peers and tasks have also been found to be more positive in child-directed settings, such as when there is free choice (Booren et al., 2012; Vitiello et al., 2012).

From a perspective of inclusion, having multiple options for children to access information and engage in learning ensures that all children have opportunities to make decisions about their learning and take ownership of some elements of the learning activity in the classroom. In a study conducted in Portugal, this autonomy support was associated with children's self-regulation (Cadima et al., 2019). ECE teachers in Finland also viewed decision-making as one of the strategies they provided to promote children's self-regulation (Kangas et al., 2015). A metasynthesis of the research on self-determination for children with disabilities of all ages found that choice was an important element of promoting autonomy and self-regulation (Cobb et al., 2009). Another study found that time spent in free play positively predicted child

engagement in inclusive classrooms, whereas the opposite was true for whole-group activities (Coelho et al., 2019).

7.2 The teacher provides children with opportunities to take on roles in the classroom.

ECE teachers can foster children's sense of competence and responsibility for the classroom and their learning by providing them with opportunities to take on roles in the classroom (Niemiec & Ryan, 2009; Schwab & Elias, 2014). In the *Teach ECE* tool, a role is defined as a function or task performed as part of a learning activity, and possible roles are divided into the Medium and High ranges, depending on whether they are limited or meaningful, respectively. For example, limited roles are defined as roles which are *administrative in nature*, such as children helping to take attendance by counting the number of children present or passing out materials. Meaningful roles in the *Teach ECE* context are ones in which the child takes responsibility for *leading an aspect of learning*, for example a child showing and talking about his/her drawing in front of the class or lead the class in a song.

Children have a psychological need for competence — they need to feel that they have effectively enacted a behavior. Experimental studies suggest that competence, paired with autonomy, is a necessary component for intrinsic motivation (Deci et al., 1999). In ECE settings, ECE teachers can foster children's competence by allowing them to take on roles that are cognitively engaging. For example, the Tools of the Mind curriculum allows children to take on complex or meaningful roles in sociodramatic play (Bodrova, 2008), showing impacts on child outcomes (Diamond et al., 2019). In a similar vein, a study found that children's active participation in complex sociodramatic play predicted greater self-regulation during clean-up, whereas solitary dramatic play was negatively correlated with self-regulation during clean-up (Elias & Berk, 2002). These results suggest that the more complex or meaningful roles children take on in sociodramatic play, the greater their self-regulation will be, as opposed to a limited role, as may be the case in solitary dramatic play. Children's empathy is also improved because as children take on roles during play, they interact and share emotions, developing sensitivity to the needs and views of others (Ashiabi, 2007).

Students learn responsibility through opportunities to practice using it (Schwab & Elias, 2014). When teachers throughout the educational system share responsibility with students, they help students feel empowered and support students' prosocial behavior and motivation. Students can share responsibility for the classroom by displaying their work and engaging in organizing the classroom environment. Teachers can also provide students with opportunities to participate in classroom decision-making, which can increase classroom productivity and support students' socioemotional development (Elias et al., 1997; Weinstein & Romano, 2018).

Taking on roles in the ECE classroom is also an important modality through which young children prepare for the roles and responsibilities of adulthood (Rogoff, 2003; Vygotsky, 1978). Building on a large body of research that documents children's involvement in daily household and community activities, Paradise & Rogoff (2009) posit that young children learn a great deal by observing and participating actively in daily activities that are meaningful in their social and cultural context. This fosters autonomy because children naturally take ownership of their learning as they seek to carry out learning activities: roles that involve carrying out their own learning activities tallow children to take ownership of their learning and therefore result in more meaningful roles for children. ECE teachers can capitalize on children's natural desire to engage in adult activities by providing opportunities to take on culturally-relevant, real-life roles in the

classroom (Coppens et al., 2014), boosting children's interest and engagement and providing important informal learning opportunities (Paradise & Rogoff, 2009; Rogoff et al., 2016).

7.3 Children volunteer to participate in the classroom.

In order for learning to occur, children must be actively engaged in and attending to a learning activity (Yair, 2000). Because children who actively participate in ECE classroom activities are engaged, participation is an important precursor to learning (Castro et al., 2017; Christopher & Farran, 2020). Participation is a key characteristic of high-quality ECE classrooms, and effective ECE teachers ensure that *all* children have opportunities to participate in ECE classroom life (Coelho et al., 2019). One of the ways ECE teachers foster children's participation in the classroom is by creating a supportive learning environment in which children feel comfortable sharing their ideas and taking on roles (Whitebread et al., 2014). Research suggests that ECE classroom emotional support and management may foster positive engagement (Castro et al., 2017). One study found that children's active engagement with learning activities was associated with gains in emotion regulation throughout the year (Williford et al., 2013).

Perseverance

Perseverance reflects how an ECE teacher encourages children by focusing on effort and not on ability. This *Teach ECE* Element also measures whether the ECE teacher maintains a positive attitude towards difficulties children may encounter during learning activities, helping children to view them as opportunities to learn. This Element also considers whether the ECE teacher encourages planning in the classroom, thus promoting goal-directed behavior.

8.1 The teacher acknowledges children's efforts.
8.2 The teacher responds positively to children's challenges.
8.3 The teacher encourages planning in the classroom.

8.1 The teacher acknowledges children's efforts.

Praise and positive feedback contribute to a positive ECE classroom environment and strong ECE teacher-child relationships. Not all praise is equally effective in supporting children's motivation and persistence, however (Bayat, 2011). Effective ECE teachers provide feedback and encouragement focused on children's efforts and not just their outcomes or achievements. This type of praise, referred to as *process* praise, is focused on the child's behavior (Bayat, 2011). In contrast, *person* praise evaluates a child's attributes, such as her intelligence. Whereas person praise "creates a fixed mindset in the child, reduces enthusiasm, and discourages motivation," process praise "helps children develop a flexible mindset, encourages them to take on challenges and hard work, and confront their weaknesses and correct them" (Bayat, 2011, p. 125). In their 1998 study, Mueller & Dweck found that children who were praised for their attributes or intelligence after successfully completing a task (e.g., "Good boy!" "You must be smart!") subsequently avoided more difficult tasks. As these children began to see their intelligence as a fixed trait, they ascribed failure to a lack of ability. In contrast, when children received praise focused on their hard work and effort (e.g., "You worked really hard!"), children demonstrated increased motivation and willingness to take on challenges that increased their learning (Cimpian et al. 2007). Process praise promotes children's growth mindset in learning, or their belief that intelligence is malleable and not a fixed attribute (Haimovitz &

Dweck, 2017). As the evidence above suggests, when children possess a growth mindset, they have a positive orientation toward challenges, are more motivated to keep trying, and experience less frustration when they engage in a challenging task. A growth mindset helps to orient children toward learning rather than performance.

For praise to be effective and motivating it must also be specific. Person-focused praise often does not communicate to children what behavior is desired, whereas process praise gives children concrete feedback that they can use to inform their actions and behavior in the future (Bayat, 2011). There is evidence that generic praise reduces children's persistence. For example, Zentall & Morris (2010) found that kindergarten teachers' nongeneric praise related to children's drawing (i.e., "You did a good job drawing!") promoted children's motivation, whereas generic praise (i.e., "You are a good drawer!") contributed to feelings of helplessness (Cimpian et al., 2007). This suggests that ECE teachers can foster children's motivation, willingness to take on challenging tasks, and perseverance by providing specific praise focused on children's behavior and efforts.

8.2 The teacher responds positively to children's challenges.

Encountering challenges and making mistakes are a natural feature of children's social interactions and learning. ECE teachers can support children's cognition and socioemotional development by helping them think about how to respond to challenges they encounter (Pawlina & Stanford, 2011). Through their words and actions, ECE teachers provide modeling that influences children's behavior and attitudes toward learning (Bandura, 1986; Schunk & Zimmerman, 2007). When ECE teachers have a positive attitude toward children's challenges and focus feedback on children's behavior rather than fixed attributes, they promote children's agency and self-efficacy (Dweck, 2016).

Encountering challenges and struggling to understand new concepts is a ubiquitous, important part of the learning process (Hiebert and Grouws, 2007). In the context of mathematics teaching and learning, Hiebert & Grouws (2007) explain that when students struggle, they "expend effort to make sense of mathematics, to figure something out that is not immediately apparent" (p. 377). They and other scholars suggest that struggling to solve problems within reach (not ones that are unnecessarily frustrating) is a key ingredient to learning (Clements & Sarama, 2012). By exhibiting a positive attitude toward children's struggles in the classroom and scaffolding their problem solving, ECE teachers normalize challenge as part of the learning process and help children develop confidence in their ability to address challenges they encounter. Deliberate practice in the face of a challenge is also a part of a trait described as grit (Credé et al., 2017) – the right response to challenges should be to think through how to overcome the challenge, what specifically to improve, what to practice, and what to fix, rather than just doing the same thing over and over again. The ECE teacher encouraging the child to think through different strategies to approach the challenge at hand is part of the High-level Range of this behavior.

Social cognitive theorists suggest that children's self-efficacy, or their perceptions of their own capabilities for learning, influences their "choice of activities, effort expenditure, persistence, and achievement" (Schunk & Zimmerman, 2007, p. 9). Children with high self-efficacy "participate more readily, work harder, persist longer when they encounter difficulties, and achieve at higher levels" (p. 9). Learners' self-efficacy develops from their own experiences, watching the experiences of others, and from the information they receive in relation to their own performance. When ECE teachers provide positive and specific feedback, they can raise

children's self-efficacy in relation to the task at hand, which will either be substantiated or invalidated based on actual performance (Schunk & Zimmerman, 2007). The effects of self-efficacy may be greater for learners who possess a growth mindset because they believe that they can incrementally improve their ability with effort (Dweck, 2016).

8.3 The teacher encourages planning in the classroom.

The ability to plan is recognized as another important milestone in children's cognitive development. The capacity to engage in self-projection to the future and to represent temporal sequences – both critical aspects of planning – develop during early childhood (McCormack & Atance, 2011). There is evidence that planning, which involves event-independent temporal representation and self-projection, contributes to children's self-regulation (McCormack & Atance, 2011; Epstein, 2003). Scholarship in this area thus suggests that ECE teacher interventions that target children's planning could positively affect children's academic achievement (Crook & Evans, 2014). Scaffolding children's planning and providing opportunities for them to take initiative is also linked to later social responsibility, as evidenced by research on the HighScope curriculum (Schweinhart & Weikart, 1997).

When ECE teachers provide children with opportunities to engage in planning they contribute to the development of executive function. Improved planning ability is linked to inhibitory control, an important sub-component of executive function (McCormack & Atance, 2011). Planning is also linked to the emergence of self-regulation because in order to plan, "a child must be able to form a representation of the problem, formulate a strategy and execute it, focus on a goal, and self-monitor progress toward the goal" (Crook & Evans, 2014, p. 409). A meta-synthesis of the research on self-determination for children with disabilities of all ages found that goal-setting was a common component of such interventions, and that they promoted autonomy and self-regulation (Cobb et al., 2009).

The ability to plan is also viewed as an indicator of flexibility of thought and children's emerging ability to think about the future. Changes in children's planning behavior are linked to changes in their flexibility of thinking. Cognitive flexibility, also called switching, is the ability to shift between two or more competing response alternatives and has been linked to school readiness and academic achievement (Vitiello et al., 2011). McCormack and Atance (2011) write: "critically, planning is a key way in which flexibility of thought can be exploited to enable behavior to adapt not just to the current state of the world, but to anticipated states of the world in the immediate or distant future" (p. 3). Future thinking is integral to planning, because creating and carrying out a plan requires the projection of self into the future (Atance, 2015). Future thinking in young children is reflected in their ability "to envision what they might do at the park tomorrow, bring an item (e.g., teddy bear) that they may need later to grandma's, and save candy or toys for tomorrow or the next day" (Atance, 2015, p. 179). Effective ECE teachers pose questions and facilitate learning activities that foster children's future thinking and planning ability.

Social and Collaborative Skills

In *Teach ECE,* Social and Collaborative Skills are defined as how an ECE teacher fosters a collaborative environment, encourages children's collaboration with one another, and promotes their interpersonal skills. In these effective environments, children work together in the ECE classroom, helping to create an environment free from physical or emotional hostility.

The ECE classroom is often a child's first group learning experience outside the home and thus an important context for developing prosocial skills. Through their interactions in the ECE classroom, children come to understand themselves as learners and social beings (Battistich & Watson, 2003). By providing children with learning activities and tasks that require collaboration, and by providing children with appropriate scaffolding and support as they work with their peers to complete those thinking tasks, ECE teachers support children's cognition and socioemotional development. "Co-operative learning in early childhood can develop positive attitudes toward school and learning, and towards peers, and can provide abundant opportunities for learning how other people think, for developing language skills, and for learning how to solve interpersonal problems" (Battistich & Watson, 2003, p. 20). There is evidence that learning these skills during the early childhood years supports children's positive peer interactions throughout their school career. Peer relations are critical for academic achievement—peer rejection and victimization can lead to social difficulties and academic failure (Hamre & Pianta, 2007). Developing the skills for successful interaction during ECE and the early primary grades leads to greater peer acceptance throughout schooling, while failure to develop these skills results in greater peer rejection (Battistich & Watson, 2003).

9.1 The teacher promotes children's collaboration through peer interaction.
9.2 The teacher promotes children's interpersonal skills.
9.3 Children collaborate with one another through peer interaction.

9.1 The teacher promotes children's collaboration through peer interaction.
Peer interaction in pairs or small groups supports children's cognition and socioemotional development (Whitebread & Sitabkhan, forthcoming; Whitebread et al., 2014; Timmons et al., 2016). As already noted in this review, sociocultural theory posits that learning occurs through interaction with more advanced partners (Vygotsky, 1962; 1978). When children work with a more advanced peer to solve a problem, their conceptual understanding is scaffolded and they can later apply new skills and knowledge to a new problem (Ramani, 2005; Rogoff, 2003). Schunk & Zimmerman (2007) also point to the role of modeling in children's learning and development of self-efficacy. They note that when a child who is initially experiencing difficulty solving a problem observes a peer model, her self-efficacy may increase because she perceives that if a peer can learn something, then she can as well.

Collaborating to solve a problem also fosters children's ability to recognize other perspectives, reconcile differences, and understand problems better. Recent experimental research has shown that "preschool children's problem-solving benefits from cooperative interaction and that working with a peer may be an effective way for young children to gain new knowledge and to generalize it" (Ramani, 2005, pp. 87-88).

While the behavioral, cognitive, and social skills needed to engage in productive collaborations develop over time, there is evidence that children as young as two begin to develop the ability to "successfully solve collaborative problem-solving tasks that require behavioral coordination" (Warneken et al., 2014, p. 49; Brownell et al., 2006; Eckerman & Peterman, 2001; Warneken et al., 2007). During their third year, children become increasingly able to respond to their peers' actions and desires, as demonstrated by behaviors like offering toys that another child actually wants (Brownell et al., 2006). These collaborative skills develop

over time on average from complementary and reciprocal play between 13 and 36 months, evolving into cooperative play 4-6 years of age (Howes et al., 1988).

In ECE classrooms, play is an important context for cooperative peer interactions that can support children's cognition and socioemotional development (Ramani, 2012). Evidence suggests child-centered play can better support and promote cooperative problem-solving skills in younger children than adult-centered, direct instruction (Ramani, 2005, p. 89; Whitebread et al., 2014). Two studies in Ethiopia and a similar study in Rwanda found that having children engage in high-quality, playful games in different kinds of ECE programs led to growth in child outcomes (Borisova et al., 2017; Dowd et al., 2016; Dusabe et al., 2019). Sociodramatic play also promotes children's collaboration through peer interaction. During pretend play, children must express their ideas to playmates, negotiate play narratives and rules, share materials, and negotiate/take on roles. Such experiences promote the development of children's collaborative skills (Whitebread & Sitabkhan, forthcoming). ECE teachers can thus provide children with opportunities to engage in pretend play with their peers, which provides a natural context for working collaboratively. As noted previously, while this play should be child-led, the ECE teacher plays a role in this process by scaffolding children's interpersonal interactions during pretend play, thus supporting the ongoing development of their collaborative skills.

ECE teachers can provide opportunities for peer interaction by varying instructional groupings (e.g., whole group, small group, and pairs) so that children have "regular, frequent opportunities for extended conversations with their peers and teachers" (National Research Council, 2015, p. 258). This also supports children's language development by providing them access to different kinds of language experiences. Working in pairs and small groups is particularly beneficial for rich language interaction (Littleton et al, 2005), though ECE teachers play an important role in ensuring that discussions in these settings are productive (Whitebread & Sitabkhan, forthcoming). When children are guided to engage in "exploratory talk, involving active joint engagement with ideas…they show significantly enhanced metacognitive awareness of their own thinking and significantly improved articulation of their ideas" (Whitebread & Sitabkhan, forthcoming.

9.2 The teacher promotes children's interpersonal skills.

One of the most important skills young children learn in early childhood settings is how to get along with others. Positive peer relations, prosocial behavior and the development of social skills in early childhood is also a predictor of children's ability to adapt to school and their later academic achievement (Coolahan et al., 2000; McClelland & Morrison, 2003; Ladd et al., 1999; Ladd, 1990; Ladd & Price, 1987). Social skills are important for school success, yet there is wide variation in children's level of social skills at the start of school (McClelland & Morrison, 2003). Positive teacher-child and peer interactions are foundational to the development of interpersonal skills (Bierman et al., 2008; Pianta et al., 2012).

While it is critical that the ECE classroom environment be positive (see the Area of Classroom Culture), ECE teachers can further explicitly promote interpersonal skills development by supporting children's ability to consider a situation from a different point of view (perspective taking), encouraging children to recognize and share another's emotions (empathy), nurturing children's ability to manage and respond effectively to an emotional experience (emotion regulation), and fostering children's ability to successfully solve interpersonal problems, a process which may involve applying aspects of perspective taking, empathy, and emotional regulation (social problem-solving). ECE teachers support the

development of these skills by modeling them in their own interactions with children and by providing scaffolding to children as they negotiate interpersonal problems that arise in the classroom. Adults play a critical role in the development of self-regulation by providing co-regulation (Murray et al., 2015). ECE teachers can provide co-regulation through direct instruction, modeling, and scaffolding. Providing labels for emotions, demonstrating methods for coping with strong emotions, such as taking deep breaths or engaging in self-talk, support children to successfully manage their own strong feelings. Over time, children's self-regulation skills grow more complex and they are better able to engage these strategies independently.

Empathy and *perspective-taking* ability are related to theory of mind skills, which begin developing between the ages of 3 and 5. Theory of mind is the ability to understand and explain one's own and others' mental states and to recognize that another's beliefs and desires may differ from one's own (Slaughter et al., 2002, p. 546; Flavell & Miller, 1998). Developing the ability to "put oneself in another child's shoes" is considered a prerequisite of prosocial behavior (Eisenberg & Mussen, 1989, as cited in Caputi et al., 2012), and research in this field has also found that children who score higher on emotion-understanding and perspective taking measures engage more frequently in prosocial behaviors (Caputi et al., 2012; Denham, 1986; Denham et al., 1990; Lalonde & Chandler, 1995; Slaughter et al., 2002). Prosocial behaviors like helping, sharing, and taking turns, have been linked to school success (Bierman et al., 2008). Prosocial behavior also helps children foster positive peer relationships, which are predictive of their attitudes toward school and cognitive achievement during kindergarten (Ladd, 1990).

Emotional regulation, or the ability to recognize and manage one's emotions, is critical to children's ability to form relationships with peers and has also been linked to school success (Denham et al., 2003). Children's ability to understand and regulate their emotions is critical to the development of social competence. Between the ages of 2 and 5, children develop their ability to interact with others and manage their emotions. Children who successfully negotiate this developmental task are well-positioned for successful social interactions in the future (Denham et al., 2003).

Self-regulation is the ability to manage one's emotions and behavior in response to a particular context or set of demands. Behavioral self-regulation involves the application of attention, working memory, and inhibitory control to a particular situation (von Suchodoletz et al., 2013; McClelland et al., 2007). The development of self-regulation in young children is critical to school success because it contributes to children's ability to focus and maintain attention, regulate their emotions, apply social rules to behavior, and sustain positive interactions with peers and adults. In contrast, children who struggle with self-regulation may have a hard time adhering to classroom expectations like sitting still and participating in learning activities. Children's internal self-regulation is aided by adults' external verbalizing of behavioral expectations, which they then can internalize. Children's ability to self-regulate develops over time, aided by adult support and scaffolding. Self-regulation is influenced by internal factors, such as one's temperament, and external factors like one's environment and interactions with others (Murray et al., 2015). The development of self-regulation skills contributes to children's ability to engage in learning and is foundational for children's adjustment to school (Blair & Raver, 2015). There is evidence that strong self-regulation skills contribute to children's successful transition to primary school and to their short- and long-term behavioral and academic outcomes in school (Blair & Raver, 2015; McClelland et al., 2007; Rimm-Kaufman et al., 2009; Schmitt et al., 2020). One recent study showed that young children who exhibited higher levels of behavioral self-regulation benefited more from a high-quality ECE experience, as evidenced

by their mathematics learning (Schmitt et al., 2020). This suggests that behavioral self-regulation is an important mediator of quality in ECE classrooms.

Self-regulation, empathy, and perspective taking all contribute to children's ability to engage in *social problem solving*. Young children regularly encounter social problems related to "initiating friendship, acquiring objects, seeking and offering help, seeking attention or information, and stopping others from acting in some way or another" (Rubin & Krasnor, 1986, p. 2). The development of emotional regulation and prosocial behavior are linked to the development of social problem-solving skills, which include the ability to define problems, generate solutions, consider alternate solutions/perspectives, and to engaging in planning, which considers potential outcomes from those solutions (Bierman et al., 2008). Child-directed pretend/sociodramatic play provides children with opportunities to engage in social problem solving because it requires that they negotiate rules, roles, and the pretense of a play situation (Bergen, 2002) as well as practice self-regulation in ways that help sustain interactions (Eggum-Wilkens et al., 2014). When conflict arises during peer play, children have opportunities to learn perspective-taking and how to negotiate competing desires (Ashiabi, 2007).

9.3 Children collaborate with one another through peer interaction.

While teacher-child relationships are critically important to children's learning and development in ECE settings, peer interaction also supports learning and cognitive development throughout the educational system (Coplan & Arbeau, 2009; Wentzel, 2009). Peer interactions in the ECE classroom reflect the culture/norms that the ECE teacher has created. If the ECE teacher has created a culture of collaboration, then peer collaboration is more likely to occur in his/her classroom. Research shows that children's peer interactions are positively associated with cognition and socioemotional development (Eggum-Wilkens et al., 2014; Sabol et al., 2017). There are multiple theoretical perspectives that explain how children may learn from interaction with peers. Scholars have suggested that children learn by observing their peers (Bandura, 1977) or by engaging with their peers and/or obtaining assistance from a more knowledgeable or advanced peer (Vygotsky, 1978; Wentzel, 2009; Eggum-Wilkens et al., 2014). Peer interactions provide children with opportunities to practice problem solving, communication, turn taking, and perspective-taking. Play provides an opportunity for children to cooperate, as children may work collaboratively on an activity (Ashiabi, 2007; Ramani, 2012).

Section 3: Discussion and Conclusions

As discussed in the introduction of this paper, *Teach ECE* is designed to be a tool that is scalable in LMICs – it is free to access, implementable by non-expert observers, and does not require long observation periods. Furthermore, it provides a comprehensive window into the core ECE learning environment – the quality of ECE teacher-child interactions, time on task, as well as the structural quality supports necessary to support the learning process.

Teach ECE provides a framework and a common language with which to observe, discuss, and improve quality ECE teaching, independent of the specific environment or learning activity. For example, *Teach ECE* can simultaneously capture Guided Learning in high-quality teacher-centered instruction as well as child-centered play, while providing insights into classroom management and the promotion of socioemotional development, elements of teaching that are fundamental in ECE environments.

Teach ECE is aimed to facilitate the scale-up of the measurement of ECE quality, particularly in LMICs, and to provide policymakers and stakeholders the information they need

to inform the design and implementation of ECE programs and policies. In particular, *Teach ECE* holds particular promise and value in driving the policy dialogue around the need to improve the supports ECE teachers receive, both in terms of the infrastructure and learning resources with which they have to work, and also in terms of the training and continuous professional development they receive.

Teach ECE has been through a rigorous development process thus far. Key next steps will include the piloting and validation of the use of the tool for monitoring ECE teaching practices and informing ECE teacher professional development programs and technical assistance. To date, *Teach Primary* has been implemented in over 20 countries, has been integrated into countries' national monitoring systems, and has been found to have solid psychometric properties (Molina et al., 2020), showing the potential for *Teach ECE*. Nevertheless, it will be important to demonstrate the strength and promise of the *Teach ECE* tool in its own right.

This literature review has provided an overview of the *Teach ECE* classroom observation tool and the rationale behind it, as well as the evidence behind each Area, Element, and behavior. It is the aim for this common framework to provide a starting point for understanding, measuring, and discussing the quality of ECE teaching practices, particularly in LMICs, leading to improved support for ECE teachers, and ultimately to better learning experiences and outcomes for young children around the world.

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Annex: Summary Table of Evidence

Area	Element	Explanation of the Key Evidence[8]
Classroom Culture	**Supportive Learning Environment**	ECE teachers foster positive relationships with children by treating them with respect. The use of positive language, including praise and encouragement, contributes to a positive classroom climate (Fuhs et al. 2013; Fullerton, 2009). Effective ECE teachers display attentiveness and sensitivity to children's needs (Hamre & Pianta, 2007; Johnson et al., 2013; Shavega et al., 2014), and treat children equitably, regardless of gender (Bhana et al., 2011; McNaughton, 1997; Meland & Kaltvedt, 2017; Mweru, 2002) or ability.
	Positive Behavioral Expectations	Positive reinforcement and praise help children understand what is expected of them in the ECE classroom. In ECE classrooms where behavioral expectations are clear (Reinke et al., 2018) and reinforced with positive language (Driscoll & Pianta, 2010), children are able to stay on-task, minimizing time spent on transitions and behavior management and maximizing opportunities to learn (Christopher & Farran, 2020; Dobbs et al. 2004; Webster-Stratton et al., 2004).
Guided Learning	**Facilitation of Learning**	When ECE teachers communicate to children what they will do in a learning activity and why, they support children's metacognitive development, children's awareness of their own thinking, and children's ability to regulate their actions in relation to that knowledge. One way ECE teachers can make sure the explanation of concepts is clear is to use multiple means of representations that aid children in building, strengthening, and connecting various representations. Learning in the ECE classroom should be meaningful and connected to children's daily lives and experiences, and children learn most readily when new concepts build upon their existing understandings (Carpenter et al., 1989; National Research Council, 2001; Sarama et al., 2012). Effective teachers provide children with assistance, or scaffolding, to support their learning and development, through the use of practices like enacting, assisting, and narrating or thinking aloud to scaffold children's understanding (Barnes et al.,

[8] Key evidence is defined as empirical studies that directly support the behavior.

		2016; Barnes et al., 2019; Bingham et al., 2017; Turnbull et al., 2009).
	Checks for Understanding	ECE teachers can check for understanding by asking children questions to elicit information about their learning (Massey et al., 2008; Mligo, 2016; Mtahabwa & Rao, 2010; Pentimonti & Justice, 2009; Pianta et al., 2002; Jensen et al., 2019a). In high-quality ECE classrooms, ECE teachers engage in repeated, systematic observation of children to obtain information about children's learning and development so that they can tailor instruction to the needs of individual children. Effective ECE teachers are responsive to children's learning needs and adjust their teaching so that they are providing the right amount of scaffolding needed to help children advance along a developmental progression of learning (Bierman et al., 2008; Burchinal, 2017; Hamre et al., 2013).
	Feedback	Over the course of their interactions with children, effective ECE teachers use feedback loops in order to support young children's understanding (Hamre & Pianta, 2005; Pianta et al., 2002h). In order for feedback to be effective, it should be intentional, explicit, prompt, direct, specific, and positive (Dickinson & Porche, 2011).
	Critical Thinking	Learning involves more than being able to memorize and recall facts and requires both the understanding and remembering concepts and the ability to apply this knowledge to new ideas. ECE teachers have a big part to play in building up young children's critical thinking skills. Specific behaviors ECE teachers can enact to foster critical thinking include asking children open-ended questions (Cabell et al., 2015; Grifenhangen et al. 2017; McNerney et al. 2020; Suleeman & Widiastuti, 2018; Wasik & Bond, 2001; Wasik & Hindman, 2011) and providing children with learning activities that make them think independently (termed thinking tasks in Teach ECE) (Taylor et al., 2003). As a result of these ECE teaching practices, children can also, in turn, ask open-ended questions, thinking tasks, or conduct open-ended tasks such as self-guided play (Clements et al., 2016; Opel at al., 2012; Reid et al., 2019; Sabol et al., 2017; Taylor et al. 2003; Whorrall & Cabell, 2015).

Socioemotional Skills	**Autonomy**	Providing children with choices in ECE is critical to their learning and development because it fosters interest and engagement and supports the development of autonomous motivation, which also fosters cognition (Booren et al., 2012; Cadima et al., 2019; Coelho et al., 2019; Goble & Pianta, 2017; Kangas et al., 2015; Montie et al., 2006; Vitiello et al., 2012). ECE teachers can also foster children's sense of competence and responsibility for the classroom and their learning by providing them with opportunities to take on roles in the classroom. Participation is a key characteristic of high-quality ECE classrooms, and effective ECE teachers ensure that all children have opportunities to participate in ECE classroom life (Christopher & Farran, 2020; Coelho et al., 2019; Williford et al., 2013; Yair, 2000).
	Perseverance	ECE teachers can foster children's motivation, willingness to take on challenging tasks, and perseverance by providing specific praise focused on children's behavior and efforts (Cimpian et al, 2007; Haimovitz & Dweck, 2017; Mueller & Dweck, 1998; Zentall & Morris, 2010). ECE teachers can support children's cognition and socioemotional development by helping them think about how to respond to challenges they encounter (Pawlina & Stanford, 2011). ECE teacher interventions that target children's planning can also positively affect children's academic achievement (Atance, 2014; Crook & Evans, 2014; Epstein, 2003; McCormack & Atance, 2011; Schweinhart & Weikart, 1997).
	Social & Collaborative Skills	Through their interactions in the ECE classroom, children develop as social beings. By providing children with learning activities and tasks that promote collaboration (Littleton et al., 2005; Ramani, 2012) and by scaffolding children's interpersonal skills (Bierman et al., 2008; Schmitt et al. 2020), ECE teachers support children's cognition and socioemotional development. In turn, children learn as they collaborate through peer interaction (Eggum-Wilkens et al., 2014; Ramani, 2012; Sabol et al., 2017).