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Measuring and predicting process quality in Ghanaian pre-primary classrooms using the Teacher Instructional Practices and Processes System (TIPPS)

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ABSTRACT

In recent years, there has been an increase in the demand for and supply of early childhood education (ECE) in low- and middle-income countries. There is also growing awareness that unless ECE is of high quality, children may attend school but not learn. There is a large literature on the conceptualization and measurement of ECE quality in the United States that focuses on the nature of teacher-child interactions. Efforts to expand access to high quality ECE in low- and middle-income countries will require similar measurement efforts that are theoretically-grounded and culturally-adapted. This paper assesses the factor structure and concurrent validity of an observational classroom quality tool to assess teacher-child interactions—the Teacher Instructional Practices and Processes System© (TIPPS; Seidman et al., 2013)—in Ghanaian pre-primary classrooms. We find evidence of three conceptually distinct but empirically correlated domains of quality: Facilitating Deeper Learning (FDL), Supporting Student Expression (SSE), and Emotional Support and Behavior Management (ESBM). Teachers' schooling level, training in early childhood development, and professional well-being positively predict the three quality domains in different ways. SSE and ESBM predict classroom end-of-the-school-year academic outcomes, and SSE predicts classroom end-of-the-school-year social-emotional outcomes. Implications for the field of international education and global ECE policy and research are discussed.

1. Introduction

Enrollments in early childhood education (ECE) programs have increased substantially in developing countries over the past several decades (Yoshikawa et al., 2018). In a global initiative to improve children's development and learning, United Nations Sustainable Development Goal 4 on education Target 4.2 aims to expand access to high quality ECE and improve school-readiness outcomes for all children (United Nations, 2015). The target's emphasis on quality is critical, as successful efforts over the last 15 years to increase access to primary education in low- and middle-income countries (LMICs) have not resulted in high learning rates. Conceptualizing and developing culturally-relevant, reliable, and valid metrics of quality is a necessary first step to monitoring and improving it.

Specific features of the classroom context have been shown to meaningfully predict student learning outcomes and trajectories of learning (e.g., Hamre & Pianta, 2001; Mashburn, 2008). Two features of classroom quality are often considered. *Process quality* – considered the driver of child development and learning (Howes, James, & Ritchie, 2003; Pianta, 2005) – refers to the nature of children's daily interactions and experiences in the classroom, with a broad focus on the social, emotional, physical, and instructional aspects of activities and interactions. *Structural quality* refers to regulable resources, such as class size, student-teacher ratio, and teacher training and education (Slot, Leseman, Verhagen, & Mulder, 2015) and are considered important for improving learning outcomes only to the extent that they promote process quality (Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Pianta et al., 2005; Vandell, 2004; NICHD Study of Early Child Care, 2002). Yet notably, research is mixed with regard to the consistency of these results across diverse settings, outcomes, and study designs, with many high-quality studies and meta-analyses showing small – or even null – associations between measured classroom quality

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and child outcomes (Auger, Farkas, Burchinal, Duncan, & Vandell, 2014; Burchinal, 2017).

The vast majority of studies assessing process quality have focused on developed countries. As efforts to expand access to quality education in LMICs increase, establishing metrics that are theoretically-grounded and culturally adapted is crucial. Yet little is known about the conceptual and empirical nature of ECE classroom processes in LMICs generally, and in sub-Saharan Africa (SSA) in particular. In the last two decades researchers have begun to highlight the need for classroom observational instruments that can be used across diverse settings and used in LMICs to gauge elements of classroom quality such as student engagement, effective instruction, and emotional factors that support child development (Schaffer, Nesselrodt, & Springfield, 1994; Venäläinen, 2008). While several instruments have been used in LMICs to assess classroom contexts (Chesterfield, 1997; Stallings & Kaskowitz, 1974; United States Agency for International Development, 2010), most are in the form of frequency-based checklists or time spent on tasks, rather than assessments of process quality.

1.1. Conceptualizing and measuring classroom process quality

Behind the concept of process quality is a long-standing theoretical base on the ways social-settings affect individuals (i.e., through their daily interactions in those settings; Tseng & Seidman, 2007), with a particular focus on classroom settings (Cohen, Raudenbush, & Ball, 2003; Pianta & Hamre, 2009). These frameworks postulate that learning and development rest with students' daily experiences with teachers and peers in the classroom (Seidman & Tseng, 2011), and that these interactions are culturally bound (Stigler, Gallimore, & Hebert, 2000). Whether underlying domains of quality are similar across contexts and cultures is not known, though evidence to date suggests that some quality dimensions are similar across countries. This body of work is primarily limited to the most studied classroom observation tool – the Classroom Assessment Scoring System™ (CLASS; Pianta, La Paro, & Hamre, 2008), and thus it is not clear whether consistences found across countries are the result of the observation tool itself (see Pastori & Pagani, 2017).

The CLASS organizes teacher-student interactions into three major domains: Emotional Support, Classroom Organization, and Instructional Support (Hamre et al., 2013). These three domains have strong empirical support in high- and a few upper middle-income country contexts (e.g., Hamre et al., 2013). Two recent studies used the CLASS in Latin America. Leyva et al. (2015) found support for the existence of three distinct domains of teacher-child interactions, and Araujo, Carneiro, Cruz-Aguayo, and Schady (2016) used teachers' total CLASS scores to represent Responsive Teaching (as in Hamre, Hatfield, Pianta, & Jamil, 2014). Both studies found that these quality measures predicted children's academic and executive function skills over one school year. Finally, a third study assessed the applicability of the CLASS in kindergarten classrooms in China (Hu, Fan, Gu, & Yang, 2016), and found support for the three-factor structure with acceptable psychometric characteristics.

Other studies, however, have identified psychometric inconsistencies with the original three-factor model (e.g., Pakarinen et al., 2010 in Finland; von Suchodoletz et al., 2014 in Germany). Some have raised critical questions about the international application of standards-based measures to assess ECE quality (Pastori & Pagani, 2017). Interviewing ECE experts and teachers in Italy, Pastori and Pagani (2017) found that while there were elements of continuity in how these teachers perceived quality based on the CLASS dimensions, there were also disagreements about some of the items and key features of the teacher-child relationship that these experts felt were not captured by the tool.

To our knowledge, the CLASS assessment has never been used in SSA and our piloting of the tool suggests it may not be feasible without significant adaptation. For example, the CLASS does not provide guidance on how to use it out of the U.S. or if adaptations are allowed, and its cost is often prohibitive in low-income countries. The cost, coupled with the difficulty of adaptation, is a serious barrier for its use in low-resource contexts. Furthermore, the inferential scoring method, coupled with the phrasing of some of the items, was difficult for local observers to implement with reliability. Finally, classroom assessment tools must be granular and nuanced to be useful for feedback, and according to Pianta (2011), the CLASS dimensions are too coarse for this purpose. This also leads to a need for higher inference on the part of the observer. Measuring classroom process quality in SSA may require a tool developed for the region that is attuned to the context – for example, with a focus on concepts that are particularly relevant when teaching in multi-lingual settings (e.g., tone of voice, language modeling), has sufficient granularity, and is designed with the ease and intent of adaptability by allowing for culturally specific examples to be incorporated.

1.2. The Teacher Instructional Practices and Processes System (TIPPS) – ECE version

The need for a classroom-quality observation tool focusing on process quality is great given its potential as a lever of change to improve education, especially in low-income countries where educating children and youth is a major policy issue (UNESCO, 2008). The Teacher Instructional Practices and Processes System© (TIPPS; Seidman, Raza, Kim & McCoy, 2013) was created to asssess classroom process quality in low-income countries. The initial reliability and validity study of the TIPPS was conducted in Ugandan secondary school classrooms (Seidman et al., 2018). As a systematic behavioral observation instrument, the TIPPS has been designed to measure the quality of teaching practices and classroom processes in as granular and nuanced fashion as possible so that they can be fed back to teachers to improve their performance, as well as student academic and social-emotional outcomes.

The development of the ECE version of the TIPPS was, in large part, led by focusing on key quality indicators in the classroom that support child development. These theoretical constructs include the use of structured free-play in the classroom, ECE-focused instructional practices, social-emotional support, classroom management and environment. The measure also includes an "environmental scan" that records the availability of classroom structural supports (e.g., availability of books, desks, and classroom lighting). In the current study, we examine the utility and effectiveness of the pre-primary version of the TIPPS in Ghana.

1.3. Early childhood education in Ghana

Ghana is a lower-middle-income country in West Africa with a population of 26.9 million people (Central Intelligence Agency, 2016). The adult literacy rate is 76.6%, with significant variation across regions. The highest literacy levels (88.5%) are in the Greater Accra Region, with nearly half of the regional population being literate in English and a Ghanaian local language (Ghana Statistical Service, 2012). Nearly one-quarter (24.2%) of the population lives below the national poverty line of approximately $290 per adult per year (Central Intelligence Agency, 2016). In 2007, Ghana became one of the first countries in SSA to extend two years of pre-primary schooling (i.e., kindergarten for 4 year olds (KG1) and 5 year olds (KG2)) as part of its free universal basic educational system and has among the highest ECE net enrollment rates in Africa at 75% (UNESCO, 2015).