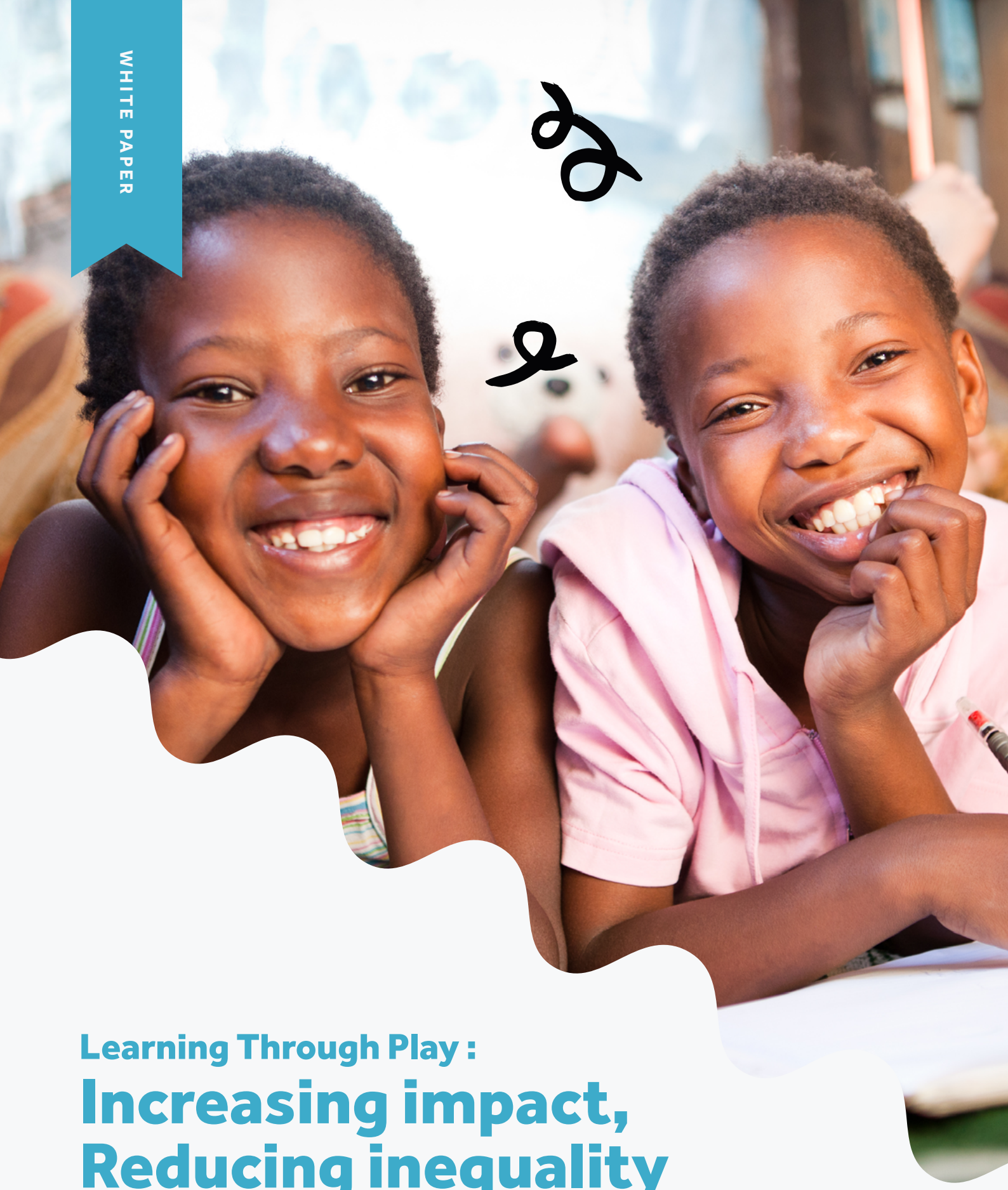
WHITE PAPER



Learning Through Play :

Increasing impact, Reducing inequality

Authored by the LEGO Foundation's Head of Evidence, Amy Jo Dowd and Chair of Learning Through Play, Bo Stjerne Thomsen

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The LEGO Foundation

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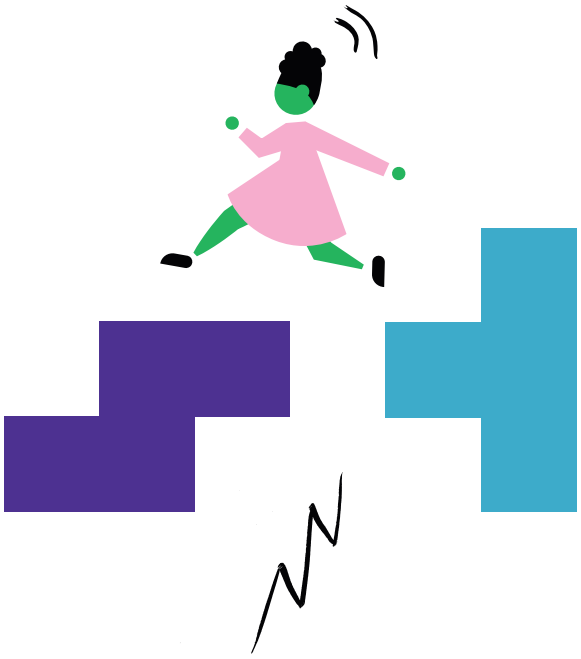


SECTION 1:

Background to the study

1.1 Acknowledgements

This study was authored by the LEGO Foundation's Head of Evidence, Amy Jo Dowd and Chair of Learning Through Play, Bo Stjerne Thomsen. Comments have been gratefully received from Sarah Bouchie and Celia Hsiao at the LEGO Foundation and Hirokazu Yoshikawa at New York University. The insights herein would not have been possible without the key informants' willingness to reflect on their work in a new light. We are grateful for their time and gracious attention.

1.2 Preface

The aim of the LEGO Foundation is to systemically reach children with learning through play, and empower them to become creative, engaged, lifelong learners. Over a number of years, the LEGO Foundation has worked consistently to redefine play and reimagine learning, in order to provide a coherent definition of learning through play which adequately demonstrates the potential for children to develop the critical skills needed for the future. This report applies the lens of learning through play and its promotion of a breadth of skills to recent evidence from early childhood interventions. It explores the extent to which these interventions engage children in learning through play, and to what degree there is potential for children's play to promote equality in outcomes and address learning gaps between children from more advantaged and less advantaged backgrounds. This report builds on the characteristics of learning through play, the play types and facilitation approaches addressed in past reports and recasts the evidence to inform recommendations for future work.

1.3 Executive summary

Many children around the world do not reach their full potential, despite continuous attention and efforts to improve early childhood interventions and policy. This context offers a growing opportunity for play and a holistic approach to learning to frame an inclusive strategy to better equip all children for the future. When children learn through play in stimulating environments with quality facilitation, there is a greater opportunity to support them, taking account of their individual backgrounds and needs. However, learning through play strategies have not consistently been clearly articulated and shared for the benefit of increasing awareness, improving facilitation, documenting impact and testing the scalability of the approaches.

While early childhood represents an "exceptionally powerful opportunity to break intergenerational cycles of inequity" (UNICEF, 2019, p. 39), fulfilling this promise requires attention to closing both access and learning gaps between children from more advantaged and less advantaged backgrounds – be they advantaged or disadvantaged by sex, geography, race, ethnicity, poverty, language, disability – or combinations thereof, as well as ensuring its quality (Chaudry et al., 2017). This study explores the role of play in contributing to the effort to promote learning and reduce inequality.

Reviews of play's importance for learning present mostly correlational evidence from small samples in high-income, developed contexts, most often the United States, and often under laboratory conditions. This review expands both the geographic breadth and the scale of this evidence and explores the use of play in early childhood classroom and home-based educational interventions that have demonstrated causal impact on learning and the closing of achievement gaps. By doing so, it aims to understand whether and how the evidence about play and learning relates to tackling the learning crisis, especially in terms of inequality in learning outcomes around the globe.

This study comprises a review of 26 early childhood evaluations from the last decade with learning and equality impact as well as 20 key informant interviews with authors of identified studies to understand the coverage of play facilitation strategies (Jensen et al., 2019), play characteristics (Zosh et al., 2018) and play types (Whitebread et al., 2017) in each intervention. The studies demonstrate benefits in terms of learning outcomes across social, emotional, cognitive and physical learning. While most studies assess a range of such skills often associated with "school-readiness," two studies in high-income settings depart from this formula to look at creativity and stress-response physiology.

The review of play facilitation strategies used in these studies shows that the majority of interventions that close achievement gaps include free and guided play and enable child choice in the classroom. However, the use of free and guided play in classrooms required time and support to help teachers implement and sustain them. Even so, in resource-constrained settings, free and guided play proved possible. Teachers also gravitated towards games. The review of play characteristics showed that these gap-closing interventions were also more likely to have observable instances of all of the characteristics of learning through play – including iteration and joy – suggesting a linkage between child choice, enjoyment, exploration, perseverance and learning that is worth further investigation. Finally, the review of types of play in these interventions showed that different types of play can promote learning in different domains, and that enduring gains, though infrequently studied, have been found in non-academic skills.

The question of whether and how variation in play facilitation and types can help children, regardless of background, develop an enduring breadth of constrained and unconstrained skills across developmental domains requires additional action and exploration. These conclusions suggest four areas for future investment, innovation and investigation: the pursuit of more free and guided play in resource-constrained contexts, the testing of incremental and disruptive ways to increase play in early childhood interventions, the launch of longitudinal studies of play in early childhood, including a breadth of skills with a focus on fade-out, and the application of this playful lens in studies of early primary interventions.

1.4 Introduction:

Reducing social inequality via investments in playful early childhood interventions

Disparities both in access to quality pre-primary education and measurable outcomes of child development and learning are unfortunately the global norm. Across 64 countries, the richest children are seven times more likely to attend pre-school programmes than the poorest children; urban children are 2.5 times more likely than rural children to do so (UNICEF, 2019). Further, an estimated 250 million young children in low- and middle-income countries are at risk of not realising their developmental potential (Black et al., 2017). Among older children, Programme for International Student Assessment (PISA) scores show that socio-economically disadvantaged 15-year-olds across 72 countries are, on average, 2.8 times more likely than more advantaged students to fail to attain basic science proficiency (OECD, 2016). Even in contexts like Denmark, Estonia and Ireland where gender and geographic parity have been achieved, 20 percent fewer disadvantaged young people achieve maths proficiency than non-disadvantaged young people (OECD, 2018).

We approach this study of play and inequality in early educational settings using the contrast of distributional mechanisms that consider resource-sharing and targeting, and relational mechanisms that consider the structure and quality of relations that transact to reproduce or transform inequality (Bruch, 2017; Bruch & Soss, 2016). While both elements of this contrast are relevant, approaches to tackling inequality that focus on the distribution of resources are dominant in the early childhood literature. These oft-used strategies include: reduction of poverty and related outcomes via investment in disadvantaged communities, redistribution via taxation and/ or services, and strengthening the poor and middle class simultaneously. Early childhood investments offer examples of each of these strategies.

First, early childhood education and development investments targeting disadvantaged communities are common across the globe and their cost-effectiveness and impact on a range of short- and long-term outcomes, from primary school readiness to employability, criminality and economic stability, are the source of evidence for many investment arguments (Engle et al., 2011; Grantham-McGregor & Smith, 2016; Heckman & Karapakula, 2019; Johnson & Jackson, 2019).

Second, universal pre-K (pre-kindergarten) is an early childhood-focused means of resource redistribution that can ultimately benefit the disadvantaged more – though evidence from the US and South Africa shows that the quality of services is essential to ensure such an equalising benefit (Friedman-krauss et al., 2016; Samuels et al., 2015; Spier et al., 2019).

The prominence of ensuring quality is also true of the third approach: investing in systems that support early childhood education and development for both poor and middle class families, making it essential to address the inequity seen in access to education programmes, while keeping an eye on how environmental and instructional quality in them may vary based on wealth (Chaudry et al., 2017).

Each of these three options features a reconsideration of inputs in which the quality of the early childhood opportunity must be present to ensure distributional equity and promote greater equality in learning outcomes. Thus we pursue equity in quality early educational inputs which may (especially for early childhood settings) include play, which in turn supports and promotes equality in educational outcomes. We turn now to a consideration of play and its importance for learning.

1.4.1 Play and learning

In recent years, the benefits of play, especially its critical role for early brain development, have been increasingly discussed, emphasised and included in early years' education policy (UNICEF, 2018). However, it has rarely been taken seriously as an inclusive solution to the development of children's knowledge and holistic skills. More often, play is seen as something separate from the seriousness of school and work. Recent work on parenting styles, preferences and economic inequality shows that when "stakes are high" for a child's success in life and school, a parent is more likely to prioritise discipline and traditional homework and school work instead of fun and play (Doepke & Zilibotti, 2019; Wolf et al., 2019). This is a critical challenge for the effort to mitigate inequalities in children's outcomes and opportunities, and raises the need to elevate the role of learning through play, and more specifically to review recent impact evidence to understand the presence and role of play in interventions that have worked to benefit learning and close achievement gaps, especially at scale and in low-income contexts.

In recent years, the LEGO Foundation has convened a range of experts to consolidate evidence across the sprawling field of research on play. This has included the identification of five key characteristics of learning through play, as actively engaging, meaningful, iterative, joyful and social (Zosh et al., 2018), and a review of the broad range of holistic skills that play helps to give children, and that are important for children if they are to grow and thrive in the face of rapid change and global challenges (Zosh et al., 2017). These efforts further identified how adults can support play in a variety of different ways across a spectrum of facilitation approaches: covering free play, guided play, games, and some forms of quality instruction (Jensen et al., 2019). Finally, five different types of play were delineated – physical play, play with objects, symbolic play, games with rules and pretend play (Whitebread et al., 2017) – with evidence that they support the development of a wide array of skills (Liu et al., 2017).

Reviews hail play as a "singular opportunity" to promote "social-emotional, cognitive, language, and self-regulation skills that build executive function and a prosocial brain" by optimally engaging children's intrinsic motivation to drive learning (Yogman et al., 2018). The vast majority of the evidence used in these pieces come from high-income, developed contexts, most often the United States. Further, most are correlational studies conducted with small samples and often under laboratory conditions. This review aims to expand both the geographic breadth and the scale of this evidence and explore the use of play in educational interventions that have demonstrated causal impact on learning across a variety of high- and low-income country settings.

Play is absent, however, in the education quality statements of a number of prominent international education organisations. The World Bank (2018), meanwhile, highlights play in its learning-focused World Development Report only in reference to brain development and early childhood. This raises the dual question of whether and how the evidence about play and learning, noted above, relates to tackling the learning crisis around the globe, especially inequality in learning outcomes. Similarly, systematic reviews of the evidence around early childhood programme impact and effectiveness, carried out by economists (Currie, 2001) and developmental psychologists (Rao, et al. 2017), also do not mention play even as they invoke the importance of quality in early childhood programming for children's development, and the potentially harmful effects of low-quality learning provision. And yet, some of the hallmarks of playful pre-schools – child-chosen activities, fewer whole-group activities and plentiful materials – are the common pre-school elements across 10 countries associated with the early education experiences of children who demonstrate greater language and cognitive outcomes in grade three (Montie et al., 2006). This study explores the relationship between quality, play, impact and equity, to inform early childhood investment decisions.

The challenge of measuring quality, and within it play, contributes to and exacerbates the challenge of more specifically linking learning and play; as does the variation in starting points across systems (highly educated workforces and safe infrastructure versus workforces with little education and temporary infrastructure). Items assessing opportunities for play and autonomy in choice of play activity are typically part of the most common early childhood education quality measures used in global contexts (e.g. the ECERS-III-R; the MELE; the forthcoming Teach ECE), though they are typically embedded

within subscales related either to emotional climate or pedagogy, and therefore do not contribute to an evidence base around play per se. A recent exception in Colombia used an observed quality measure that included support of creativity through arts activities in classrooms – and in a national study showed a positive association of exposure to these activities with higher language, motor and executive function skills, improved approaches to learning, and reduced antisocial behaviour (Maldonado-Carreño et al., 2018). Looking more carefully at play and its use and support in pre-schools, kindergartens and homes offers a lens through which programme, policy and research can offer greater nuance for understanding quality in early childhood settings. This study applies a playful lens to revitalise the dialogue around quality measurement and learning in early childhood settings.

1.4.2 Play as a solution to inequality

Academics, practitioners and policymakers in many countries posit quality early childhood programming as a powerful driver for early learning, and research often shows that disadvantaged children within both high- and low-income contexts benefit from it more than their more advantaged peers (Currie, 2001; Engle et al., 2011; Martinez et al., 2014; Sylva et al., 2004; U.S. Department of Health and Human Services, 2010; Vandell, 2002). Caution is advised, however, against seeing play-based early childhood opportunities as a way to "fix young children from minoritized backgrounds" (Souto-Manning, 2017, p. 785); rather, we should focus on play's role as a means to re-envision children's learning. Building from this, there are at least two ways to conceive of play as a solution to inequality: one is at a macro level – across schools and programmes, even at a national level, and relates to distributional mechanisms for addressing inequality – and the other is at a micro level, within the classroom, and relates to relational mechanisms for addressing inequality. While the macro and micro are linked through important priorities for and investments in workforce, curriculum, governance and finance – all of these highlight the importance of better understanding the potential and the nuances of play as a solution to inequality.

At the macro level, in distributional approaches to addressing inequality, we ask what evidence do we have that play can help address existing inequality in learning outcomes among children with different levels of access to learning opportunities, both within and between countries? In this, the power of play to address inequality is in harnessing motivation for learning (UNICEF, 2018; Whitebread et al., 2017) and addressing the toxic stress of living in poverty or emergency contexts (Center on the Developing Child at Harvard University, 2017) to close achievement gaps. Several developed contexts offer examples of 20th century efforts, as well as those in the first decade of this century, to address poverty via playful interventions and targeting, as being effective for low-income children (Biroli et al., 2017; Diamond et al., 2007; Marcon, 2002; Presser et al., 2015; Siegler & Ramani, 2008) – though none of these shows the closing of achievement gaps.

This review aims to build on that evidence by looking globally at the last decade of evidence – both of the impact of playful pre-school practice on learning among disadvantaged populations, and of the role of play in interventions that close achievement gaps.

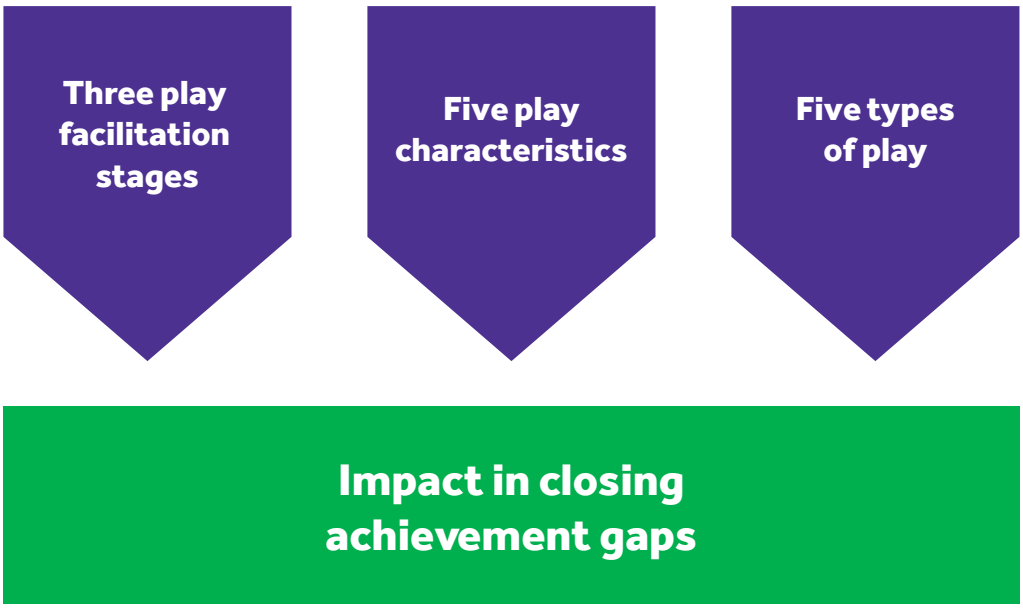


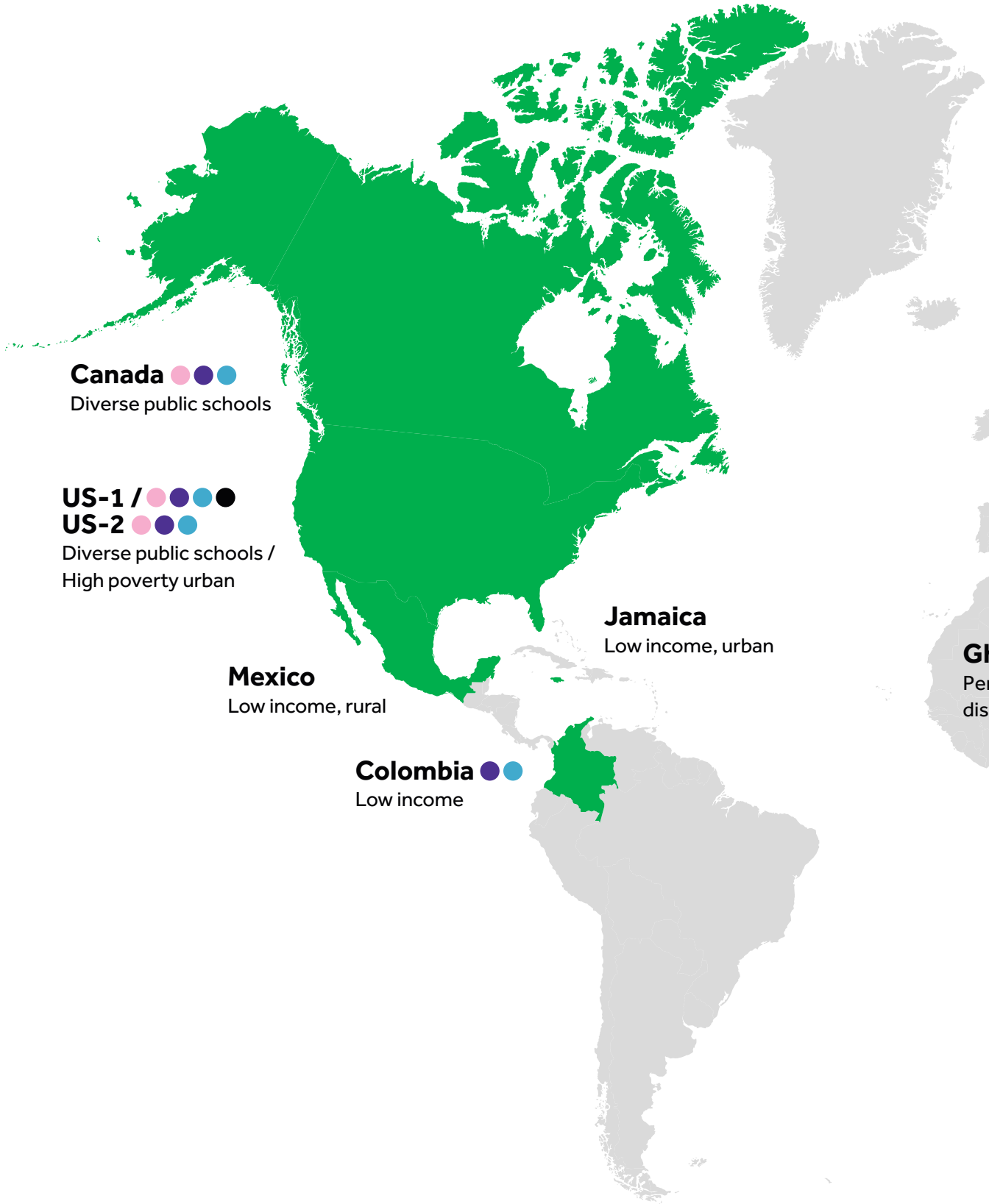
Figure 1. A playful lens to review evidence of the impact of ECD distributive interventions

At the micro level, in relational approaches to addressing inequality, what evidence do we have that play can be a mechanism for valuing child identity, culture and agency in framing a more egalitarian society? Here, the power of play is in enabling children to ask questions, test solutions, develop friendships and group affiliations, and promote change. At both levels, it is important to reflect on the evidence that play helps children "make sense of the world in ways that mirror and reinforce inequities in the societies in which they live," necessitating sensitive and intentional responses to break cycles of injustice and inequality (Nicholson & Wisneski, 2019, p. 4).

While acknowledging the power of play to address distributive and relational inequality at each of these levels, this report focuses primarily on distributive approaches at the macro level, reviewing the evidence around the power of play in interventions that target the disadvantaged, to realise the learning potential of all children and close achievement gaps.

After reviewing the evidence at the macro level, we return to available information on relational inequality, in which play shows potential for tackling bias and realising greater acceptance and inclusion in classrooms, to inform our conclusions and recommendations. This review aims to build upon the prior definition-focused work of the LEGO Foundation noted above, applying the framework in *Figure 1* to recent evidence of early childhood impact.

Using this frame, we aim to better understand the role of play in driving equality in learning outcomes. We also use it to identify strategic gaps for future action and research.



● = *Study found achievement gaps closing for children of low versus higher socio-economic status*
● = *Intervention includes free and guided play*
● = *Author describes intervention classrooms as featuring all five play characteristics*
● = *Study found achievement gap closed for Hispanic children*

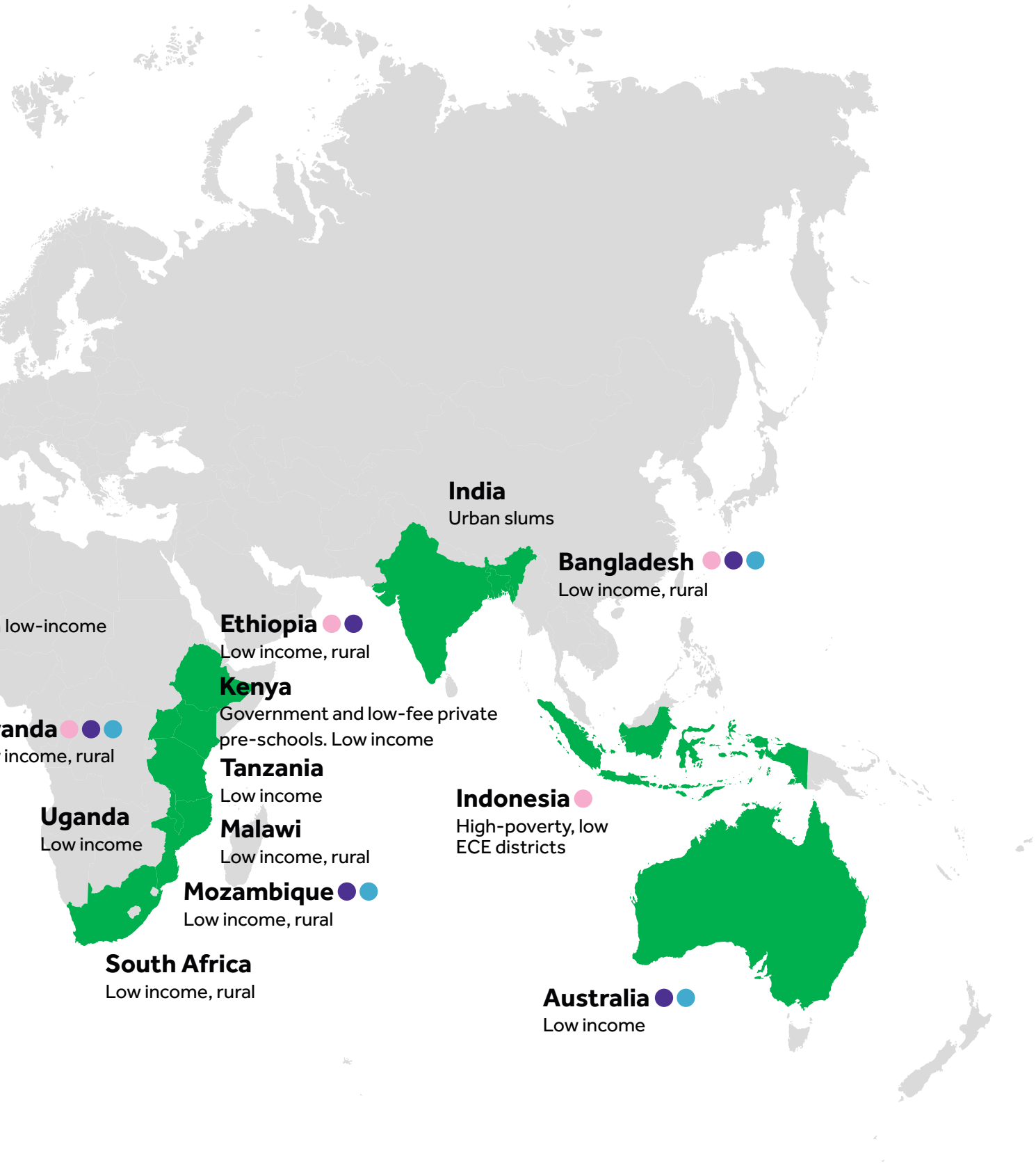


Figure 2. Countries of the study

Map not to scale

1.5 Methodology

This study comprises a literature review of early childhood programme evaluations from the last decade, with learning and equality impact, as well as key informant interviews with authors of identified studies. The literature review included databases (ERIC, PsycINFO, PubMed and the Africa Education research database) as well as institutional websites, including those of the World Bank and its Strategic Impact Evaluation Fund, the British Academy, DFID, the Inter-American Development Bank, the Global Partnership for Education, the African Population and Health Research Council, Innovations for Poverty Action, and the Bernard van Leer Foundation. Search criteria focused on play and its five characteristics using the terms: play, play-based, playful, active engagement/ing, relevant, meaningful, iterative, social, exploration, and curiosity. The studies that were found were then further screened to include those which evaluated interventions promoting the learning and development of children aged three to six. This was done using the terms pre-school, kindergarten, ECD, ECE, pre-primary and pre-K, and then filtering for studies using experimental or quasi-experimental methods to establish impact. Finally, the remaining studies were reviewed for their inclusion of some element of addressing inequality or disadvantage. This process led to a total of 26 peer-reviewed, published experimental and quasi-experimental evaluations, in locations in 18 different countries (*see map in Figure 2*), spanning high- and low-income settings. Several sites had more than one evaluation of the same strand of programming over time, as the efforts went to scale, tested alternative hypotheses about playful learning in early childhood, or followed children longitudinally into formal schooling.

The final 26 studies were then reviewed with an eye to understanding the coverage of play facilitation strategies (Jensen et al., 2019), play characteristics (Zosh et al., 2018) and play types (Whitebread et al., 2017) in each intervention. Given that many of the publications offered just a paragraph or two of detail about the intervention, we sought out more information by contacting each of the authors and requesting a key informant interview with them or a member of their team who was familiar with the work on the ground. In all, 20 key informants were interviewed, enabling a fuller understanding of the extent to which these impactful early childhood interventions were leveraging the potential of play to support learning and address inequality. *Appendix A* has the details of these study designs, intervention arms, and samples.

1.6 Limitations

This study has three main sources of limitation. First, it is limited by the lack of time-specific data with which to describe the play facilitation, play characteristics and types of play in each intervention. The recollection of the authors – months or even years after the research occurred – gives only an initial view of play in these settings upon which additional research can build. Further, several authors spoke of additional analyses of classroom environments and interactions that were either possible or even completed but not published due to time and/ or funding constraints. Thus, the grey literature as well as existing datasets may hold additional insights into play, learning and inequality.

A second limitation arises from the many ways to describe play and playful practice. This study utilises play and its characteristics (Zosh et al., 2018) as keywords, so interventions including playful practice that was described in other terms may not have been located.

Finally, the search focused on studies that assess learning and address achievement gaps at the macro level via programme interventions, offering less insight into effective efforts to address inequality in the classrooms at the micro level than if the literature review had been focused on them. This trade-off belies the need to look more holistically at play environments and dynamics within them, alongside their impact on learning and equality in future studies.

SECTION 2:

Findings

2.1 Findings

In all 18 locations, studies demonstrate the impact of interventions that include learning through play upon one or several domains of child development in disadvantaged populations (*see Appendix B*). Seven of these playful interventions (*marked with pink in Figure 2*) also display the closing of achievement gaps between children from less and more advantaged socio-economic groups, with one also finding this for Hispanic children in the US. Further, among the interventions which authors described as featuring all five of the key characteristics of learning through play (*marked with blue*), the majority also included free and guided play (*marked with purple*). In the sections below, we will explore the overlap of many of these elements – gap-closing, all five play characteristics, and free and guided play.

Twenty of the studies document the impact of interventions focused upon play-based pre-school/ kindergarten teacher training and materials provision – some in comparison to traditional pre-schools and others in comparison to no pre-school – or both. Two studies test the impact of play-based training in playgroups with parents, and three studies test out these delivery options against each other or in combination (*see Appendix A for details*). Four key points arise from analysis of the available information on the intervention content:

1. Teacher training is part of every centre/ school-based approach but varies greatly, from multiple one-day local training workshops to weeks-long residential trainings.

2. Follow-up teacher support is also common, particularly if teacher training has been short and intensive, but it varies from in-classroom coaching and on-site experts to monthly follow-up training and consultations.

3. Most interventions include material provision of manipulatives, books, puzzles, local materials and toys, whether in ECD centres or the home environment, along with singing, reading, playing, storytelling, including opportunities for creative and physical outlets, especially where they are integrated as a natural part of the curriculum.

4. Few of the interventions include parent engagement, either through awareness workshops or deliberate parent trainings; only one mentions follow-up support to parent workshop facilitators.

While using inputs that vary in dosage, intensity and target groups, these interventions are moving early childhood settings towards being more playful. All are having an impact on inequality by ensuring that disadvantaged children are more ready for formal schooling, and seven also address context-specific inequalities within the disadvantaged settings, by supporting sub-groups to make progress on an array of outcomes. Across these studies, the domains investigated differ (*see Figure 3*), as do those on which the intervention had an impact (*see column 3, Appendix B*).

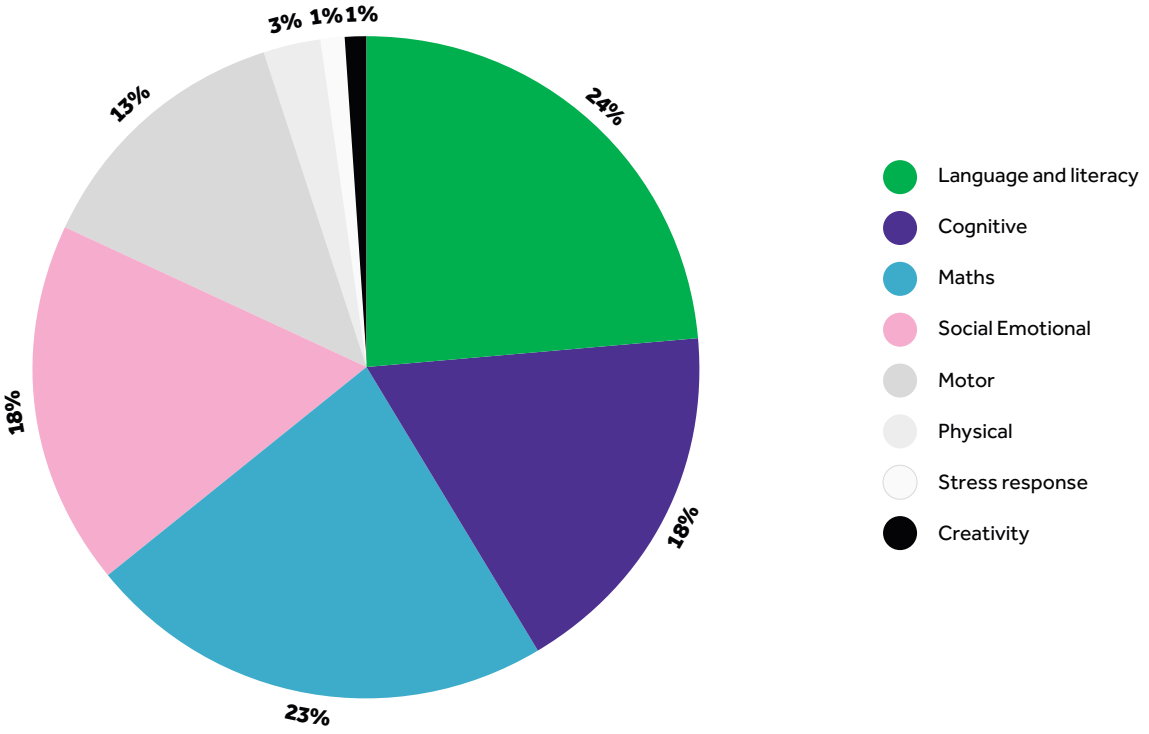


Figure 3. Domains of child development included in intervention studies

While most studies describe benefits across a wide range of skills (*language and literacy, maths, cognitive and social/ emotional skills being most prevalent in Figure 3*), two studies in high-income settings explore impact across a greater breadth of outcomes. One assesses creativity, but does not show any impact on it (Lillard et al., 2017). The second study measures indicators of stress response using neuro-endocrine function indicators of cortisol and alpha amylase, finding impact of a playful kindergarten programme on these in high-poverty schools (Blair & Raver, 2014). These two studies expand beyond the outcomes commonly associated with school-readiness and push the boundaries of our current understanding of how play promotes learning and development.

Thus, there remains a great deal to learn about how play can promote a breadth of skills. Paramount in this understanding is greater detail about the facilitation, character and types of playful practice being used as governments and their partners promote early learning across the globe.

We turn now to a review of the extent to which play facilitation strategies, play characteristics and play types are used or present in the classrooms and playgroups of these studies. This informs a summary of what we know about play, learning and inequality in early childhood programmes across the globe, as well as what evidence gaps might be crucial to address to further our understanding.

2.2 Play facilitation strategies

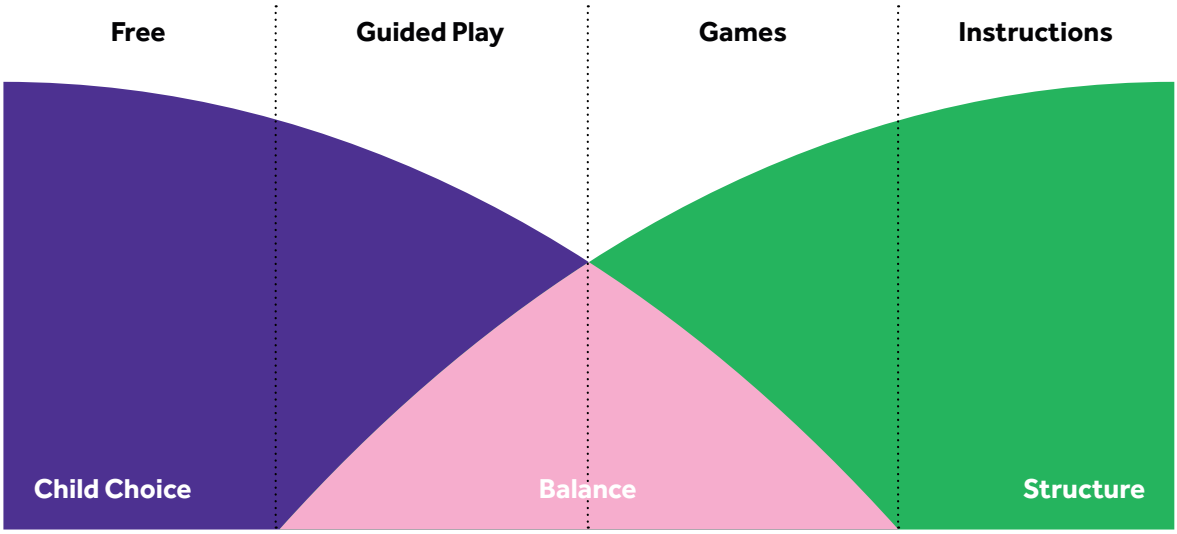


Figure 4. The spectrum of classroom facilitation strategies

Play facilitation strategies in these 18 sites range across the spectrum of practice that has child-chosen free play at one end, teacher-facilitated, guided play and games at the mid-point, and structured, teacher-led instruction at the other end (*see Figure 4, from Jensen et al., 2019*).

While the range in this continuum can be seen in the 18 settings, many of the authors supporting studies in low- and middle-income countries also speak of "teacher-led play," where the "idea for the play that the children will do comes from the teacher," or "the teacher does the play and asks the children to copy it." This suggests an additional aspect of the range – in which playful activities are an improvement upon didactic rote learning, but keep the use of play in the classroom at the structured, teacher-led instructional end of the spectrum.

Games were the most common play facilitation strategy in these interventions (*see Figure 5*), though their use across the interventions differed. Some authors described games as tools to engage the children in topics across the curriculum, while others described games that were designed very specifically as the sole intervention content. One author noted: "the teachers like games – you can play them any time and if you're early for lunch you can fit one in." This echoes prior findings comparing games against a training programme in Switzerland to promote maths learning, in which all but one teacher in the games group reported that they would use them in the next academic year, while only half of the teachers using the educator-led maths training programme reported that they were likely to use it again (Vogt et al., 2018).

The way that game play is used in the classroom matters as well. Teachers can use games to fill time with or without an instructional goal; they can use them to promote the use of specific skills (see Dillion et al., 2017 for an example for India), and they can use them with periodic pauses to reflect on why moves are being made and what hypotheses are being tested (see McCormick et al., 2019 for an example from the Building Blocks curriculum implemented in the Boston Public Schools).

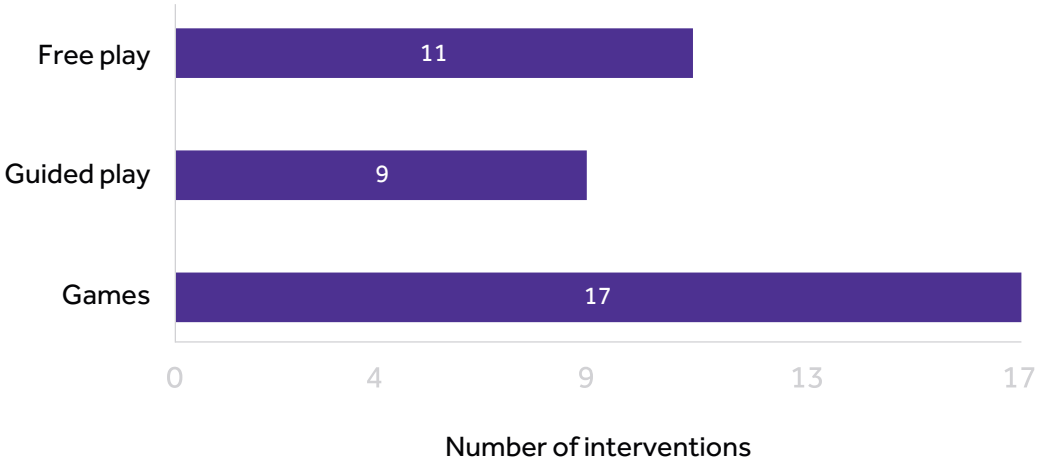


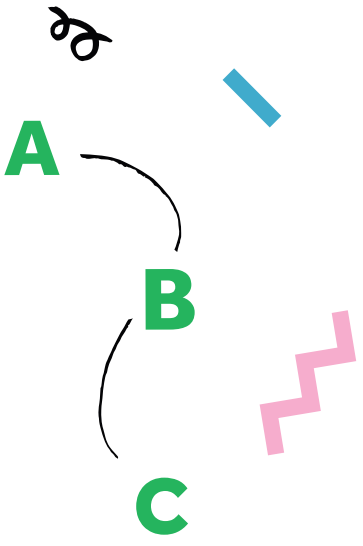
Figure 5. Intervention use of play facilitation strategies

As noted above, many playful activities that the authors observed across these settings remained teacher-directed, but represented an improvement upon rote learning and skill drills. Several interventions that were described as using this teacher-directed play approach promoted greater learning for disadvantaged pre-school children than comparison pre-schools in Kenya (Piper et al., 2018), Ghana (Wolf et al., 2019a), Indonesia (Jung & Hasan, 2016) and in Madrasa Pre-schools across Kenya, Uganda and Tanzania (Malmberg et al., 2011; Mwaura et al., 2008), though evidence of achievement gaps closing comes only from Indonesia. One author explained that this approach to play in pre-schools misses out on the key element of child initiative and choice:

For an activity about water play and measurement, the teacher sets out a bucket, water and small and larger measures, then tells the children what to do rather than let the children have these materials and play with them, then ask questions about the play and probes.

It's a small difference but it gives up the child initiative. The same happens with ABC items – pair up children and give them a task – it is still teacher-directed.

This example illustrates the difference between guided play and direct instruction; making the link to the former's importance for child choice, we explore further.



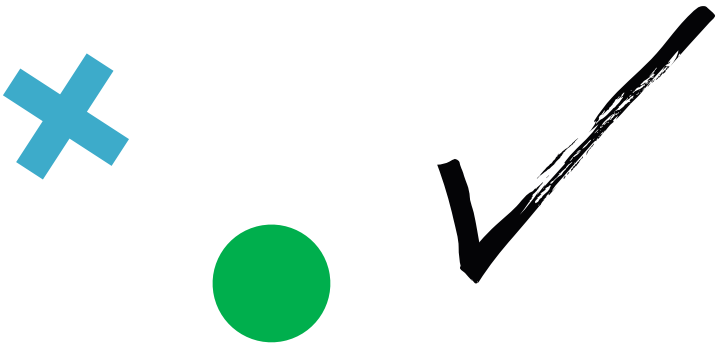
2.2.1 Free and guided play

Interventions that featured child choice via free play and guided play were present in both high- and low-income sites. In nine sites these existed side by side, while in two additional sites children played freely during parts of their daily routine without teacher facilitation or extension of their play. In guided play, an adult extends the free play of children or defines the outcomes and provides guidance and reflection, but the child directs the approach and activities (Hassinger-Das et al., 2002; Toub et al., 2016; Weisberg et al., 2016). This approach is prominent in the Tools of the Mind intervention implemented in both Canada and the US, where teachers set up an iterative dramatisation of The Magic Treehouse books, helping children to plan their play, create their props, and fulfill their roles. Children randomly assigned to this intervention showed greater reading, writing, self-control, attention-regulation and joy in being at school than peers in "business as usual" early childhood settings; they also experienced lower levels of exclusion/ostracisation and their teachers experienced reduced teacher burnout (Diamond et al., 2019). This intervention also closed achievement gaps between poorer and better-off students, replicating a prior trial of the same intervention in the US (Blair & Raver, 2014) that showed effects on executive function, reasoning, attention and stress response physiology, often of larger magnitude in high-poverty schools, as well as sustained academic benefits into grade one.

Two studies conducted in a low socio-economic status setting in Victoria, Australia compare learning via a curriculum highlighting free play and teacher scaffolding for guided play to learning in a traditionally structured classroom, and find that although the children start with equal scores at baseline, those in the play-based school gain significantly more over the course of a year in language, and have significantly lower social disconnection scores than those in the traditional pre-primary setting (Reynolds et al., 2011; Stagnitti et al., 2016). The authors supporting these studies observe that "self-initiated play ticks so many of the boxes in the curriculum all at once, while other [schools] look at the curriculum and insert play into the boxes. "The author notes, however, that the school day is not all free and guided play – there are teacher-led elements that the children must sign up for and attend. In this setting, children opt into teacher-led instruction.

At a larger scale in Bangladesh, Rwanda and Ethiopia, the interventions evaluated promote a mix of instruction as well as free and guided play across dozens if not hundreds of early childhood centres in disadvantaged communities. In Bangladesh, the pre-school routine had at least 40 minutes of free play each day, during which teachers would facilitate and guide the play. They also had dialogic reading and a structured maths programme, offering a mix of facilitation types across the day. In this setting, block and pretend play were dominant, while at the sand and water table, children would often choose to follow pretend recipes. In Rwanda, teachers had specific trainings on how to balance the daily schedule to include free play, and how to create and set up and use corners for guided play. And in Ethiopia, corners for pretend play, block play, reading and outdoor play made up options for free and guided play choices, as did open-ended teacher-led activities like going on a nature walk to find things that are similar/different to sort and describe. The evaluations of these interventions show significantly larger learning gains for children across literacy, numeracy, motor and social-emotional development compared to children in traditional early childhood centres in these contexts, and the closing of achievement gaps within these settings related at baseline to socio-economic status (Aboud & Hossain, 2011; Borisova et al., 2017; Diazgranados et al., 2016; Dowd et al., 2016; Dusabe et al., 2019). Similarly in the Boston Public Schools, where the curriculum is seen as "a directed knowledge project with play as the mechanism for achieving it," these achievement gaps are closing, as are those for Hispanic children (Weiland & Yoshikawa, 2013).

Importantly, Aboud and Hossain (2011) point out that the closing of achievement gaps happened in Bangladesh only after the programme underwent considerable enrichment because at first play was not free, materials were in short supply, non-play time was dominated by whole-group unison response, and teachers rarely interacted with individual children. Once better materials, books, games, a maths programme and training for engaging children in conversations to guide their play were introduced, children experiencing this enhanced quality not only gained significantly over peers in traditional pre-schools in all domains of learning that were measured, but they also closed gaps and sustained benefits into second grade. Thus, enhanced materials, training and guided play boosted learning and equality.



2.2.2 Child choice in play

Child choice in leading, changing and contributing to play is central to playful pre-school learning in these settings. In the Montessori model, for example, teachers offer examples and structure, explain games that peers play together, and facilitate learning that children of different ages choose. In a randomised study in the US, children in these classrooms had better academic and social outcomes and liked school better than children who went to other pre-schools. They also had an orientation towards mastery, and the model equalised the outcomes of children from higher and lower socio-economic groups (Lillard et al., 2017). In a high HIV-prevalence setting in Mozambique, supporting teachers to facilitate play was a lower priority than helping them use playful activities to support literacy and maths skills. Still, as the maths activities supported children's choices in choosing from their bags of local materials to do games and exercises individually and in small groups, teachers found it hard to have children doing different things. At the end, children in these pre-schools were significantly more likely to enrol in primary school, and had significantly higher gains in cognitive abilities and problem-solving, as well as fine motor and socio-emotional skills, compared to similarly disadvantaged children who did not attend pre-school (Martinez et al., 2014). While it is not possible in hindsight to disentangle the main effect of pre-school participation from the presence of guided play and child choice, it raises the question of the importance of the presence of these elements in the intervention for future investments and innovations.

The importance of child choice has been documented previously in developed settings as varying by context (home, school, after-school programmes) and adult presence (King & Howard, 2014), being associated with a range of children's learning and developmental outcomes in primary schooling (Parker & Thomsen, 2019) as well as being associated with both learning and closing achievement gaps related to socio-economic status in secondary education (Mannion & Mercer, 2016). Its emergence here in early childhood, and across such a wide array of geographies, warrants further investigation.

2.2.3 Teacher support for free and guided play

Almost every author commenting on interventions promoting guided play noted how difficult it can be for teachers to make this shift from directing classroom activities to facilitating play. The author describing the two versions of water play above called for qualitative investigations of teacher practice scaffolding play: especially the way that teachers have been able to transfer from prior practice more dominated by teacher-direction to being able to facilitate play. This transformation was noted as a challenge whether in a high- or low-income context; whether teachers began with high or low capacity. One author estimated that "it takes 12 months for a school to get their minds around what is play" and another clarified:

Play time management is tricky because teachers often want to direct the play... They don't interpret play as teaching. Using a game to teach is making play a tool to achieving learning, but it doesn't allow the child to lead the play or change when they want to contribute. It limits them to just responding to the teacher direction.

In Colombia, children randomised into a playful pre-school, in which a third of the day was spent with teachers guiding and extending children's play, showed significant gains in language and cognitive development in just eight months compared to those in traditional care (Nores et al., 2019). Although it required intensive teacher training and support to move to scaffolding play, the teachers now do not

want to use a more structured approach (Nores et al., 2018). However, in other settings the authors argued that scaffolding play was "too much pressure" for the teachers to make this leap, or was not realistic due to class size, space and/ or capacity constraints. In both Ghana (Wolf et al., 2019a) and Malawi (Ozler et al., 2018), where interventions aimed to shift early childhood classrooms away from didactic rote learning towards more teacher-led playful interactions or even child-led activities, authors report that the shift was apparent at the end of each intervention. However, further study in Ghana showed that the use of the target strategies weakened among new teachers over time (Wolf, 2018). This raises the question of how a return to didactic teaching might influence child outcomes over time, as well as how much training and support is need to both make and sustain a shift from directing to facilitating play.

Several authors point out that the teacher support in the interventions that they evaluated was "light touch" and "not ideal, but could be done by government" or "not enough to rapidly flip a classroom to a fully play-based approach." For example, the intervention in Ghana involved five days of training with three days of refreshers and six coaching visits in a year; in Kenya the intervention included two days of training a term and (optimally) monthly coaching visits; while in contrast the intervention in Colombia featured 120 hours of pre-service and over 130 hours of in-service training, on-site pedagogues and artists, and continuous improvement processes. Each intervention had an impact on child development outcomes over its eight months (Colombia), year (Ghana) or two years (Kenya), but longitudinal child outcome data from both Ghana and Kenya show that benefits in terms of academic skills faded once the children were in primary school. While no longitudinal data exists from Colombia with which to compare these investments, the differences in inputs speak to the variation in intensity with which government systems take up quality ECD investment. Additional longitudinal and implementation details in future studies would enable a more thorough understanding of impacts and their sustainability to improve investments and drive new innovation.

One author explained that since "one cannot just waltz in and scaffold" play, because "it takes careful observation and training to tune in to what the child is thinking," scaffolding "isn't in the curriculum" for teacher training. Indeed, even in a low-income site with free play each day in the morning routine if not twice

a day, "the teacher role grew more sophisticated over time. At first it was facilitating a positive environment and it grew towards facilitating play." This notion of incremental change is echoed in Kenya where the intervention aimed "for meaningful change but not so different that it will make the teachers quit." Finally, Rwanda may offer a cautionary tale in which the learning impact of free and guided play is seen in a pilot phase but not at scale via government systems (Dusabe et al., 2019), highlighting the importance of implementation research noted in prior studies of play in classrooms (Jensen et al., 2019; Lillard, 2019).

Improving industry-wide understanding of these types of play facilitation can enable their design into new interventions, their observation and support via monitoring systems, and their measurement in future research and evaluation studies. This would fuel implementation research more specific to the role of play in early childhood learning, and further our understanding of how adult facilitation of play supports learning. Thus, while free and guided play may present unique benefits to children's learning and address inequality, it takes time and training to effectively shift teacher behaviour towards this type of play facilitation. What is unclear is the level and length of support that teachers need, and whether the optimal approach to including more play in classrooms is incremental or disruptive.

2.2.4 Perceptions of play as separate from learning

Apart from these examples, the remainder of the interventions reviewed either did not include guided play, included free play as a break from learning sessions, or used children playing in corners as something to fill time while teachers took a break, waited for parents to collect children, or worked with one or two children on a task. Two different authors noted that free play was in the teacher guide or that there were corners where it could be possible, but during their studies it was witnessed "once in 400 observations" or not at all. While it is possible that observing free play was limited by teachers wanting to "show the researchers their teaching," so that they chose to read a book or lead a whole-group vocabulary or maths lesson, this further underscores the challenge of teachers not thinking of facilitating play as part of teaching young children.

One author described interventions that "just didn't get there" because the starting point of expanding access to early childhood learning through play was beginning from a much more basic point of helping teachers and parents see the value of play in classrooms and at home, and its role in learning. Many authors spoke of systemic push-back against play – because it wasn't "serious enough" for learning – and many noted that the proximity of pre-schools to primary schools – sometimes even co-located with them – had the tendency to intensify the lack of support for play-based learning. Another author noted that free play was something to balance – that the teachers and parents wouldn't stand for a day with one 20-minute circle time and the rest free play: "we ask that the teachers have free play every day and are OK with it happening three times a week." Thus, while the promotion of free and/ or guided play may be present in teacher guidelines and curricular ideals, its lack of support among teachers, parents and systems may de-prioritise it in daily practice. To be effective, future implementation of playful curricula and policies requires consideration of social norms around learning through play, and how efforts can address both the capacity and attitudes of both teachers and parents. In these interventions, free and guided play were less frequently used facilitation strategies than games, perhaps reflecting the notion, presented above, that many settings represented in these studies are beginning from a more basic introduction of play that leads teachers away from instruction-dominated days towards a balance of direct instruction and play-based learning. One author noted: "I have not seen guided play; teachers find it easier to think about integration of songs and games into teaching topics." And while class sizes and resources challenge options for guided and free play in many settings, some of these interventions have made progress worth further exploration. It is clear from the studies in Bangladesh, Ethiopia, Mozambique and Rwanda that even in very resource-limited contexts free and guided play can be promoted. Further, free and guided play feature in all but one of the sites where achievement gaps close between less and more socio-economically advantaged children, suggesting the need for replication as well as investigation of mechanisms at work in the relationship between closing achievement gaps and the facilitation of free and guided play.

SECTION SUMMARY:

Play facilitation

What we know:

- A range of different examples exist to illustrate the ways that play facilitation is implemented in low-income settings, with successful outcomes.
- Play facilitation requires time and support to help teachers implement and sustain it.
- Many interventions that close achievement gaps include free and guided play and child choice in the classroom, but teachers gravitate more towards games.
- Even in resource-constrained settings, free and guided play are possible.

What we need to know next:

- How to document the spectrum of play facilitation practice, especially in low- and middle-income contexts.
- How to innovate in each context, to move towards an optimal balance between free play, guided play, games and playful direct instruction for learning and equality impact.
- How to support teachers and systems in implementing free and guided play.
- What are the best free and guided play strategies for classes of 30+ children, and their impact on learning and equity.
- Whether there is a causal link between the use of free and/ or guided play and the closing of achievement gaps.

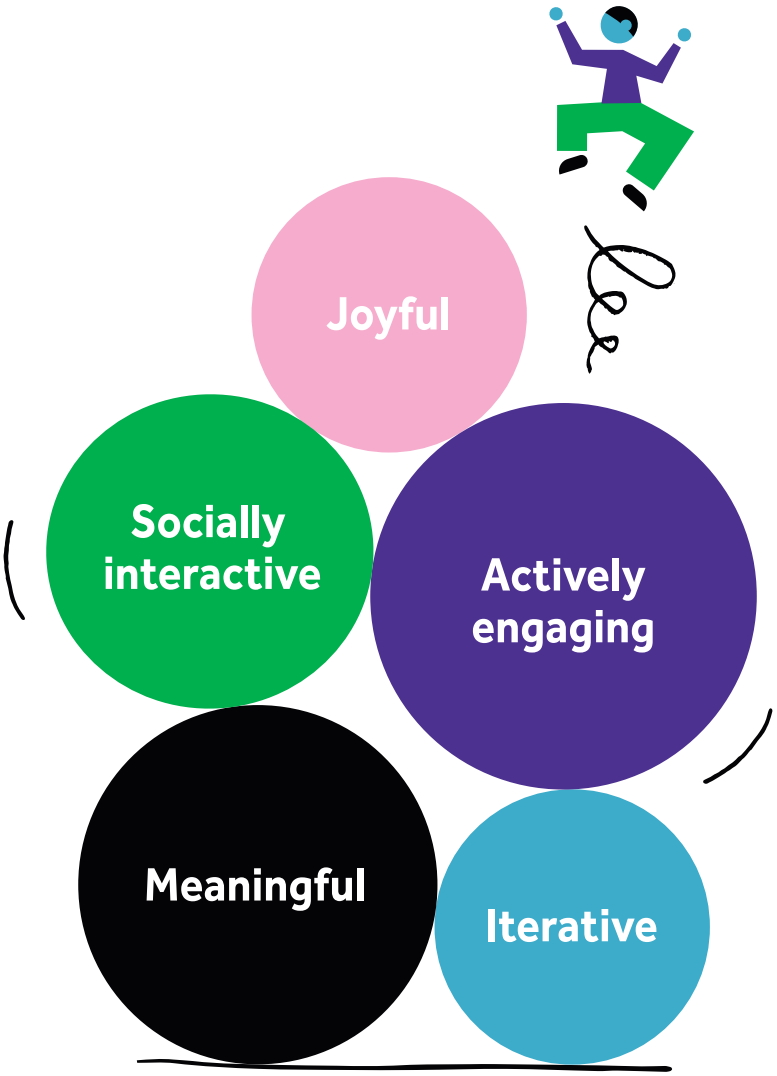


Figure 6. The five characteristics of play

2.3 Play characteristics

Reflecting on the five characteristics of play (*Zosh et al., 2018 and Figure 6*), the interviewed authors most readily described the play that they observed happening in the intervention settings as social, meaningful, and actively engaging (*see Figure 7*). One author offered: "every lesson every day has an activity in a group, so it is definitely social and engaging." Across these contexts, authors' examples of how play is made meaningful (by building deliberately on the children's experience and local context) varied from a field trip to the market in the US to interview the produce man, to using familiar games and found materials in Ghana, Kenya, Uganda and Tanzania, to children in Ethiopia reading books created by their parents telling stories. Play was also social in different ways across the settings: children in Bangladesh playing board games in groups of three or four, children in India choosing to play maths games with or against each other, children in Australia deciding to govern their classroom village as a democracy. Finally, active engagement comes through in the social examples above, as well as in the US and Kenya where children clap and hop while counting. These characteristics differentiate the learning that is happening in playful pre-school settings from rote memorisation and teacher-led drills of alphabets and numbers.
Several authors, however, had trouble giving examples of how the play in the intervention that they studied

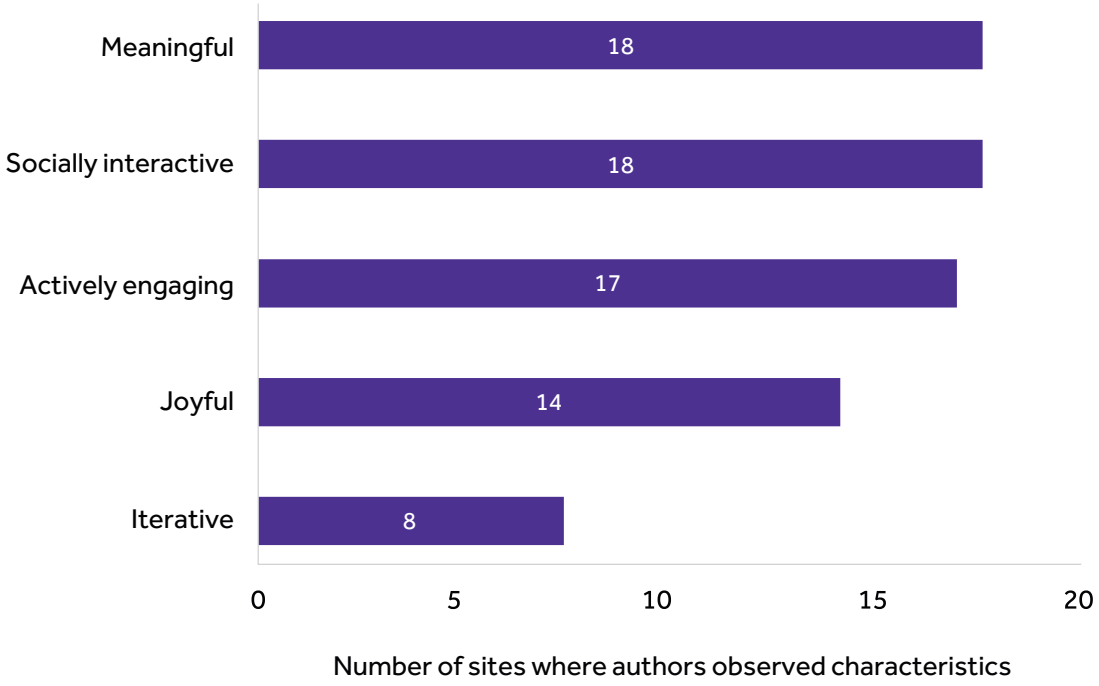


Figure 7. Play characteristics observed in intervention sites

was joyful. One offered: "joyful is tricky because, if you look at the children's faces, you will see concentration and maybe not joy, but the choice is there and choosing to do it makes it enjoyable even if it might in a moment be frustrating; the child is enjoying trying to do it." From across the globe another author echoes this point, observing that if you interrupt children's free play they "may not be the nicest" or may tell you pointedly, "I am having serious fun." Finally, a teacher-led playful intervention author observed that while the teacher-led play was "more fun than maths computations," it might not be joyful. Similarly, for interventions with parenting elements – playgroups or awareness and modelling sessions as in Indonesia, Mexico, Malawi and Ethiopia – some authors pointed out that the notion of parents as first teachers, or helping children play to learn, led to activities "on the adult-directed end of the spectrum" and perhaps were not as joyful even as they showed impact on disadvantaged children's learning and development (Borisova et al., 2017; Jung & Hasan, 2016; Knauer et al., 2016; Ozler et al., 2018).

Iteration was described by many as the most challenging or hardest characteristic of play to describe; this came through in the reflections that authors had of the interventions. The exceptions were the Montessori and aeioTu models about which one author proclaimed "it is the hallmark of the model!" and another insisted that the iteration made for being meaningful and social. Those describing studies in Australia, Mozambique, and Rwanda all suggested that you would see the five characteristics coming through during free and guided play, one describing them all being present "in spades." Another noted that they could be seen in the free choice corners (where there were blocks, books, games and puzzles) and outdoors – with two teachers rotating between scaffolding and guiding children's play – but even so, identifying iteration was tough. The third noted that iteration clearly came through in the construction area, where children were "trying to make different things, trying to figure out which piece fits where without being shown by the teacher." But this author wondered whether all children have this chance to iterate and persevere at trying something when daily schedules 90 percent full of teacher-directed activity leave little opportunity. Other authors echoed this idea of iteration as being up to the student but not a characteristic of play constantly observable like some of the others. Thus, this set of interventions often demonstrate the play characteristics of being meaningful, social and actively engaging, while joy and iteration are reflected alongside child choice and free play.

In the section on play facilitation above, the interventions including free and guided play were seen to be more common among those that closed achievement gaps. In this section, authors' reflections note the more frequent presence of iteration and joy during free and guided play. As noted in *Appendix B*, the same sites that have free and guided play more often feature all of the five play characteristics.

That these interventions also show results that close achievement gaps raises the possibility of a causal link between the presence of play showing all five characteristics and reducing disparities. Linkages between child choice, enjoyment, exploration, perseverance and learning are worth further attention and support in interventions as well as investigation.

SECTION SUMMARY:

Play characteristics

What we know:

- Learning through play in pre-school classrooms is readily described as social, meaningful, and actively engaging.
- Joy could be unobservable at some points in play.
- In contexts moving from rote to teacher-led playful classrooms, joy seems further afield.
- Iteration is periodic and child-chosen; most often seen by authors studying interventions that include free and guided play.

What we need to know next:

- Can iteration be supported across the spectrum of play types and facilitation strategies? And can we observe it, as well as joy, if/ when this happens?
- Can child choice, enjoyment, exploration and perseverance spark more and more equal learning?

2.4 Play types

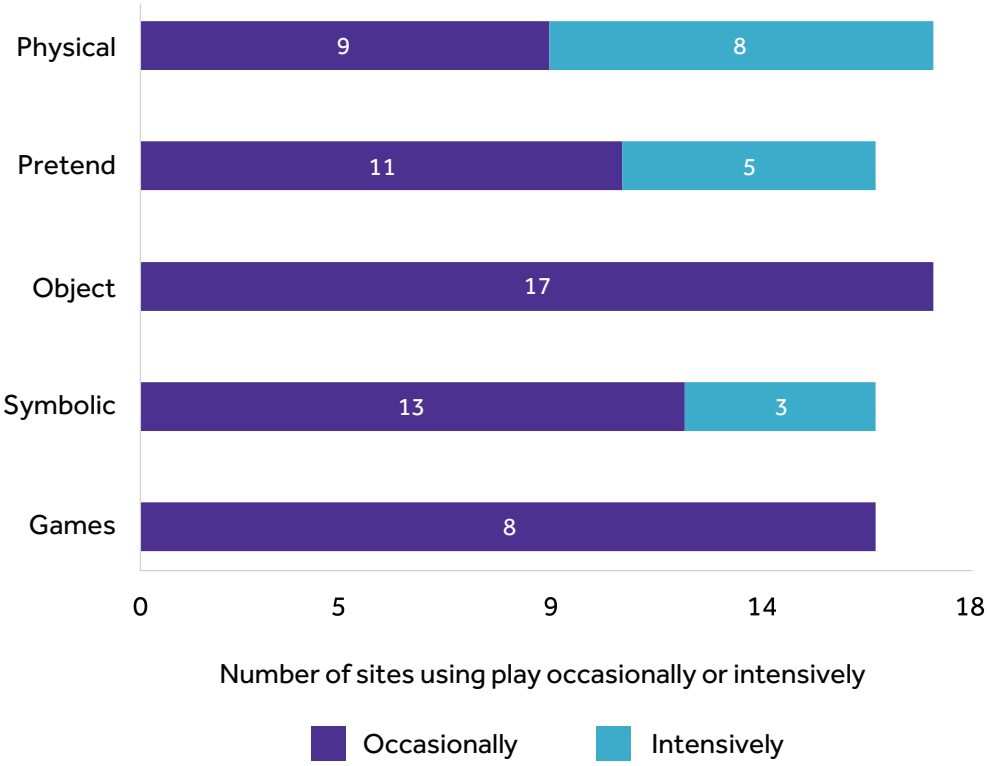


Figure 8. Intervention use of play types

These 18 intervention sites used the five play types – physical play, pretend play, object play with materials, symbolic play and games with rules – with very different frequency and intensity (*see Figure 8*).

Where the type of play is noted as being used occasionally, the author described it as being present periodically or used as a break or a time filler, but not central to the intervention being evaluated. One author noted that the play types "overlap quite a bit – object play with blocks to create a castle or a parking garage becomes pretend play when you begin parking cars in it." Another author pointed out that:

The complexity of play is such that you have pretend play superimposed over the others… when you have play in a park, the main activity is jumping around with a ball, but there are roles and parts in a battle. It isn't just physical play. Good players make pretend play out of the other types… Pretend play is thinking play.

In some interventions, all types of play were introduced over time; in others the intention was there to have all of them but it was not realised; in still others only one type of play was the focus. Games and object play are the most common types of play across these interventions, and both are used intensively as opposed to occasionally when present. This may be because games and object play lend themselves to a span of both child-led and more teacher-directed facilitation, so they fit into more learning scenarios, including those promoting specific academic skills, than other types of play. Several authors also made a direct connection between objects used for learning through play in the classroom and the play being meaningful. For example, the students in Mozambique and Ethiopia had many locally sourced natural objects for maths activities, while students in Kenya made balls and played culturally relevant games during the day's learning.

Since most of these interventions focus on being ready for school, it is not surprising to see a lower amount of intensive emphasis on physical play as it is commonly thought of as being less central to school-readiness than play that promotes academic skills. Further, given the common feeling among parents in many contexts that play is differentiated from learning which is formal and pursued in schools (see for example Avornyo & Baker on Ghana, 2018; Rao et al., 2018 on Hong Kong), it is also not unexpected to see fewer programmes with pretend play and more occasional use of it. However, it is interesting to note that among the interventions that closed achievement gaps between children of higher and lower socio-economic status, the authors reflect that all but one utilise pretend play in the classroom.

Alongside variation in play types was variation in the domains of children's learning that playful interventions aimed to boost. For example, Dillon et al. (2017) tested only games that are used in urban slums in India to foster maths learning, finding that maths game play made for significant and enduring improvement in non-symbolic maths learning compared to maths instruction in traditional pre-schools. Unfortunately, these gains failed to translate into enduring gains in symbolic maths that are meaningful in primary classrooms. This finding led to further iterations on the games, child choice within them, and their testing in more pre-schools as well as primary schools, to ensure that the link is made between non-symbolic and symbolic maths, so that play supports school-readiness. Another intervention used primarily games and object play, especially with blocks, in low-income urban neighbourhoods in Jamaica to address violence and behaviour problems (Baker-Henningham et al., 2009, 2012), finding significant reduction in conduct problems and behavioural difficulties as well as significant increases in observed friendship skills and teacher-reported social skills as compared to pre-schools without these types of play, used for this purpose. Finally, a study of second language learning via play-based versus traditional methods in South African pre-schools found that play-based settings supported basic English language learning while the traditional format better promoted academic language required for school-readiness (Moodley et al., 2014). Thus, games and other types of play can promote specific skills development, but sometimes playful direct instruction benefits skills development.

The evidence thus supports the notion of different play and facilitation types for different purposes or topics, necessitating further study of playful types of learning for holistic, equitable and enduring child development benefits. This is suggested by the variation in longitudinal findings from Bangladesh and India noted above, and the fact that the impact in Kenya did not last into primary school (Piper et al., 2018) nor beyond 36 months in Malawi (Ozler et al., 2018). Further, recent data from Ghana shows that the benefits of the early childhood intervention in in literacy and numeracy fade out while those in non-academic domains – executive function and social and emotional learning – persist into the early grades (Wolf, 2019). Thus, supporting the development of a breadth of skills requires a breadth of playful facilitation.

These findings raise the notion of constrained versus unconstrained skills – those basics of literacy such as knowledge of the alphabet and sounds that are finite, teachable and measurable versus language and knowledge skills such as narration and reading comprehension that are open-ended and require more sophisticated support and measurement (Paris, 2005). Snow and Matthews (2016) note that constrained skills are more easily taught and tested while unconstrained skills are more linked to family socio-economic status and parent education, and

harder to tackle in the classroom. Using US national data, they tell a cautionary tale of years of investment in short-term gains in the basics at the expense of long-term, higher-order outcomes. This brings into question whether early childhood programmes for disadvantaged populations that focus on the constrained basic skills of school-readiness are the best long-term investment for tackling inequality. Indeed, a longitudinal study showing the influence of self-control across three decades of health, wealth and crime (Moffitt et al., 2011) as well as Blair and Raver's (2014) finding of sustained and increasing academic benefits of a kindergarten intervention focused on executive function indicate that this is worth further study. Whether and how variation in play types can help children, regardless of background, develop a breadth of enduring constrained and unconstrained skills across developmental domains requires additional investment, innovation and investigation.

SECTION SUMMARY:

Play types

What we know:

- In these sites, object and game play (when present) are used intensively, pretend and symbolic play less often intensively and physical play often only occasionally.
- Different types of play can promote learning in different domains.
- Enduring gains, though infrequently studied, have been found in non-academic skills.

What we need to know next:

- Can fostering more pretend play close learning gaps? At scale?

2.5 Impact on bias and inclusion within the classroom

While most authors did not have detail about classroom-focused attention to inequalities, a few offered anecdotes from their time in these settings. In Rwanda, the author witnessed a teacher facilitating outdoor play adjusting a ball game for a disabled child who couldn't jump by giving them a role of tossing and giving instructions. They noted that the children were accepting of this modelling of inclusion. In Bangladesh, an author noted addressing inequalities "in an unobtrusive way" by placing figurines in the block corner where the boys would gather as well as blocks in the household corner where the girls headed for their free play. While this could be a step towards helping children play across local norms, MacMevin and Berman (2017) caution against objects alone promoting inclusion in the absence of support for teacher-child interactions and/ or curriculum regarding biases. In the Australian site, the play-based intervention created a community of learners in which difference was accepted if not valued, and play was seen as "providing a level playing field." This was also done in the Canadian site by purposefully rotating play partners across the whole class and changing roles in each iteration of their dramatisations. Finally, while the Jamaican intervention did not have a detectable differential impact on sub-groups, the author felt that it made the classroom a more welcoming environment overall, and especially for boys. In each of these cases, playful environments support diverse learners' needs and promote greater inclusion. While these authors reflected on dynamics that promote inclusion within these classrooms, there remains much to learn about the role of play in promoting equality inside early childhood classrooms.

SECTION 3:

Conclusions and recommendations

3.1 Conclusions

Reviewing these 26 studies of 18 sites with a playful lens suggests that learning through play could be an effective strategy to close achievement gaps for children ages 3 to 6 years. Several examples address a broad range of holistic skills that are not only critical for school-readiness, but for children's general development, learning and well-being. Interventions that included free play and guided play were more likely to display all five play characteristics. These were also more likely to close achievement gaps. Games are most widely used, and many of the interventions mix the facilitation approaches of free play, guided play and games throughout the school day. In this group of studies, the use of play spanned the spectrum of facilitation practices, though many featured teacher-directed play as an incremental improvement upon didactic, rote learning. Often these interventions are implemented in a format that can be followed by the government, although not fully play-based. Teachers from both high- and low-income countries have a variety of experience and training in supporting free and guided play, and some examples even show a reduction in teacher burnout. It is unclear as yet how intensive teacher training and follow-up are required for scaffolding play, as implementation varies greatly.

The interventions reviewed generally demonstrate the characteristics of learning through play that are related to active engagement, social and meaningful experiences, with some opportunities for joy and iteration. This included social experience with peers or in groups, use of local songs, resources and storytelling, as well as active and physically engaging experiences. Joy is often difficult to identify, and iteration most frequently appears when it is directly associated with free and object play. The different types of play are used in very different frequencies and intensities, and can overlap in one activity. Object play and games are the most common among the 18 intervention sites which might be due to their ease of application across different facilitation approaches. Most promisingly some of the interventions do indicate long-term benefits into primary school, and offer insight into investment options in learning through play.

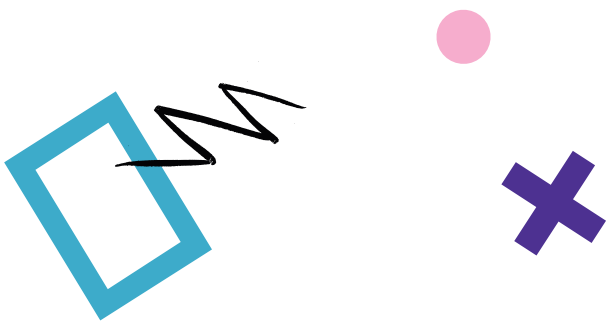
3.2 Recommendations

Using this frame to collect authors' recollections of play facilitation, characteristics and play types in interventions that have been shown to have learning impact, has revealed three big ideas about play, learning and equality.

First, impactful interventions that include the use of free and guided play, as well as pretend play, are more likely to display all five characteristics of play – even iteration – and to address inequality at the macro level by closing achievement gaps between children from less and more socio-economically advantaged groups. This suggests a linkage in more diverse settings than previously known, between child choice, enjoyment, iteration, adult facilitation and learning. A more nuanced understanding of the differences between free play, guided play and games, and strategies to build the competencies of teachers in facilitating them, would move this topic forward.

Second, while play scaffolding and child choice may present unique benefits for children's learning and addressing inequality, they take time and training of teachers: in several of the interventions, this was not sufficiently provided. Examples from Bangladesh, Ethiopia, Mozambique and Rwanda show some success in supporting and scaffolding children's choices and the use of free and guided play in very resource-constrained environments: this provides a counterpoint to claims that it is not possible. They also set the stage for additional documentation to inform further testing of playful interventions. Where it is contextually feasible, these could begin from a more "disruptive" place than current incremental shifts from didactic pre-school teaching. Key to such efforts are implementation research and documentation of the enabling factors in shifting teacher practice.

Finally evidence, from a wide variety of contexts, of impact on a breadth of skills supports the notion of different play and facilitation types being suitable for different purposes or topics. Some skills are better taught while others have more staying power when learned – or earned – through exploration, so we need a breadth of playful facilitation and opportunities to play in these settings. Many early childhood programmes target disadvantaged populations and focus on teaching the constrained basic skills of school-readiness. This review questions whether that is the best long-term investment for tackling inequality, and offers alternatives for advocacy and programme innovation. Play may have long-term value in helping children (regardless of background) develop a breadth of skills – constrained and unconstrained, academic and non-academic – across developmental domains: skills that do not fade out. What is not known from this evidence is how to find the optimal balance between free play, guided play, games and playful direct instruction in each context, for learning and equality impact. We also do not yet have data on the importance of play for either creativity or stress reduction in low-income, conflict and crisis settings.



3.3 Four areas for future investment, innovation and investigation

Building from these conclusions and recommendations are four areas for further investment, innovation and investigation:

1. We need to document the range of playful facilitation that is used in settings with guided and free play in resource-constrained contexts (including exploration of these characteristics, types and facilitation strategies in unanalysed data and unpublished papers), to inform: a) hypotheses about mechanisms through which play and child choice benefit learning and close achievement gaps, b) enabling environments that support the testing/replicating of play-promoting strategies for learning, c) reliable and realistic measurement of free and guided play and their impact, and d) whether such facilitation does or can support relational strategies for addressing inequality.

2. We need to test both "disruptive" and "incremental" approaches to the inclusion of more play in pre-school classrooms – where disruptive interventions promote child choice, free and guided play, pretend play and iteration – while incremental interventions test the addition of some of these elements to teacher-directed play schemes. Across settings, teacher guidelines and curricular ideals that promote play offer fertile ground for creating collaborations, but attention to parent, teacher and system acceptance is also warranted. We should aim to learn within and across settings about variation in teacher support systems for facilitating play (e.g., dosages of training, materials and follow-up support), parenting components (e.g., frequency, intensity, messaging, materials and follow-up), impact at scale and replicability of gap-closing.

3. We need to launch longitudinal studies of children's holistic development (both academic and non-academic outcomes, especially in relation to creativity) to develop a greater understanding of play's use in promoting learning impact and equality, and whether and how play might constrain fade-out. Such studies could usefully take up a range of the questions in this report's "need to know next" sections, such as: can child choice, enjoyment, exploration and perseverance spark more, and more equal, learning? Can more free, guided, and pretend play close learning gaps? At scale? Can more variety in types of play, or in specific types of play, sustain non-academic outcomes?

4. We need to apply a playful lens to the next level of schooling, to understand the importance of free play, guided play, games and playful direct instruction in primary schools. Exploring play and its impact on learning and equality in primary education settings will extend our understanding of how these elements interact to achieve SDG4. This is especially important in contexts where didactic teaching dominates and children's curiosity and play have little traction, but are no less important for learning and equity. Such exploration can inform strategies to address the abruptness of transitions into formal schooling, and the benefits of using a breath of playful facilitation to enliven national curricula.

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Appendix A. Evaluation sites, designs, interventions and samples

SITE	DESIGN	INTERVENTION GROUPS	SAMPLES
Australia	Quasi-experimental	Play-based vs traditional pre-school	31 children in 2 schools 54 children in 2 schools
Bangladesh	Quasi-experimental	Play-based pre-school vs none Play-based vs traditional pre-school vs none	437 children in 30 pre-schools 709 children in 40 villages
Canada/US	RCT	Tools of the Mind versus business as usual	315 children in 18 kindergartens 759 children in 79 kindergartens in 29 schools
Colombia	RCT	Play-based vs traditional childcare	819 children in 2 communities
Ethiopia	RCT	Play-based vs traditional pre-school vs none; play-based pre-school versus parenting	408 children in 36 centres, sample not in centres; 276 children in 18 villages
Ghana	RCT	Play-based vs traditional pre-school vs play-based + parenting	3,600 children in 240 schools 3,435 children in 240 schools
India	RCT	Game-based maths vs traditional pre-school maths	1,540 children in 214 schools
Indonesia	Quasi-experimental	Playgroup versus no ECD	2,124 children in 303 villages
Jamaica	Cluster RCT	Play-based vs traditional pre-school	618 children in 17 classrooms 225 children in 24 pre-schools
Kenya	RCT	Play-based teacher training and support vs play-based teacher training and support plus instructional materials vs play-based teacher training and support plus health interventions vs traditional pre-school	9,600 children in 600 centres
Kenya, Tanzania, Uganda	Quasi-experimental	Play-based vs traditional pre-school vs none	906 children in 47 pre-schools 321 children in 46 pre-schools
Malawi	Cluster RCT	Pre-school materials versus materials plus play-based teacher training vs materials plus play-based teacher training plus stipend vs materials plus play.based teacher training plus parenting	2,120 children in 150 centres
Mexico	RCT	Cash transfers versus cash transfers + parenting	1,362 children
Mozambique	RCT	Play-based vs no pre-school	1,839 children in 76 communities
Rwanda	Quasi-experimental	Play-based vs traditional pre-school vs parenting vs none; Play-based vs traditional pre-school	833 children 595 children in 10 pre-schools
South africa	Quasi-experimental	Play-based vs traditional pre-school	175 students in 10 classrooms
US-1	Quasi-experimental	Regression discontinuity - based on enrolment date cut off	2,018 children in 238 classrooms
US-2	RCT	Montessori pre-school vs other	Lottery placed 70 in two Montessori schools, 71 others tracked

Appendix B: Site, context, and domains of learning impact of each intervention reviewed

SITE	CONTEXT	DOMAINS OF LEARNING IMPACT
Australia	Low income	Oral language, receptive vocabulary, social competence in peer play, abstract reasoning and non-verbal cognition
Bangladesh	Low income, rural	Phase 1: speaking, writing, reading, oral and written maths. Phase 2: language and literacy, numeracy and problem-solving, social-emotional development, knowledge of health, hygiene, nutrition, safety
Canada/US	Diverse public schools	Site 1: reading, writing, self-control, attention-regulation, social inclusion and pro-social behaviour, joy experienced in school. Site 2: reading, vocabulary, maths, executive function, reasoning, attention, stress response physiology
Colombia	Low income	Receptive and expressive vocabulary, cognitive, gross and fine motor development
Ethiopia	Low income, rural	Emergent language and literacy, emergent numeracy and problem-solving, social-emotional development
Ghana	Peri-urban low-income districts	Language and literacy, numeracy and problem-solving, social-emotional development, motor development, executive function, behavioural regulation
Indla	Urban slums	Symbolic and non-symbolic maths
Indonesia	High-poverty, low ECE districts	ECED enrolment, social competence, language and cognitive development, communication and general knowledge, and pro-social behaviour
Jamaica	Low income, urban	Child attendance, behaviour, conduct problems, friendship and social skills
Kenya	Government and low-fee private pre-schools	Numeracy tasks: number identification, shape-naming, and producing a set
Kenya, Tanzania, Uganda	Low income	Block-building, verbal comprehension, early number concepts, picture similarities, verbal meaning, exclusion and closure
Malawi	Low income, rural	Language skills and pro-social behaviours
Mexico	Low income, rural	Verbal, quantitative, perceptual, memory and cognitive skills
Mozambique	Low income, rural	Primary school enrollment (and at appropriate age), cognitive and problem-solving abilities, fine-motor skills, socio-emotional and behavioral outcomes
Rwanda	Low income, rural	Phase 1: language and literacy, numeracy and problem solving; Phase 2: no impact
South africa	Low income, rural	Second language speaking and listening
US-1	Diverse public schools	Receptive vocabulary, early reading, numeracy, geometry executive function and emotional development
US-2	High poverty urban	Reading, vocabulary, numerical understanding, social cognition, mastery orientation, relative enjoyment of school

= Study found achievement gaps closing for children of low versus higher socio-economic status

= Intervention includes free and guided play

= Author describes intervention classrooms as featuring all five play characteristics

= Study found achievement gap closed for Hispanic children

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